The Day-of-the-Week Effect’ Asymmetry in Return and Volatility in China: An Empirical Study

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Abstract. This paper aims to investigate the day-of-the-week effects’ asymmetry based on the CSI300 Index, the Shanghai Composite Index and the Shenzhen Component Index. The Kruskal–Wallis test established that the day-of-the-week effects exist in Chinese stock markets. In addition, the Brown–Forsythe test was applied to investigating the constancy of variances across the days of the week, which demonstrated that only the Shanghai Composite Index satisfies the null hypothesis of constancy variances. Furthermore, the first-generation threshold models were used to assess the day-of-the-week effects’ asymmetry. Comparative analysis of ARMA-GARCH, ARMA-GJR-ARCH and ARMA-APARCH using the Engle and Ng test implied that ARMA-GJR-GARCH and ARMA-APARCH could explain Chinese stock markets better; the Nyblom test showed the parameters’ constancy in these models. Finally, and most importantly, with the aid of the sensible proxy variable of the volatility, the Diebold–Mariano test was used to compare the forecasting performance of competing models; the results indicated that for the CSI300 and Shanghai Composite Indices, ARMA-GJR-GARCH displays better performance than ARMA-APARCH. However, for the Shenzhen Component Index, no significant difference was observed between the two models.

1. Introduction
In the stock market, the day-of-the-week effect is one of the most extensively documented seasonal anomalies, wherein stocks yield markedly more on some days of the week than that on others. To date, the literature on financial market anomalies has primarily studied the scale effect, stock split effect and seasonal effect. Several facts indicate the existence of some predictable patterns in the weekly rate of return. Empirical studies have reported that the day-of-the-week effect occurs not only in the United States, the world’s largest capital market, and some other developed markets (e.g., Britain, France, Canada, Australia, and Japan) but also in emerging markets (e.g., mainland China, Malaysia, Hong Kong, and Turkey).

To date, what elucidates the difference in expected earnings between different trading days of the week remains unclear. The weekend effect can be explained by several possible explanations, including measuring error, delay between stock trading and liquidation, experts-related bias of price, spillover effects from other big markets, specific concentration of investment decision, etc.. Of note, the above reasons do not entirely explain the anomalies in a week, and, to date, no study has thoroughly illustrated this phenomenon; hence, this market anomaly constitutes a fascinating research topic.

Although numerous scholars in China study the day-of-the-week effect of stock market returns, relatively few studies the day-of-the-week effect of volatility. Based on the existing research, this
paper aims to investigate the day-of-the-week effect of volatility of the CSI300 Index, the Shanghai Composite Index and the Shenzhen Component Index using a set of tests postulated by Engle and Ng—sign bias test, negative size bias test, positive size bias test and join test—which revealed that the fitting property of the model is better than the general GARCH model after the introduction of asymmetric effect. In this study, Nyblom test was used for the parameter stability test in the first-generation threshold model and Diebold–Mariano test to assess which model has better predictive ability, which is also of value in this paper.

2. Literature Review

The day-of-the-week effect, which implies that investors can profit from these seasonal patterns through a particular trading strategy, seemingly contradicts the efficient market hypothesis. Nevertheless, Kohers et al. (2004) [1] believed that the day-of-the-week effect might have disappeared in recent years because of the improvement of the market effectiveness over time. Cho (2007) [2] tested the ‘Monday effect’ of the daily return of the stock index based on the random dominance criterion; the author applied the test to a broad range of stock indices, including US Large-Cap and Small-Cap Indices, UK indices and Japanese indices. Berument and Kiyamaz (2001) [3] allowed different weeks of constant change and used the GARCH specification for day-of-the-week effect modelling; the results revealed that both the returns and volatility of the S&P 500 Index have the day-of-the-week effect.

Likewise, domestic scholars have also conducted extensive research on the day-of-the-week effect. In an empirical study using the GARCH model, Ji Zheyun (2018) [4] confirmed that the average return rate of the Shanghai stock market exhibited a significantly negative ‘Thursday effect’ and inferred that the volatility of the Shanghai stock market was highly persistent. Zhou et al. (2017) [5] established the AR-GARCH-GED model to analyse the Shanghai Composite Index in the past 25 years; after using sliding window regression to investigate the significant proportion of day-of-the-week effect on the whole, they believed that the considerable portion of day-of-the-week effect only accounted for a relatively low level.

