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An Analysis of Political Changes on Nikkei 225 Stock Returns and Volatilities

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This paper examines whether there exists the effect of party alternative on Nikkei 225 stock behavior by the asymmetric GARCH model. The empirical work finds that the transition of ruling party effect is not a crucial variable to Nikkei 225 returns and volatility. Japanese feel apathy and alienation about political environment result in the succession of prime ministers does not influence the Japanese stock market behavior. Therefore, resigned previous prime ministers have become scapegoats for the poor performance of financial and economic policies.

Key Words: Party alternative; Volatility asymmetry; Scapegoating; EGARCH.
JEL Classification Numbers: C20, G10.

1. INTRODUCTION

The ruling party faces the unprecedented challenge following democracy and economic development, thus, transition of ruling party becomes the convention of the democratic countries. The political parties provide financial and economic policies that may be accepted by the public in elections and the competition among the parties promotes economic development. Stock market is the exhibition of the national economy, and in the fact that it speculates future of economy. It generally responds to new information regarding political decisions that may affect financial and economic policies. Positive stock returns are expected following the high expecta-

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tions of financial and economic policies of a new ruling party. In contrast, if the outcome of the related policies does not allow investors to immediately measure the negative impact on the stock market, then the political outcome constitutes an uncertainty inducing surprise.

Although Japan becomes a democratic nation, since 1955, the Liberal Democratic Party has still maintained its governing position. Long-term domination of the Liberal Democratic Party and donations from groups that give rise to corruption let people perceive political apathy and alienation. When the Japanese House of Representatives held an election in July 1993, the Liberal Democratic Party could not win more than half of the seats, and so they lost for the first time. The opposition parties obtained new political rights, and the leader of the New Party Morihiro Hosokawa constituted the coalition cabinet on August 9 since when Japan has had nine prime ministers to April 26, 2001. The government officials change frequently, and political intrigues and factions operate behind the scenes. Despite the Liberal Democratic Partys winning again in 1996, they depended on coalition government. The economical bubble burst in Japan in1989, causing the Nikkei 225 to fall from 39,000. Although all successive prime ministers tried to undertake projects to promote economy, they for many years could not solve the economic problems, and the stock market in Japan was stuck between 13,000 and 23,000 for a long time. This study examines whether which political party is governing Japan affects stock prices.

Usually showed in managerial literature, the theories indicate that a manager must have a vision of the future of corporate, and establish a managerial system to promote corporate performance. CEOs are usually changed when the organization performs poorly, and a new manager succeeds the old. However, manager succession affects organizational performance[1]. Japan is cabinet nation, and the majority leader is the prime minister, who forms this Cabinet. The duty of the prime minister is to direct administrative departments, make proposals, and report on govern-

[1]CEO turnover and corporate performance has become a topic of broad attention in the literature of management research, but there is no general agreement on the relationship between CEO turnover and corporate performance. Empirical studies found that corporate chooses new CEO with experience of managerial practices and the corporate performance reacted positively to CEO turnover (The common-sense theory; Davidson, Worrell and Cheng, 1990; Borokhovich, Parrino and Trapani, 1996; Lausten, 2002). Further research found the CEO turnover makes members of the organization nervous, reduces corporate performance, and a negative firm performanceCEO turnover relationship (The vicious cycle theory; Weisbach, 1988; Barro and Barro, 1990; Gibbons and Murphy, 1990; Denis and Denis, 1995; Parrino, 1997; Conyon, 1998; Farrell and Whidbee, 2002). Other studies have found corporate performance tends to no response to CEO turnover, and CEO is victims of poor corporate performance. Accordingly, corporate performance is independent of CEO turnover (The ritual scapegoating theory; Friedman and Singh, 1989; Kaplan, 1994; Kang and Shivdasani, 1995; Nelson, 2005).

ment affairs and foreign relations to House of Representatives. Accordingly, the prime minister is the top chief who is responsible for the performance of the cabinet, and stock price may reflect his performance. The ruling party may become the opposition party when performance is poor.

