The effects of policies changes on return and volatility in Vietnamese stock market

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Abstract

Using the stock index data of financial sector spanned from January 2, 2009 to December 31, 2014, this study examines the effects of some policies on stock returns and volatility in Vietnamese stock market. The empirical results of EGARCH model reveal that two policies, namely, M&A and VAMC have an significantly positive impact on stock returns but they do not represent any effects on stock volatility. The third policy, regulatory reform, does not show any affection on stock return but it has an impact on the stock volatility. It implies that investors should adjust and alter their portfolio accordingly when changing policies. Besides, policymaker needs to know when they should prioritize which policy to be issued because some policies sometimes can hurt the stock market if the stock market is efficient.

Key Words: Effects of Policies; M&A; VAMC; Regulatory Reform; EGARCH

JEL classification: G21; G28; G35

Introduction

It is generally believed that financial system plays a vital role in the development and the economic growth of a nation. As De Gregorio and Guidotti (1995) stated, financial development leads to improved growth performance. When the financial system has some risk signals, policymakers need to react through launching new policies. The big influence of the global financial crisis in 2008 has required restructuring the financial systems in impacted countries. In the case of Vietnam, under the financial crisis, the financial and banking system has suffered from stress, and exposed a lot of weaknesses, as well as significantly affected the whole economy. Many Vietnamese commercial banks seem to be less competitive while the wave of financial liberalization increases. Many banks have suffered from large non-performing loans (NPLs). The data for Vietnam from World Bank shows that the highest NPLs ratio reached at 3.4% in 2012 and it has been considered as an alarm for the banking sector. In addition, GDP growth rate of Vietnam felt down in the period 2008 – 2009 and it still kept low rate (about 5.5%) in following years. Thus, the issue of intervention policies for the financial system, especially, for the banking system is urgent and expect to be helpful.
In fact, Vietnamese government had launched several policies to support the banking system and encourage the development after the financial crisis. The first policy concerning with the regulatory reform was promulgated at the end of 2010 and validated from 2011. Another policy which encourages the trend of merger and acquisition (M&A) was released several months later and validated from 2012. The third policy, namely, Vietnam Asset Management Company (VAMC) with much power which was issued in 2013 and aimed to mitigate the burden of bad debts of financial institutions. In the real world, these policies directly have a certain impact on financial institutions as well as the financial system. However, this study does not examine the direct effects of these policies on financial institution performance, the main purpose is to consider whether these policies have an impact on the stock return and volatility in stock market.

It is thought that the economic condition of a country can be known through its stock market performance. According to Olweny and Kimani (2011), the macroeconomic condition of a country is reflected in the movement of stock prices and can, therefore, be used to predict the future path of economic growth. Likewise, the stock performance of a sector may also reflect the operational performance of this industry. Moreover, policy changes can affect stock returns, Pastor and Veronesi (2012) found that policy change makes stock returns more volatile.

The investors interested in the stock of financial sector may expect that these policies will have positive effects on stock return but negative affect on stock volatility. Based on the objective of this study, it is hopeful to provide usefully referenced information for investors in making decision and policymakers in effect evaluation of policies. This work differs from previous literature by two-way. First, unlike major recent studies, which often apply to the data of a stock exchange, this work makes a concentration to a small scope, particularly, uses the sectional index and related events. Second, unlike traditional approaches, using EGARCH model can capture stylized facts in financial time series, like volatility clustering as well as does not require any restriction on the parameters.

This paper is organized as follow. The next section discusses related literature; Section 3 then demonstrates EGARCH models of stock returns; The preliminary analysis and empirical evidence are represented in section 4. Finally, section 5 illustrates discussion and conclusions.

**Literature Review**

In financial research, the relationship between macroeconomic factors and stock returns have received great attention for many years. Whether the purpose is testing causality or forecast, given conclusions of significant relationship also seem to be mentioned. According to Fama (1970), the efficient market hypothesis (EMH), which stated that stock prices must contain all relevant information including publicly available information. The theory has still been developed over time by many researchers.

**Macroeconomic Variables**

Arbitrage pricing theory (APT) of Ross (1976) has represented a way of linking macroeconomic variables and stock market where multiple risk factors can explain asset returns. Sieng and Leng (2005) performed a simple theoretical model formulated based on the monetary approach. It is found that stock prices, economic activities, real interest rates and real money balances are linked together in the long run. Ibrahim and Musah (2014) investigated the effects of macroeconomic variables on stock market return and exposed the findings that some variables could explain the variance error of stock returns.

By considering the effect of macroeconomic news on stock returns, Birz and Lott (2011) found that news about GDP and unemployment does affect stock returns while news about durable goods and retail sales are statistically insignificant. Hayo and Neuenkirch (2012) also considered the impact of central bank communication and macroeconomic news on the stock, bond and foreign exchange market. The results demonstrated that there is an existence of the impact on the financial market from those variables.

Studies consider the effects of macroeconomic indicators on stock return in emerging markets. Abugri (2008) found that key macroeconomic variables in four Latin American countries impact the stock return at varying significance and magnitudes. Likewise, Kuwornu and Victor (2011) used monthly data over the period January 1992 to December, and full information maximum likelihood estimation procedure to
investigate the relationship between macroeconomic variables and stock market returns in Ghana. It is found that consumer price index represents a positive significant effect while exchange rate and treasury bill rate has negative significant impacts on stock market returns. Unlike, the crude oil prices do not exhibit any significant effect on stock returns.