In addition, marked differences exist in day-of-the-week effects owing to differences in investor behaviour patterns in different economic periods. Shi and Ai (2016) [6] extended the GARCH model to the time-varying parameter case based on the weekly calendar to portray the generalised intra-week characteristics of the volatility. The empirical structure revealed that the volatility displays a pronounced day-of-the-week effect in the traditional sense; the volatility of China’s stock market has a ‘leverage effect’ with intra-week characteristics, and the stock market’s consecutive decline will only push up the volatility of the stock market on Wednesday and Thursday, among which Thursday is more significant. Based on the extensive use of the GARGH model by scholars, Shi (2017) [7] investigated the breadth and applicability of the model and illustrated the correlation between the structure of the GARGH model and the ‘day-of-the-week effect’ under the conditional variance.

The asymmetry of the stock market fluctuation implies that the same degree of positive and negative information exerts a different impact on the stock market fluctuation. As most empirical studies mentioned above jointly estimated the day-of-the-week effect of earnings and volatility, it was impossible to determine whether asymmetry affected the day-of-the-week effect of volatility. Based on this problem, this paper aims to establish whether there will be a new understanding of the day-of-the-week effect of volatility after considering the asymmetric effect of the positive and negative impact on volatility. Hence, this paper aims to investigate whether the day-of-the-week effect will be markedly reduced after asymmetric correction. On this basis, this paper uses the GARCH model to study the impact of the day-of-the-week effect on Chinese stock market under the prediction framework.

3. Sample Data and Its Statistical Description

In this study, data were obtained from the RESSET database. The research objects were the daily closing price of the CSI300 Index, the Shanghai Composite Index and the Shenzhen Component Index,
and the selected time interval was January 1, 2011 to December 31, 2017. The sample size was 5839. The three indices studied can precisely reflect the real situation of China’s stock market and are representative of the study on the asymmetric day-of-the-week effect of the volatility of China’s stock market. The calculation formula of return rate is as follows:

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

where \( P_t \) is the closing price at time \( t \).

Table 1 provides descriptive statistics of the daily returns of the selected three indices; the average daily returns of the CSI300 Index, the Shanghai Composite Index and the Shenzhen Component Index are positive, amongst which the average daily return of the Shenzhen Component Index is the highest (0.211%). The yields on Monday were the highest in a week, and the volatility was the highest.

The skewness of the CSI300 Index, the Shanghai Composite Index and the Shenzhen Component Index is negative, suggesting that they are asymmetric and have left-trailing phenomenon; their kurtosis values are relatively high (greater than the normal distribution value 3), and it can be found from the JB value that their distribution does not conform to the normal distribution.

### Table 1. Statistical description of data of the CSI300 Index, Shanghai Composite Index and Shenzhen Component Index.

|                | Mean   | Minimum | Maximum | Standard deviation | Skewness | Kurtosis | JB     |
|----------------|--------|---------|---------|--------------------|----------|----------|--------|
| **CSI300 Index** |
| Total sample   | 0.000819 | -0.090092 | 0.08931 | 0.02052            | -0.4149  | 5.3181   | 382.67* |
| Monday         | 0.004211 | -0.085677 | 0.07908 | 0.02427            | -0.6897  | 4.3882   | 43.56*  |
| Tuesday        | -0.00201 | -0.097782 | 0.03367 | 0.01919            | -1.4081  | 6.9142   | 499.84* |
| Wednesday      | 0.002392 | -0.09097  | 0.079090 | 0.02078          | -0.0407  | 4.9125   | 43.87*  |
| Thursday       | -0.00087 | -0.090902 | 0.0878  | 0.01924            | -0.2411  | 5.2016   | 64.46*  |
| Friday         | 0.000850 | -0.67677 | 0.09931 | 0.01828            | 0.1290   | 5.2905   | 66.63*  |
| **Shanghai Composite Index** |
| Total sample   | 0.000814 | -0.0934  | 0.01046 | 0.02886            | -0.1226  | 5.7618   | 385.65* |
| Monday         | 0.00317  | -0.0618  | 0.0921  | 0.02030            | 0.0800   | 5.7614   | 94.97*  |
| Tuesday        | -0.00237 | -0.0933  | 0.0928  | 0.01830            | -0.0358  | 6.0769   | 129.36* |
| Wednesday      | 0.00256  | -0.07902 | 0.712   | 0.03033            | -0.286   | 4.6901   | 44.84*  |
| Thursday       | -0.00101 | -0.08875 | 0.0773  | 0.01759            | -0.6401  | 6.5144   | 178.41* |
| Friday         | 0.000911 | -0.0677  | 0.0956  | 0.01842            | -0.1466  | 5.976    | 110.78* |
| **Shenzhen Component Index** |
| Total sample   | 0.00241  | -0.0121  | 0.0990  | 0.02134            | -0.2907  | 4.9150   | 348.02* |
| Monday         | 0.004658 | -0.0819  | 0.705   | 0.02523            | -0.5117  | 3.9900   | 24.64*  |
Before investigating and comparing the returns of different trading days, it is essential to check the homoscedasticity in the fluctuations on different trading days. In this study, the Brown–Forsythe test (Brown, Forsythe, 1974) was used to test the homoscedasticity to determine whether k samples have the same variance. The Brown–Forsythe test is more robust than other methods when the studied samples present non-normal distribution.