Specifically, the purpose of this paper is to investigate the response of Nikkei 225 stock market to transition of ruling party in Japan. Employing univariate asymmetric GARCH model, we utilize stock return volatility as an indicator to measure the impact of transition of ruling party and to explore the dynamic relationship between financial market reaction and political behavior in Japan. Second, owing to the prime minister must be responsible for the performance of the cabinet, and stock market will reflect his ruling performance, by applying the theory of organizational effectiveness, which focus on the succession of leaders, we seek to answer whether the succession of prime minister affects the performance of capital market. This paper is organized as follows. Section 2 presents the related literature. Section 3 then presents GARCH modeling of financial returns. Next, section 4 describes the data and preliminary analysis. Moreover, section 5 presents empirical evidence. Finally, section 6 discusses the results and presents conclusions.

2. LITERATURE REVIEW

The relationship between economics and politics was first analyzed by Nordhaus (1975), who developed the political business cycle to show that governments actively manage the economy, causing it to expand before presidential elections and then contract (Tufte, 1978; Frey and Schneider, 1978; Soh, 1986; Milas, 2000). Other studies have empirically examined the influences of economic events on presidential election and the impact of different political structures significantly to the economic variables (Chandiok, 1996; Bratsiotis, 2000; Cover and VanHoose; 2000).

Furthermore, recent research has examined market efficiency issues by examining stock market behavior responses to uncertain political events. In a recent study, empirical investigations have focused on tracking financial market movements in relation to elections (Gemmill, 1992; Gwilym and Buckle, 1994; Easaw and Garratt, 2000; Brggelambert, 2004). Major studies supported the presidential election cycle, in which US stock markets make larger gains in the third and fourth year of a presidential term (Niederhofer, Gibbs and Bullock, 1970; Allivine and O'Neill, 1980; Huang, 1985; Stoken, 1994; Foerster, 1994; Foerster and Schmitz, 1997), while average returns in second year were found to be negative.

Other studies have focused on the stock market preference. Academic research on such subject reported that small stock perform better under De-

mocrats relative to Republicans. (Reilly and Luksetich, 1980; Lobo, 1999; Santa-Clara and Valkanov, 2003). Further empirical studies examined the impact of various types of political uncertainties, which may be related to capital markets, such as strikes, boycotts, terrorist acts, macroeconomic management, monetary policy, legislation, social and political evolution. (Bachman, 1992; Michelson, 1993; Chan and Wei, 1996; Willard, Guinnane and Rosen, 1996; Lamb, Pace and Kennedy, 1997; Bittlingmayer, 1998; Pantzalis, Stangeland and Turtle, 2000; Kim and Mei, 2001; Perotti and Oijen, 2001; Bel, 2002; Hassan, Maroney, El-Sady and Telfah, 2003; Lin and Wang, 2004).

Based on the above, various political events significantly influence stock market behavior, however, only fewer academic researches have explored the stock market behavior responses to transition of ruling party. Nevertheless, they merely mention about stock return as result in ignoring the unexpected shocks of political impact reflected by stock volatility and only focus on temporal behavior of stock market. Therefore, the present study examines not only the long-term stock market behavior to change of political environment, such as transition of ruling party, but also utilize the viewpoint of corporate performanceCEO turnover relationship to integrate political science and financial economics through the empirical case in Japan.

3. DATA AND METHODOLOGY

3.1. The sample data

Nikkei 225 daily stock data collected from AREMOS of the Ministry of Education, Taiwan are used in this paper for the sample period from November 9, 1979 to April 5, 2005. Daily stock returns were calculated as the difference in the logarithms of daily stock prices multiplied by 100. The political data about Japanese Congress elected nineteen Prime Ministers to form a cabinet during the sample periods were obtained from official records of Prime Ministers of Japan (www.kantei.go.jp/foreign/archives_e.html) that contained about previous Prime Ministers term of office, party membership of prime minister and member of previous the cabinet.