Tangjitprom (2012) reviewed studies of macroeconomic factors and stock returns. It is found that there are four groups of the macroeconomic variables related to general economic conditions, variables concern interest rate and monetary policy, variables reflect price level, international activities. In addition, various methodologies were applied for studies on macroeconomics factors and stock returns to capture their purposes and the results are mixed. However, most of all studies conclude that there are significant relationships between macroeconomic variables and stock returns.

Focusing on banking stock, Elyasiani and Mansur (1998) examined the effect of interest rate and its volatility on the stock return of bank by using GARCH in mean methodology. It is found that the long-term interest rate has a negative and significant impact on the bank stock return and interest rate volatility is an important determinant of the bank stock return volatility and bank stock risk premium. Kasman, Vardar, and Tunç (2011) had a similar conclusion when investigating the impact of interest rate and exchange rate volatility on banks’ stock returns in Turkey.

**Political Events**

The degree of stability of politics has a certain impact on the economy of each country and the stock market also responds quickly to the change in politics as a response to the economy. Because of the strong attraction, many studies were born in order to examine the relationship between political change and the stock market.

Kim and Mei (2001) utilized the daily returns of Hang Seng index to investigate the possible market impact of political risk. It is found that the political developments have a significant affection on its market return and volatility.

Concerning to the impact on stock return, Chuang and Wang (2009) investigated the effects of political changes in the developed stock markets such as United States, Japan, United Kingdom and France by using the panel data of political changes of these countries during the period November 9, 1979 to January 19, 2001. The finding implies that the relationship between political changes and American, Japanese, British, and French stock return is negative at 5% level of significance. In addition, the effect of political change on stock returns after the 1987 crash is significantly exceeding those prior to this crash.

Pástor and Veronesi (2013) indicated that day after day, asset prices seem to react to news from the government. Therefore, the authors developed a general equilibrium model of government policy choice to observe stock prices respond to the political news. The result implies that political uncertainty generates a larger magnitude for a risk premium in the case of weaker economic conditions. Additionally, stocks also become more volatile and more correlated, under political uncertainty, especially in the circumstance of weak economy.

In general, most of all studies which investigate the interaction between political events and stock market have the similar conclusion. The political development may lead to a positive impact on stock return while the political uncertainty can make stocks more volatile.

**Merger and Acquisition**

In recent years, M&A became a trend for firm to restructure and grow rapidly in its sector or enter a new field, without creating a subsidiary, establishing child entity or performing a joint venture. Because of its important role, M&A activity may affect stock returns as well as market volatility. For both individual firms and the stock market, the positive stock returns and reduction in volatility are expected following M&A announcement.

Focusing on a specific industry, Samitas and Kenourgios (2007) used event study and bootstrap methodology to investigate the impact of mergers and acquisitions on tramp firms’ stock returns. The data
set of member firms of NASDAQ and NYSE was considered and revealed empirical results in consistency with previous studies. The mergers and acquisitions have a positive impact on stock returns of tramp shipping firms and this impact plays as a key for new challenges and financial value creation of these firms.

In term of banking industry, Cybo-Ottoni and Murgia (2000) also used an event methodology to observe a sample of 54 deals from 13 European banking markets and the Swiss market. The result leads to a conclusion that mergers and acquisitions are mainly driven by significant positive abnormal returns.

The evidence of Parisi and Yáñez (2000) demonstrated that the target company has positive cumulative abnormal returns. With the same conclusions, Havrylchyk (2004) argued that positive abnormal returns were obtained by Polish merged banks and shareholders also increased their profit.

By investigating the intra-industry effects of cross-border acquisition of Australian firms, Otchere and Ip (2006) found that the target firms’ rival obtained significantly positive abnormal returns after finishing both the acquisition proposal and termination announcements. Scholtens and De Wit (2004) tended to have a similar conclusion. The study of bank mergers announcement effects in Europe and US stock market was considered and the results indicate that mergers create small positive abnormal returns and target banks realize significantly higher returns than bidders. In addition, the announcement effects of European and US bank mergers are different.

Kumar, Kumar, and Deisting (2013) employed event study methodology and daily and weekly share price data to examine the impact of merger announcement on bank stock returns and volatility. The findings indicate that the merger announcement had a mixed impact on the returns to the shareholders of the bidder banks. In both cases of daily and weekly returns, some banks showed significantly positive returns, while some banks had significantly negative returns and other banks showed no significant results. In term of volatility, merger announcement had a limited impact on volatility in share prices of the acquiring banks.

Considering the impact of bank merger program on the volatility of the Malaysian bank stock returns, Boon Tan and Wooi Hooy (2004) found that there were a positive risk returns tradeoff and asymmetrical news effects in the bank stocks before the initial consolidation announcement of July 29th, 1999. In addition, the estimation of the conditional variance showed that bank stocks obtained a big reduction in the volatility as well as the asymmetrical news effects after the announcement.

Generally, there are many studies concerned about the impact of the mergers and acquisitions in the banking industry and the results showing in previous studies are mixed. However, many studies exhibit evidences that the mergers and acquisitions have a positive impact on stock returns.