Table 2 presents the test results. The CSI300 Index and Shenzhen Component Index rejected the assumption that the variance of returns on different trading sessions in a week was constant, whilst the Shanghai Composite Index accepted the assumption. Hence, the Kruskal–Wallis test was used to analyse the existence of the day-of-the-week effect in this study; the results revealed that all three indices rejected the assumption of the relative average daily return, that is, a significant difference exists in the returns of different trading days within a week, and there is a day-of-the-week effect.

### Table 2. The test of the homoscedasticity and average daily return of the CSI300 Index, Shanghai Composite Index and Shenzhen Component Index.

| Index                  | Brown–Forsythe | Kruskal–Wallis |
|------------------------|----------------|---------------|
| CSI300 Index           | 0.0003*        | 0.0003*       |
| Shanghai Composite Index| 0.4002        | 0.009*        |
| Shenzhen Component Index| 0.0000*       | 0.0031*       |

### 4. Research Methods and Ideas

Financial time series (such as stock return series) often exhibit the ARCH effect, that is, the clustering effect of the volatility. In this paper, the first-generation threshold model was selected to study the asymmetric effects of the volatility: GJR-GARCH model and APARCH model.

The GJR-GARCH model was adopted to study the day-of-the-week effect of the volatility. To eliminate autocorrelation and other problems, the following model was established:

$$R_t = \mu_0 + \sum_{i=1}^{p} \phi_i R_{t-i} + \sum_{j=1}^{q} \theta_j \epsilon_{t-j} + \sum_{k=2}^{5} \lambda_k D_{kt} + \epsilon_t$$

$$\epsilon_t \mid \Omega_{t-1} \sim N(0, \sigma_t^2)$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 \epsilon_{t-1}^2 + \beta \sigma_{t-1}^2 + \gamma \epsilon_{t-1}^2 | I_{t-1} + \sum_{k=2}^{5} \delta_k D_{kt}$$

where, $R_t$ represents the yield of trading day $t$ and $D_{kt}$ represents that the trading day $t$ is the $k$ day of a week. To avoid the dummy variable trap, Monday was set as the basis. For example, when the trading day $t$ is Tuesday, $D_{2t}$ is 1, and the remaining time takes the value of 0. To guarantee the non-negativity of the conditional variance (hence), the parameters must satisfy the conditions of $\alpha_0 \geq 0$, $\alpha_1 \geq 0$ and $\beta \geq 0$.

In the absence of asymmetric day-of-the-week effect of the volatility within a week, the $\gamma$ value should not be significant, that is, the null hypothesis that the coefficient is equal to 0 is accepted.
In addition, the ARARCH model was used to investigate the asymmetric day-of-the-week effect of the volatility, as this model can capture the leverage effect. The model is as follows:

\[ R_t = \mu_0 + \sum_{i=1}^{p} \phi_i R_{t-i} + \sum_{j=1}^{q} \theta_j \epsilon_{t-j} + \sum_{k=2}^{5} \delta_k D_{kt} + \epsilon_t \]

\[ \sigma^2_t = \alpha_0 + \sum_{i=1}^{q} \gamma_i (|\epsilon_{t-i} - \gamma_i|) + \sum_{j=1}^{p} \beta_j \sigma^2_{t-j} + \sum_{k=2}^{5} \delta_k D_{kt} \]

This model can derive, at least, seven models as the parameters change.