During the last two decades, economists and financial analysts have developed a broad class of conditional heteroskedasticity models for capturing systematic patterns of variance over time. The first and most basic of these is the Autoregressive Conditional Heteroscedasticity (ARCH) model developed by Engle (1982) and the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model of Bollerslev (1986). Subsequently, Hentschel (1995) discusses a unified treatment of various symmetric and asymmetric GARCH models.

Since there is a large body of literature on the asymmetric volatility phenomenon in GARCH model, a large number of studies presented univariate models capture the asymmetric volatility effect in EGARCH or GJR GARCH model (Yeh and Lee, 2000; Friedmann and Sanddorf-Köhle, 2002), and most of these models successfully outperform their symmetric counterparts in practice. Hence, we will compare the performance of the EGARCH and the GJR model fitted to daily stock returns in this paper.

In this paper, we employ two GARCH-type modelsExponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) model and the GJR GARCH model (Glosten, Jagannathan and Runkle, 1993)—to decompose stock returns into expected returns and return shocks and see which of the components of daily Nikkei 225 stock index returns play a predominant role in explain stock index returns. First, we will compare the performance of the EGARCH and the GJR model fitted to daily Nikkei 225 stock returns. Furthermore, we apply the fitted model to examine the effect of transition of ruling party on the stock market behavior.

Accordingly, the dummies are embedded in the EGARCH (1, 1) and GJR GARCH (1, 1)[2] to detect the effect of the legislative sessions and power change as follows:

$$R_t = a_0 + a_1 D_1 + a_2 D_2 + \sum_{i=1}^{m} b_i R_{t-i} + \varepsilon_t \tag{1}$$

$$\varepsilon_t | \Omega_{t-1} \sim T(0, h_t) \tag{2}$$

D_1 denotes the dummy of transition of ruling party. For example, D_1 equals 1 when it corresponds with the transition of ruling party, and otherwise equals 0. Moreover, it is well known that international stock markets are marked by high volatility during whole sample period, and the high volatility are found to be related with important events[3], the October 1987 crash, is the only global event in the last decade that significantly increased volatility in several markets, so that changes of Nikkei 225 stock return volatility before and after 1987 crash may be investigated. Therefore, The sample period is further broken into a pre-1987 crash period and a post-1987 crash period, D_2 represents the dummy of the October 1987

[2]The GARCH(1,1) model was considered sufficiently specific to capture the conditional heteraschedastical variance by Bollerslev(1987), Lamoureux and Lastrapes (1990), Baillie and DeGennaro(1990) and so on.

[3]The crises related literature has mainly focused on the 1987 stock and currency financial crash, and investigated issues related to the causes of crises, stock returns and volatilities change surrounding the 1987 crash, international stock market linkages, and changes in benefits to international diversification (Roll, 1989; Pantel and Sarkar, 1998; Aggarwal, Inclan and Leal, 1999; Nich, 2002).

crash, D_2 equals 1 during post-1987 crash, and otherwise equals 0. Given the inferences above, a_1 and τ_1 which implied that the marginal value of transition of ruling party on the stock market return and volatility, respectively; a_2 and τ_2 which implied that the marginal value of the 1987 crash on the stock market return and volatility, respectively.

An asymmetric response to shocks is made explicit in Nelson's (1991) univariate EGARCH model:

$$\ln h_t = \tau_0 + \tau_1 D_1 + \tau_2 D_2 + \alpha[|u_{t-1}| - E|u_{t-1}| + \theta u_{t-1}] + \beta \ln h_{t-1} \quad (3)$$

Where $u_t = \varepsilon_t/\sqrt{h_t}$. The news ε_{t-j} impacts conditional volatility $\ln h_t$. When $p = q = 1$, it captures an asymmetric response since $\partial \ln h_t/\partial\varepsilon_{t-1} = \alpha_1(\theta + 1)$ when $\varepsilon_{t-1} > 0$, and $\partial \ln h_t/\partial\varepsilon_{t-1} = \alpha_1(\theta - 1)$ when $\varepsilon_{t-1} < 0$. Volatility is minimized in the absence of news, $\varepsilon_{t-1} = 0$.