**Asset Management Company**

When a financial crisis happens, the health of banking systems becomes weak. Thus, the policymakers need to generate some solutions in order to help banks survive as well as improve the economy. One of the solutions is establishing of AMCs to remove non-performing loans from banks and strengthen banking system. Therefore, this action may lead to a positive impact on bank stocks.

Considering the role of AMCs, Fung, George, Hohl, and Ma (2004) compared the experiences of some of the public AMCs in East Asia since the late 1990s and found that many East Asian economies have set up government-owned AMCs. In general, the performance of these AMCs varies widely across the East Asian economies, however, almost public AMCs have played an important and positive role to make the banking system return healthy by removing NPLs from banks. Ingves, Seelig, and He (2004) also discussed the role of AMCs in facilitating bank and tends to the similar conclusion. The study exhibits that there is no single optimal solution for AMCs but there is a combination of strategies varied from bank to bank and country to country. J. Wang, Guthrie, and Xiao (2012) examined the effects of state-owned AMCs by observing nearly all (99%) of the publicly-listed companies from 1994 to 2003. The performance is measured in term of net profits, cash operating profits and the operating margins of the firm. The result indicates that net of other effects, firm profitability did not vary significantly with the two types of ownership (state shares and state institutional shares). However, the result of firm operating margins shows that the greater the level of state ownership the worse a firm performs and the greater the level of state institutional ownership the better a
firm does. Inoguchi (2012) investigated whether variables including the characteristics of banks, the purchase of NPLs by asset management companies, and macroeconomic indicators have the impact on the decline of NPLs in Malaysia and Thailand. The results indicate that the public asset management companies help significantly to reduce the number of NPLs in both two countries.

The studies above considered the role of AMCs in removing NPLs that helps banks to improve their performance. However, there is no studies mention directly the impact of AMCs on stock market or bank stocks. The interaction may exist between bank stocks and AMCs through bank performance when nonperforming loans are resold.

In term of performance impact on stock return, Beccalli, Casu, and Girardone (2006) employed parametric and non-parametric methods and found that there is a significant relationship when changes in efficiency are reflected in changes in stock prices. Shamsuddin and Xiang (2012) used the data of publicly listed Australian banks over the period 1985-2008 to investigate the efficiency. The result from a pooled regression of bank stock return on bank efficiency proposes that the shareholder wealth maximization goal is aligned with the goal of maximizing bank efficiency in the Australian context because the market value of a bank can be contributed to an improvement in technical, cost or profit efficiency. Moradi-Motlagh, Saleh, Abdekhoodae, and Ekteصابي (2012) examined the relationship between changes in Australian banks performance and the returns of banks in the stock market over the period 2001-2010 and found that changes in performance are reflected in stock returns. It means that well-performed banks tend to make more return for their stockholders.

Turning to the linkage between stock volatility, operating performance and stock returns, Dutt and Humphery-Jenner (2013) found that low volatility stocks earn higher returns than high volatility stocks and the low volatility stocks also have higher operating returns.

In the both aspects of stock return and volatility, the impact of AMCs seems to be new and less attracting for researchers. Almost all studies focus on the influence of AMCs on bank performance and there is a limitation in considering the impact of bank performance on stock return volatility. However, there is an expectation that through the impact of bank performance on both return and volatility, AMCs may have a positive affection to bank stock returns and a significant reduction in stock return volatility.

Regulatory Reform

Regulation in the economic field is a form that represents for management policy of the government. However, a regulation cannot fit very well with a lot of changes over time. Therefore, at a certain time, a regulatory has to be reformed, and better things would be expected afterward and the changes in regulation may affect the stock market in some aspects.

Stigler (1964) is one of the pioneers who considered the impact of the federal securities regulations on stocks. He found that the mean returns are not statistically significantly different in any year. However, the variances of the price relatives were greater in the prior period than in the post period. The studies in this area are still expanded by many researchers. The methodologies were might not similar, and the studies of Jarrell (1981), Simon (1989), Benston (1973, 1975), Officer (1973) and Bhattacharya, Groznik, and Haslem (2007) lead to two groups of conclusion. The first one says that securities regulations do not have a significant impact on stock return while the variability of stock returns seems to be reduced. The second one tends to an opposite implication because they did not find any substantial evidence to support the above opinion. It means that securities regulations have no effect on both stock return and risk.

In order to investigate the effect of regulation on stocks of regulated firms, Ababneh and Tang (2013) examined the effect of the health care reform (Patient Protection and Affordable Care Act), and other reform-related events, on the stocks of health insurance companies, hospitals, brand-name drug makers, and generic drug makers. An event study methodology is used to compute cumulative average abnormal returns for these companies. There are two different results. Health insurance companies, and on generic drug makers suffer a negative effect from the law while it has a positive effect on hospitals and on brand-name drug makers.
Another study seems to have the similar conclusion. Cornett and Tehranian (1990) used the stock returns to investigate the impact of regulatory reform on firms in the regulated industry. The findings indicate that the events leading to the passage of the Garn-St. Germain Depository Institutions Act of 1982 generated abnormal stock returns. Additionally, the impact of the Act was not consistent throughout the industry. The introduction of increased competition resulting from the passage of the Act benefitted the shareholders of large banks and savings and loans while shareholders of small banks and savings and loans experienced negative abnormal return.