Additionally, to allow asymmetric volatility effects, Glosten, Jagannathan and Runkle (1993) add an additional term in the conditional variance that to be the GJR GARCH model:

$$h_t = \tau_0 + \tau_1 D_1 + \tau_2 D_2 + \sum_{j=1}^{q} \beta_j h_{t-i} + \sum_{i=1}^{p} \alpha_{1i} \varepsilon_{t-i}^2 + \alpha_2 \overline{S}_{t-1} \varepsilon_{t-1}^2 \quad (4)$$

$$\overline{S}_{t-1} = \begin{cases} 1 & \text{if } \varepsilon_{t-1} < 0 \\ 0 & \text{if } \varepsilon_{t-1} \geq 0 \end{cases}$$

Here, $\overline{S}_{t-1} = 1$ if $\varepsilon_{t-1} < 0$ and $\overline{S}_{t-1} = 0$ if $\varepsilon_{t-1} \geq 0$. We denote this model asymmetric GARCH, or for short GJR GARCH. The process is well-defined if the conditions $p \geq 0, q \geq 0, \tau_0 > 0, i = 1, 2, 3, \ldots, p, \beta_j > 0, j = 1, 2, 3, \ldots, q$.

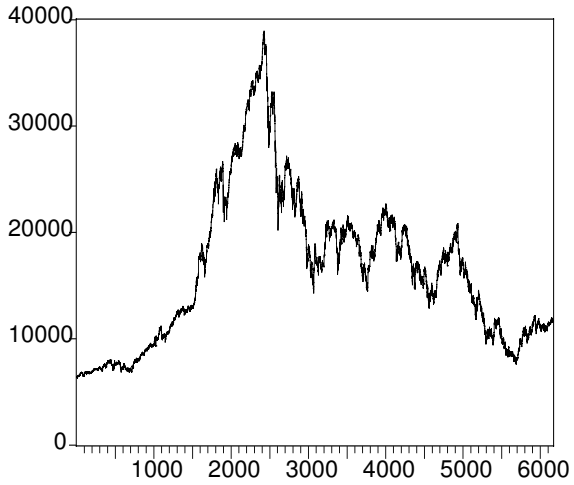
The lags of conditional mean returns of GARCH(1,1) model is chosen as three by the minimum value of the Akaike information criterion (Akaike, 1973) and the Schwarz Bayesian Criterion (Schwarz, 1978). The parameters of the mean and time-varying conditional variance-covariance are jointly determined using the maximum likelihood estimation method. Since the log likelihood function is a nonlinear function of the parameters, the BHHH algorithm, proposed by Berndt, Hall, Hall and Hausman (1974), is used to obtain the maximum likelihood estimates of the parameters in this investigation.

4. PRELIMINARY ANALYSIS

This section presents a preliminary analysis of the Japan stock market. The trend of Japan stock market and return are shown as figs. 1 and

2, respectively. Table 1 lists the basic statistics of daily Nikkei 225 stock market during the sample period. The statistics include the sample size, mean return, standard deviation, skewness, kurtosis, the median, minimum, maximum returns, Jarque-Bera test statistic and Ljung-Box Q test statistics.

FIG. 1. The trend graph of Nikkei 225 stock market



The mean of Nikkei 225 returns is not significantly different from 0 at the 5% level. The skewness of Nikkei 225 returns series is significantly skewed to the left at 5% significance level and kurtosis is also significantly excess kurtosis at the 5% level. The skewness and kurtosis measurements are highly significant revealing departures from normality. Likewise, the Jarque-Bera statistic for Nikkei 225 returns series reject significantly the assumption of the normality at the 5% level. Regarding the shape parameters of the distribution of Nikkei 225 returns, this study concludes that the distributions are clearly non-normal. The rejection of normality can be partially attributed to intertemporal dependencies in the moments of the series, which is strongly supported by Jarque-Bera statistic of the returns and squared returns. The Ljung-Box Q statistics of the Nikkei 225 returns and squared returns for 6 lags are statistically significant at the 5% level, revealing the presence of nonlinear intertemporal dependencies.

Table 2 reports the testing results for the Augmented Dickey-Fuller (ADF) and Phillips and Perron (P-P) tests. The unit root hypothesis should be rejected if the calculated statistic is smaller than the 5% level critical value. Nikkei 225 returns are stationary under the unit root test

FIG. 2. The trend graph of Nikkei 225stock returns

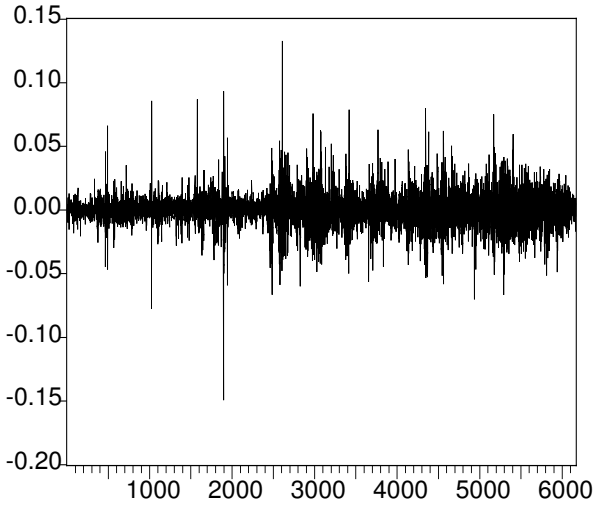


TABLE 1.

Basic statistics of the variation of Nekkei 225 index

Mean	0.0099	S. D.	1.7328
Maximum	12.4303	Minimum	-16.1354
Skewness	-0.1209^{**}	Kurtosis	8.7343^{**}
$Q(6)$	46.0045^{**}	$Q(12)$	52.3957^{**}
$Q^2(6)$	553.1136^{**}	$Q^2(12)$	684.2160^{**}
Jarque-Bera	8461.5316^{**}	Sample Size	6166

Notes: 1. ** (*) denotes statistical significance at 1% (5%) level.
2. S. D. denotes standard deviation.
3. Normal test is checked by the Jarque-Bera test.
4. $Q(6)$ ($Q^2(6)$) is the Linjung-Box Q statistic for the returns (the squared returns) lagged 6 trading days and its critical value at 5% significant level is 12.5916.
5. $Q(12)$ ($Q^2(12)$) is the Linjung-Box Q statistic for the returns (the squared returns) lagged 12 trading days and its critical value at 5% significant level is 21.0261.

and the lag interval is 4, which is determined based on the minimum values of AIC and SBC.

Table 3 listed the result of ARCH test to find out if there is any heteroscedastic effect (Engle, 1982) and diagnostic test (sign bias test (SBT), negative size bias test (NSBT), positive size bias test (PSBT), and joint test (JT)) to find out if the conditional heteroskedasticity has any asym-

TABLE 2.