In term of stock return volatility, Prasanna (2013) used Garch (1,1) to test the impact of corporate governance legislation on stock market volatility and efficiency. He found that the market volatility has decreased significantly in the post-governance act period. However, the informational efficiency of the market was not proved by substantial evidence. This study shows an important evidence that the additional news had a significant impact on the Indian stock market volatility.

The impact of reforming regulation on stock return and volatility is examined by many studies. But the results are still mixed. In term of stock return, some evidence shows that changes in regulation do not lead to changes in stock return. However, another evidence demonstrates that regulatory reform might benefit this type of firms but hurt others. In term of stock return volatility, many studies have a similar conclusion that risk can be reduced by regulatory reform influence.

**Data and Methodology**

**Sample Data**

Using the daily stock index in research will obtain some advantages such as the availability, and large sample size. In addition, in event study, the daily data also takes advantage when it can capture the autocorrelation in the data and changes in the variance conditional on an event (Brown & Warner, 1985). In order to capture EGARCH process, this study uses the daily stock index of the financial sector which is calculated from the capitalization of sixteen financial listed companies in HOSE. The data is collected on the website http://cophieu68.com/ with the collection of 1496 observations spanned from January 2, 2009 to December 31, 2014. The daily stock return is computed from the daily stock index. It is the changes in the logarithm as the following equation:

\[
R_t = \ln(P_t) - \ln(P_{t-1})
\]

Where, \( R_t \) denotes the stock return at time \( t \); \( P_t \) presents the stock index at time \( t \); \( P_{t-1} \) demonstrates the stock index at time \( t-1 \).

**Model Specification**

In order to capture the impact on the stock return and volatility, the model of Exponential General Autoregressive Conditional Heteroscedasticity (EGARCH) is used in this study. This model was developed by Nelson (1991) from the autoregressive conditional heteroskedasticity (ARCH) introduced by Engle (1982). The introduction of EGARCH is a solution for the requirement in capturing the asymmetric response to shocks. In addition, the EGARCH model also has the added benefit that the model is expressed in terms of the log of conditional variance, \( h_t \), so that even if the parameters are negative, the conditional variance will always be positive. We do not, therefore, have to artificially impose non-negativity constraints and it is helpful to avoid possible misspecification in the volatility process. The mean equation of EGARCH model is as follows:

\[
R_t = a_0 + a_1D_1 + a_2D_2 + a_3D_3 + \sum_{i=1}^{m} b_i R_{t-i} + \epsilon_t
\]

Where, in equation (2), \( R_t \) denotes the stock return at time \( t \) and \( R_{t-i} \) presents the stock return at time \( t-i \); the dummy variables are used to detect the impact of main events on stock return and volatility. Table 1 refers to the periods assigned to the dummy variables. D1 denotes the effect of the M&A encouragement (
issued on March 1, 2012), D1 equals 1 if post-event period and equals 0 otherwise. The full name of this policy is called an improving of the project on “restructuring the system of credit institutions during 2011 – 2015”. Its main purpose is to encourage and facilitate the voluntary M&A among credit institutions. The effect of VAMC (established on June 27, 2013) is presented by D2 which equals 1 if post-establishment period and equals 0 otherwise. VAMC is a 100% state-owned as well as a form of one-member limited liability company. It has the paid-up capital of VND 500 billion (approximately US$ 23.2 million) and is subject to state management, inspection and monitoring conducted by the State Bank of Vietnam (SBV). Pursuant to Decree No. 53, credit institutions may sell their NPLs to VAMC if their NPLs ratio is less than 3%, while those with NPLs ratio of 3% or more are required to sell NPLs to VAMC. D3 is used to demonstrate the impact of regulatory reform (validated from January 1, 2011), D3 equals 1 if post-reform period and equals 0 otherwise. This reform addresses how to organise and operate credit institutions, cover corporate governance, share structure, and other issues.

<table>
<thead>
<tr>
<th>Event description</th>
<th>Date of validity or issue</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>M&amp;A encouragement</td>
<td>March 1st, 2012</td>
<td>Decision No. 254/QD-TTg (<a href="http://thuvienphapluat.vn/">http://thuvienphapluat.vn/</a>)</td>
</tr>
</tbody>
</table>

The error term ε₁ in equation (3) is assumed that it follows the non-central t distribution because the central t-distribution allows stock returns to have thicker tails, but is still symmetric (Ang & Chen, 2002); Ωₜ₋₁ is the set of all information available at time t-1.

\[ \varepsilon_t | \Omega_{t-1} \sim \mathcal{T}(0, h_t) \]  

The volatility of the EGARCH model is measured by the conditional variance \( h_t \) which is an asymmetric function of the past innovation shock \( \mu_{t-1} \) as below:

\[ \ln h_t = \tau_0 + \tau_1 D_1 + \tau_2 D_2 + \tau_3 D_3 + \alpha(\mu_{t-1} - E[\mu_{t-1}]) + \theta |\mu_{t-1}| + \beta \ln h_{t-1} \]  

The innovation, \( u_t \), is standardized by dividing the random error by conditional variance, \( u_t = \varepsilon_t / \sqrt{h_t} \).