The AIC and SBC value of unit root test

Item	ADF	Order	P-P	Order
None	-36.5095^{**}	4	-78.9548^{**}	4
Intercept	-36.5306^{**}	4	-78.9653^{**}	4
Trend and Intercept	-36.5821^{**}	4	-78.9974^{**}	4

Notes: 1. ** denotes statistical significance at 1% level which the critical value is decided on the critical value table of MacKinnon (1991).
2. The Augmented Dickey-Fuller(ADF) and the Phillipss-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:
$AIC(k) = T \cdot \ln \sigma_t^2 + 2k$
$SBC(k) = T \cdot \ln \sigma_t^2 + k \cdot \ln T$
Where k denotes the lagged period, T denotes the number of sample, and σ_t^2 denotes the lagged k periods of $\sum_{i=1}^{T} \varepsilon_t^2$.

metric effect (Engle and Ng, 1993). Based on the above examination, the volatility of Nikkei 225 returns exhibits conditional heterscedastical and asymmetry.

TABLE 3.

The ARCH effect and volatility asymmetry test

Method	$ARCH(3)^2$	SBT^3	$NSBT^3$	$PSBT^3$	JT^4
Value	842.8256^{**}	3.3108^{**}	-12.7996^{**}	3.5503^{**}	728.3334^{**}
	(5.6673)	(0.1443)	(0.0870)	(0.0892)	(5.6677)

Notes: 1. ** (*) denotes statistical significance at 1%(5%) level.
2. ARCH denotes the Lagrange Multiplier test of Engle (1982), and the criterion is 7.82 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 criterion is 2.353 at the 5% significant level.
4. JT denotes the joint test, and the criterion is 7.82 at the 5% significant level.

5. THE EMPIRICAL RESULTS

5.1. Model Diagnosis

This study applied the Likelihood Ratio (LR) Test to compare the performance of the EGARCH and the GJR GARCH model fitted to Nikkei 225 stock index. $LR = -2\ln\lambda = 2 \times [\ln L(\hat{\beta}, \hat{\sigma}^2) - \ln L(\hat{\beta}^*, \hat{\sigma}^{2^*})] = 2 \times [-5580.1371 - (-5911.9106)] = 663.5470 > 3.84 = \chi^2_{0.05}(1)$, the LR test statistic is statistically significant at the 5% level. It denotes that

EGARCH is better than the GJR GARCH model fitted to Japan stock market, hence, this study capture the volatility asymmetry of Nikkei 225 stock return by the EGARCH(1,1) model.

For model diagnosing, the Liung and Box statistics given $Q(6) = 7.1909$ and $Q(12) = 13.5769$ for the standardized residual process and $Q(6) = 2.1089$ and $Q(12) = 3.0854$ for the square process. Therefore, there is no correlation or conditional heteroscedasticity in the standardized residuals of the fitted model and the above AR(1)-EGARCH(1,1) model is adequate.

5.2. Testing for the effect of transition of ruling party

Table 4 reveals that the coefficient of transition of ruling party dummy, a_1, is insignificantly related at 5% significant level on Nikkei 225 returns. This fact may be attributed to the Liberal Democratic Partys long-term rule since 1955 result in new ruling party still maintain the political hue of Liberal Democratic Party. Furthermore, the new political parties lack governmental experience, minority in Congress and interest group operate behind the scenes. These reasons generated economic performance following by transition of ruling party is not as good as the expectation of investors result in conservative investing action and behavior that may reduce the equity returns. Therefore, the insignificant coefficient, τ_1, indicates that the transition of ruling party effect in Japan is not a crucial variable to Nikkei 225 volatility. The dummy of 1987 Crash, a_2, shows that Nikkei 225 returns are significantly negative at the 1% level. On October 19, 1987, Black Monday, major stock market indices fell by a dramatic amount, the Dow Jones fell by almost a quarter (fell over 22 percent) and S&P 500 index fell over 20 percent. Actually, the Nikkei 225 index also slumped immediately after 1987 stock market crash. Fortunately, the trading system has 15% price limit and the Japanese government interfered in the bearish trend result in the trading volumes of Nikkei 225 got the highest trade record on Wednesday and Nikkei 225 stock price kept going upward until the end of 1980. Similarly, the volatility of the Nikkei 225, τ_2, is significantly positively related at the 5% level to the 1987 stock market crash, and the empirical findings herein are the same as those of Schwert (1990) and Engle and Mustafa (1992) stock volatility increased extensively after the 1987 crash.