Moreover, in equation (4), this function contains two parameters which define the size and sign effect of the innovation shock on stock return. The term, \( \alpha(\mu_{t-1} - E[\mu_{t-1}]) \), derived from unexpected shock, exhibits the effect of the magnitude of innovation shock, \( u_{t-1} \). The second term, \( \theta |\mu_{t-1}| \), represents the sign effect; According to Wang and Lin (2007), if the coefficient of \( \theta \) is positive, there is nonexistence of asymmetric volatility (leverage effect), and the leverage effect is present when the coefficient is negative and also statistically significant. Leverage effect means that the stock return volatility is higher during market downturns than during upswings if the asymmetric volatility is represented. In addition, the term, \( \beta \ln h_{t-1} \), indicates the linkage between current volatility and past volatility; if \( \beta \) is positive, the current volatility would be a function of past volatility.

Winrats 6.0 software is used to proceed steps and generate results for EGARCH model. Besides, Eviews 7 software is also employed to follow the stationarity testing of time series data. Based on EGARCH model, the affection of these policies on the stock return is expected to be significant and positive. In term of risk, it is better to expect the significantly negative effects of these policies on stock return volatility.

Table 1: Event Identification

<table>
<thead>
<tr>
<th>Event description</th>
<th>Date of validity or issue</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>M&amp;A encouragement</td>
<td>March 1st, 2012</td>
<td>Decision No. 254/QD-TTg (<a href="http://thuvienphapluat.vn/">http://thuvienphapluat.vn/</a>)</td>
</tr>
</tbody>
</table>
Data Descriptions and Empirical Result

Data Descriptions

The trend of stock return of financial sector is shown as figure 1. Table 2 lists the basic statistics of stock return during the sample period. The chart of figure 1 demonstrates that the stock return reached the maximum value at about 0.064 and got the biggest loser of 0.068. In addition, the stock return might combine between large and small fluctuations in each period.

Figure 1: Stock Return Of Financial Sector in Vietnam

Table 2 demonstrates the basic statistics of daily stock return with the sample size of 1495 observations. The mean of stock return is positive and very small, it is also significantly approached to zero. However, it is difficult to conclude whether the stock return increased. The skewness is insignificant and almost equal to zero. However, the kurtosis is significant at 1% level of significance, and it is very different from 3. In addition, the Jarque-Bera test statistic which is computed from skewness and kurtosis is also statistically significant at 1% level and the test statistic is large enough in comparison with the critical Chi-squared value at the same level of significance with 2 degrees of freedom ($\chi^2 = 9.21$). Therefore, the null hypothesis of the normal distribution is rejected. It means that the stock return of financial sector is not normally distributed. Moreover, all of the Ljung-Box statistics of stock return, $Q(6)$, $Q^2(6)$, $Q(12)$, and $Q^2(12)$ are statistically significant at 1% level. In other words, the daily stock returns of financial sector have a significant serial correlation.

<table>
<thead>
<tr>
<th>Mean</th>
<th>Std. Dev.</th>
<th>1.7624</th>
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</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>6.3563</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>-6.7910</td>
<td></td>
</tr>
<tr>
<td>Q (6)</td>
<td>39.6528*</td>
<td>835.0517*</td>
</tr>
<tr>
<td>Q (12)</td>
<td>48.3923*</td>
<td>1279.4785*</td>
</tr>
<tr>
<td>Sample size</td>
<td>1495</td>
<td>129.7046*</td>
</tr>
</tbody>
</table>

Notes:

1. *(**) denotes 1% (5%) level of significance.
2. $Q(6)$ ($Q^2(6)$) is the Ljung–Box Q-statistic for the returns (the squared returns) lagged six trading days and the critical values are 16.8119, 12.5916 and 10.6445 at 1%, 5% and 10% significant level, respectively.

$Q(12)$ ($Q^2(12)$) is the Ljung–Box Q-statistic for the returns (the squared returns) lagged 12 trading days and the critical values are 26.2170, 21.0261 and 18.5494 at 1%, 5% and 10% significant level, respectively.
Stationary Testing

According to Brooks (2008), the stationarity or otherwise of a time series data can strongly influence its behaviour and properties, thus, determining whether a series is stationary or not is one important steps in a whole process.

The Augmented Dickey-Fuller (ADF) tests (Dickey & Fuller, 1979), Phillips and Perron (PP) tests (Phillips & Perron, 1988) and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) tests (Kwiatkowski, Phillips, Schmidt, & Shin, 1992) are applied in this data sample to detect whether the stationary is held for daily stock return. Table 3 aggregates the results of AIC and SBC values in three cases, with neither a constant term nor time trend (none), with a constant term (intercept) and with time trend (trend and intercept). The results reveal that the optimal lag interval is 1 based on the minimum AIC and SBC.

Table 3: The AIC and SBC Value of Unit Root Test

<table>
<thead>
<tr>
<th>Lag</th>
<th>None</th>
<th>Intercept</th>
<th>Trend and Intercept</th>
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</thead>
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<tr>
<td></td>
<td>AIC</td>
<td>SBC</td>
<td>AIC</td>
</tr>
<tr>
<td>1</td>
<td>-5.2582*</td>
<td>-5.2511*</td>
<td>-5.2569*</td>
</tr>
<tr>
<td>2</td>
<td>-5.2570</td>
<td>-5.2463</td>
<td>-5.2556</td>
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<td>3</td>
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<td>-5.2418</td>
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<td>4</td>
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<td></td>
<td>5.2515</td>
<td>5.2314</td>
<td>5.2544</td>
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<tr>
<td></td>
<td>5.2527</td>
<td>5.2369</td>
<td>5.2544</td>
</tr>
</tbody>
</table>

Notes:
1. * denotes minimum value.
2. The Augmented Dickey-Fuller(ADF) and the Phillipps-Perron(P-P) statistics which the lag interval is determined on the criterions of minimization of AIC and SBC value. The function of AIC and SBC areas follows:

\[ \text{AIC}(k) = T \ln \sigma_i^2 + 2k \]

\[ \text{SBC}(k) = T \ln \sigma_i^2 + k \ln T \]

Where \( k \) denotes the lagged period, \( T \) denotes the number of sample, and \( \sigma_i^2 \) denotes the lagged \( k \) periods of \( \epsilon_i^2 \).

Table 4 represents the statistic tests results at lag 1 for three kinds of tests including ADF, PP and KPSS. It is shown that the statistic tests at order 1 of both approaches (ADF and PP tests) are significant at 1% level. Therefore, the null hypothesis is not accepted. It means that the stock return of financial sector is stationary. In addition, the test statistics of KPSS tests is insignificant. In other words, the null hypothesis is accepted, and the stock return of financial sector is stationary. Thus, the stationary testing in these three approaches leads to the same conclusion.

Table 4: ADF, PP And KPSS Test Statistics of Unit Root Test

<table>
<thead>
<tr>
<th>Item</th>
<th>ADF</th>
<th>Orde</th>
<th>P-P</th>
<th>Orde</th>
<th>KPSS</th>
<th>Order</th>
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<tbody>
<tr>
<td>None</td>
<td>-25.5112</td>
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<td>-32.8705</td>
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</tr>
<tr>
<td>Intercept</td>
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<td>-32.8597</td>
<td>1</td>
<td>0.0520</td>
<td>1</td>
</tr>
<tr>
<td>Trend and Intercept</td>
<td>-24.971</td>
<td>1</td>
<td>-32.8524</td>
<td>1</td>
<td>0.0410</td>
<td>1</td>
</tr>
</tbody>
</table>

Notes:
1. * denotes statistical significance at 1% level which the critical value is decided on the critical value table of MacKinnon (1991).
2. The critical values for KPSS tests is decided on the critical value table of Kwiatkowski et al (1992)

ARCH Effect and Volatility Asymmetry Testing

Table 5 shows the result of ARCH and diagnostic tests. The ARCH test is employed with 5 lags of squared residuals which come out from the mean equation estimated by Least Squares method as follows:

\[ \hat{u}_i^2 = \gamma_0 + \gamma_1 \hat{u}_{i-1}^2 + \gamma_2 \hat{u}_{i-2}^2 + \gamma_3 \hat{u}_{i-3}^2 + \gamma_4 \hat{u}_{i-4}^2 + \gamma_5 \hat{u}_{i-5}^2 \]  (5)

The ARCH (5) statistic test, \( T^*R^2 = 562.1981 \), is much greater than its critical Chi-square value \( (\chi^2_{5} = 11.71) \) at 5% level of significance. Thus, the null hypothesis that all 5 lags of squared residuals have coefficients
are not significantly different from zero is confidently rejected. In other words, it means that the stock returns of financial sector have ARCH effect.

For diagnostic tests, four tests including sign bias test (SBT), negative size bias test (NSBT), positive size bias test (PSBT) and joint test (JT) are considered. The test for sign bias is based on the significance or otherwise of \( \phi_1 \) in below equation:

\[
\hat{u}_t^2 = \phi_0 + \phi_1 S_{t-1}^- + v_t \tag{6}
\]

Where \( S_{t-1}^- \) is an indicator dummy that takes the value 1 if \( \hat{u}_{t-1} < 0 \) and zero otherwise. The result in table 5 shows that the test statistic of SBT is statistically insignificant. It refers that positive and negative shocks to \( \hat{u}_{t-1} \) do not impact differently upon the conditional variance.

It could also be the case that the magnitude or size of the shock will affect whether the response of volatility to shocks is symmetric or not. Thus, a negative size bias and positive size bias test would be conducted. The negative size bias is argued to be present if \( \phi_2 \) is statistically significant in the below regression:

\[
\hat{u}_t^2 = \phi_0 + \phi_1 S_{t-1}^- \hat{u}_{t-1} + v_t \tag{7}
\]

While the positive size bias is based on the significance or otherwise of \( \phi_3 \) in this below equation:

\[
\hat{u}_t^2 = \phi_0 + \phi_1 S_{t-1}^+ \hat{u}_{t-1} + v_t \tag{8}
\]

Where defining \( S_{t-1}^+ = 1 - S_{t-1}^- \), so that it just picks out the observations with positive innovations. The results in table 5 reveal that both the test statistics of NSBT and PSBT are statistically significant at 1% level. In other words, the stock return volatility responses to shock are asymmetric because of the size effects.