The results in this study tend to support the ritual scapegoating theory, in that a change of the prime minister does not obviously affect the Japanese economy. The Japanese have no real choice of other political parties, so Japanese voters take apathy attitude toward political environment. Therefore, the succession of prime ministers does not influence the Japanese stock market behavior. Despite Japan's experience of many prime ministers and its implementation of various economic policies, the Japanese

economy has not yet improved. Accordingly, responsible prime ministers in all previous sessions have become scapegoats for bad financial policy.

TABLE 4.

The Empirical Results of AR(1)-EGARCH Model

$R_t = a_0 + a_1 D_1 + a_2 D_2 + b_1 R_{t-1} + \varepsilon_t$
$\ln h_t = \tau_0 + a_1 D_1 + a_2 D_2 + \alpha[|u_{t-1}| - E|u_{t-1}| + \theta u_{t-1}] + \beta \ln h_{t-1}$
D_1 denotes the dummy of the change of ruling party and
D_2 denotes the dummy of 1987 Crash.

Variable	Return	Volatility
Constant	0.0668^{**}	0.0260^{**}
	(0.0143)	(0.0058)
The Effect of the change of ruling party	-0.03492	-0.0062
	(0.0391)	(0.0075)
The Effect of 1987 Crash	-0.0565^{*}	0.0351^{**}
	(0.0230)	(0.0071)

Coefficient	**Estimation**	**Coefficient**	**Estimation**
β	0.9715^{**}	α	-0.4223^{**}
	(0.0040)		(0.0545)
θ	0.1885^{**}	VD	5.9608^{**}
	(0.0136)		(0.3270)
b_1	0.0110		
	(0.0129)		
Model Diagnosis			
$Q(6)$	7.1909	$Q(12)$	13.5769
$Q^2(6)$	2.1089	$Q^2(12)$	3.0854

Notes: 1. Numbers in parentheses are asymptotic standard error.
2. ** (*) denotes statistical significance at 1%(5%) level.
3. VD denotes degrees of freedom.
4. $Q(6)$ ($Q^2(6)$) is the Linjung-Box Q statistic for the returns (the squared returns) lagged 6 trading days and its critical value at 5% significant level is 12.5916.
5. $Q(12)$ ($Q^2(12)$) is the Linjung-Box Q statistic for the returns (the squared returns) lagged 12 trading days and its critical value at 5% significant level is 21.0261.

6. CONCLUSIONS

This study empirically examines the effect of party alternative on Nikkei 225 stock returns and volatilities using the EGARCH model from November 9, 1979 to April 26, 2001. This investigation found that Nikkei 225 returns and volatilities are insignificantly related at 5% significant level for transition of ruling party. However, the effect of 1987 Crash on Nikkei 225

stock returns is significantly negative at the 1% level and is significantly increased at the 5% level of volatilities.

Japan pursued economic prosperity in the second half of the 20th century. The remarkable trajectory of Japanese economic growth was interrupted by the oil crisis of the 1970s. This was an inflection point in rapid growth of Japanese economy. After that, Japanese economic growth rate gradually shifted with a downward tendency. From the beginning of the 1990s, Japan had entered a protracted recession. Though all previous Japanese prime minister devised various policies to reform financial and economic system based on Western financial paradigm, the investors seemed to lack confidence in related economics and financial policies and disillusioned with the nature and style of Japan politics. Therefore, in responsive governance, all previous resigned prime ministers have become scapegoats for poor Japanese economy.

Japan represents modern democracy in Asian, therefore, the development of Japanese politics and economy has affected other emerging Asian democratic countries. It seems that Japanese economy will face an even more problematic situation following the politician make decisions quickly without foresight. The results of this study perhaps provide a severe warning for myopic voters and investors that there is no need to overestimate the reformative effect of the transition of ruling party.

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