Joint tetst is also conducted to conclude whether the stock return volatility is asymmetric. The significance of \( \phi_1 \) indicates the presence of sign bias, and the significance of \( \phi_2 \) or \( \phi_3 \) would suggest the presence of size bias in the following equation:

\[
\hat{u}_t^2 = \phi_0 + \phi_1 S_{t-1}^- + \phi_2 S_{t-1}^+ \hat{u}_{t-1} + \phi_3 S_{t-1}^+ \hat{u}_{t-1} + v_t \tag{9}
\]

The result of the joint test in table 5 shows that its test statistic is much larger than its critical Chi-squared value of 7.82 with 3 degrees of freedom at 5% level of significance. Consequently, based on the joint test, the null hypothesis of no asymmetric effect is rejected. In conclusion, the results from ARCH and diagnostic tests indicate that there is an existence of conditional heteroscedastic and asymmetry in the volatilities of stock returns.

### Table 5: The Arch Effect and Volatility Asymmetry Test

<table>
<thead>
<tr>
<th>Method</th>
<th>ARCH (5)</th>
<th>SBT</th>
<th>NSBT</th>
<th>PSBT</th>
<th>JT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>562.1981* (5.5723)</td>
<td>-0.3689 (0.2885)</td>
<td>-6.8568* (0.1340)</td>
<td>6.9716* (0.13549)</td>
<td>455.3050* (5.2966)</td>
</tr>
</tbody>
</table>

**Notes**

1. *(***) denotes statistical significance at 1% (5%) level
2. ARCH denotes the Lagrange Multiplier test of Engle, 1982, and the critical Chi-squared value with 5 degrees of freedom is 11.71 at the 5% significant level.
3. SBT, NSBT and PSBT denote the sign bias test, negative size bias test, and positive size bias test respectively, and the critical t value with 3 degree of freedom is 2.353 at the 5% significant level.
4. JT denotes the joint test, and the critical Chi-squared value with 3 degrees of freedom is 7.82 at the 5% significant level.
Empirical Results

The results showing in ARCH effect and asymmetry tests reveal that EGARCH model may be well fitted with the data. Therefore, it is feasible to estimate the response of stock returns and volatility of the financial sector on certain policies related to restructuring financial system. The lag of order 2 is conducted into the mean equation (2), and the EGARCH with AR(2) is re-written as follows:

\[ R_t = a_0 + a_1 D_1 + a_2 D_2 + a_3 D_3 + b_1 R_{t-1} + b_2 R_{t-2} + \varepsilon_t \]  

(10)

\[ \ln h_t = \tau_0 + \tau_1 D_1 + \tau_2 D_2 + \tau_3 D_3 + \alpha(\mu_{t-1} - E[\mu_{t-1}]) + \theta \mu_{t-1} + \beta \ln h_{t-1} \]  

(11)

In table 6, for model diagnosing, the Ljung-Box Q tests give Q(6) = 5.0508 and Q(12) = 16.3670 for the standardized residual process as well as Q^2(6) = 3.6980 and Q^2(12) = 10.1346 for the square process. Thus, there is no serial correlation or conditional heteroscedasticity in the standardized residuals of the fitted model and the EGARCH model with AR (2) is adequate.

In terms of the M&A encouragement, it has a positive impact on stock returns of financial sector when the coefficient of the M&A encouragement dummy, \( a_1 \), is significant at 5% level of significance. In fact, there are many previous studies which also showed the positive influence of M&A on stock return. This result is consistent with Boon Tan et al. (2004). Concerning to the volatility, the coefficient, \( \tau_1 \), presents a negative sign and this variable seems to reduce risk. However, the test statistic is insignificant. It means that the M&A encouragement has no effect on financial stock return volatility.

The dummy variable coefficient of VAMC, \( a_2 \), is insignificant for the stock returns. Therefore, this variable has no impact on the stock return as expected. In contrast, VAMC dummy, \( \tau_2 \), demonstrates a negative sign on the volatility and statistically significant at 10% level of significance. This result seems to be suitable since the main role of VAMC is to remove non-performing loans from banks. Thus, the existence of VAMC helps to reduce the stock volatility of financial institutions.

For stock returns, the coefficient of the regulatory reform dummy, \( a_3 \), presents an unexpected sign (0.0430) and statistically significant at 10% level of significance. The possible reason is that the investors do not like the change in regulatory when the law is obligatory for regulated firms. In some studies, they also indicated that the change in regulatory can benefit this kind of institutions but hurt others. As the expectation that the reform of law can decline the risk for the stock market. In table 5, this variable illustrates an expected negative sign. However, the coefficient, \( \tau_3 \), is insignificant. It indicates that the law reform has no affection on financial stock return volatility.
### Table 6: The Estimation Results of EGARCH Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Return</th>
<th>Volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.0174</td>
<td>0.1633*</td>
</tr>
<tr>
<td></td>
<td>(0.0285)</td>
<td>(0.0352)</td>
</tr>
<tr>
<td>The effect of M&amp;A</td>
<td>0.0838**</td>
<td>-0.0367</td>
</tr>
<tr>
<td></td>
<td>(0.0419)</td>
<td>(0.0338)</td>
</tr>
<tr>
<td>The effect of VAMC</td>
<td>-0.0091</td>
<td>-0.0576***</td>
</tr>
<tr>
<td></td>
<td>(0.0472)</td>
<td>(0.0328)</td>
</tr>
<tr>
<td>The effect of regulatory reform</td>
<td>-0.0430***</td>
<td>-0.0088</td>
</tr>
<tr>
<td></td>
<td>(0.0247)</td>
<td>(0.0272)</td>
</tr>
<tr>
<td>Coefficient</td>
<td></td>
<td>Estimation</td>
</tr>
<tr>
<td>(\alpha)</td>
<td>0.3360*</td>
<td>0.1146*</td>
</tr>
<tr>
<td></td>
<td>(0.0441)</td>
<td>(0.0234)</td>
</tr>
<tr>
<td>(\theta)</td>
<td>-0.0090</td>
<td>-0.0345*</td>
</tr>
<tr>
<td></td>
<td>(0.0599)</td>
<td>(0.0168)</td>
</tr>
<tr>
<td>(\beta)</td>
<td>0.9242*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0210)</td>
<td></td>
</tr>
<tr>
<td>Model Diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Q(6)) ((Q^2(6)))</td>
<td>5.0508</td>
<td>3.6980</td>
</tr>
<tr>
<td>(Q(12)) ((Q^2(12)))</td>
<td>16.3670</td>
<td>10.1346</td>
</tr>
</tbody>
</table>

**Notes:**
- * denotes 1% significant level
- ** denotes 5% significant level
- *** denotes 10% significant level

\(Q(6)\) (\(Q^2(6)\)) is the Ljung–Box Q-statistic for the returns (the squared returns) lagged six trading days and the critical values are 16.8119, 12.5916 and 10.6445 at 1%, 5% and 10% significant level, respectively.

\(Q(12)\) (\(Q^2(12)\)) is the Ljung–Box Q-statistic for the returns (the squared returns) lagged 12 trading days and the critical values are 26.2170, 21.0261 and 18.5494 at 1%, 5% and 10% significant level, respectively.

Concerning to the variance equation, the coefficients, \(\alpha\) and \(\beta\) are significant at 1% level of significance. It means that there is an existence of size effect or the magnitude of innovation shock, \(u_t - u_{t-1}\). The coefficient of \(\beta\) is positive (0.9242). Thus, the linkage between current volatility and past volatility is existed and it could be stated that the current volatility is a function of past volatility. In term of sign effect, \(\theta\) coefficient is negative, it implies that there is leverage effect. However, the test statistic of \(\theta\) is statistically insignificant.

### Conclusion

Many empirical studies suggest that the countries with better developed financial systems will experience faster economic growth. Vietnam is also affected by 2008 global financial crisis. The banking system suffers from difficulties in the financial resource. Therefore, the government, especially the State Bank should consider suitable policies in order to apply for the financial system of the country. In fact, Vietnamese government had already promulgated some policies to help the financial system recover and develop in the future. However, the effect of these policies in practice is still a question that should be investigated.

Interested in financial policy and its impact on stock market, this study employs the EGARCH model with AR(2) to fit the daily stock return data of the financial sector spanned from January 2\(^{nd}\), 2009 to December 31\(^{st}\), 2014. Some events which are collected to examine the effect of financial policy include M&A encouragement, the establishment of Vietnam Asset Management Company and the reform in credit institutions law. The empirical results reveal that only two dummy variables affect the stock returns but do not impact on the volatility and one remain dummy variable just has the effect on volatility but no affection on stock returns.
Firstly, the encouragement of government to promote M&A activities among banks is significantly positive to stock returns but it represents no effect on stock volatility.

Secondly, the existence of Vietnam Asset Management Company is significant and reduces stock volatility although its impact on stock returns is not exhibited.

Third and lastly, the changes in regulatory are significantly negative and decreases the stock returns while it also demonstrates no effect on stock volatility.

These empirical findings are quite acceptable for the case of Vietnam. When the trend of M&A is still new and attractive for the Vietnamese market. Moreover, based on the advantages of M&A, it may be considered as a safe strategy for banks to solve out their financial problem. In fact, there were many successful M&A deals after the motivation generated from policymaker and there have been many M&A deals in progress. Thus, the positive response for the M&A encouragement from banks seems to create a good signal for investors in stock market. That is a partial reason to explain why M&A encouragement can have a positive effect on the stock return of financial sector.

In term of the VAMC effect, a sizeable amount of non-performing loans were also resold from banks to VAMC. However, the effect of VAMC operation seems to be still limited in the aspect of stock returns in a short time period. According to VAMC, this company has bought about 121 VND billion non-performing loans from banks (approximately 5.5 $US million) as of December, 2014. The empirical result of this study is very consistent with VAMC role which links to the risk reduction for banks.

In term of the regulatory reform, the reduction in the limit of ownership ratio for both individuals and institutions as well as the prohibition of directly engaging in some activities may be considered as a reason for its negative effect on stock return.

The findings of this study may be helpful for investor and policymaker. It implies that the investors rationally measure the stock market which reflects the information of changes in policies. Besides, the investors also adjust and alter their portfolio accordingly when changing policies. This study also implies that policymaker needs to know when they should prioritize which policy to be issued because some policies sometimes can hurt the stock market if the stock market is efficient. In general, the findings in this study are expected to contribute to the literature in stock return and volatility, especially, for the developing market.

In another aspect, this study still has some limitations. The stock index of financial sector contains the market capitalization calculation from only sixteen financial firms. While these events may also relate to securities companies. In addition, the stock market is still very young, there are many joint stock banks and financial firms which are still not listed yet. Therefore, the index may not reflect enough the impact of these three policies and it may partially influence the empirical results. Hopefully, the stock market will be improved in the future, and it will be helpful for financial research in Vietnam.

References