The parameters \( a_0 \geq 0, \nu \geq 0, \) and \( \beta_j \geq 0 \) (\( j = 1, \ldots, p \)); whilst \( a_i \geq 0 \) and \(-1 < \gamma_i < 1\) (\( i = 1, \ldots, q \)). This paper focused on the value of \( \gamma_i \), which is a parameter that captures the asymmetric effects up to the \( r \)-order. If \( \gamma_i \) is not significantly 0, it indicates an asymmetric effect. Other variables and parameters of the equation are basically consistent with the GJR-GARCH model.

5. Empirical Analysis and Results

In this study, the ARMA(1,1) model was used to conduct the Breusch–Godfrey LM series correlativity test. Then, ARCH-LM was used to test the ARCH effect. Finally, BDS was used to test whether the series is nonlinear. The results revealed no autocorrelation in the equation; for the ARCH-LM test of the equation, the results revealed an ARCH effect, that is, there is a time-varying characteristic. The BDS test revealed that the statistical value of BDS is markedly higher than the critical value, implying that the series is non-linear.

To better assess the impact of the asymmetric effect on the day-of-the-week effect of the volatility, this paper first considered the ARMA(1,1)-GARCH(1,1) model, which does neither considers the asymmetric effect nor introduces the dummy variable of the week. Table 3 summarises the estimated results.

Before considering the asymmetric effect, the model was first considered without introducing the dummy variable of the week in the GARCH model. Table 4 presents the estimated results of the ARMA-GH-GARCH and ARMA-APARCH models.

Table 3. Estimated results of the ARMA-GARCH model.

|                          | CSI300 Index | Shanghai Composite Index | Shenzhen Component Index |
|--------------------------|--------------|--------------------------|-------------------------|
| Mean equation            |              |                          |                         |
| \( \mu_0 \)              | 0.001031*    | 0.00113*                 | 0.001007*               |
| \( \varphi_1 \)          | -0.73007*    | 0.65041**                | -0.65734*               |
| \( \theta_1 \)           | 0.770183*    | -0.81037**               | 0.7225*                 |
| Variance equation        |              |                          |                         |
| \( \alpha_0 \)           | 0.00010067*  | 0.0000033*               | 0.0000064*              |
| \( \alpha_1 \)           | 0.070009*    | 0.045101*                | 0.060691*               |
| \( \beta_1 \)            | 0.92998*     | 0.9005693*               | 0.902812*               |

Table 4. Estimated results of ARMA-GJR-GARCH and ARMA-APARCH models.

|                          | CSI300 Index | Shanghai Composite Index | Shenzhen Component Index |
|--------------------------|--------------|--------------------------|-------------------------|
| Mean equation            |              |                          |                         |
| \( \mu_0 \)              | 0.005* (0.005*) | 0.003* (0.004*) | 0.005* (0.005*) |
| \( \varphi_1 \)          | -0.658* (-0.501*) | -0.819* (-0.881*) | -0.680* (-0.588*) |
When dummy variables were not considered in the fluctuation, the yield on Monday was markedly higher than that on other dates in all periods of a week in China, whilst the yield on Tuesday was just the opposite, the lowest value on all dates. The value of coefficient $\lambda$ is considerably different from 0; this result revealed that not only the futures market but also the stock market in China has a day-of-the-week effect. No asymmetric effect was observed on the CSI300 Index; the asymmetric effect here refers to the impact of negative news on the CSI300 Index. The impact of positive news on the CSI300 Index is symmetrical. However, for the Shenzhen Component Index, irrespective of the ARMA-GJR-GARCH or ARMA-APARCH model used for analysis, the asymmetric effect here refers to the impact of negative news on the Shenzhen Component Index. The impact of positive news on the CSC300 Index was, however, different for different models.

The research object of this paper is the asymmetric day-of-the-week effect of the volatility. The dummy variable was introduced into the GARCH model to observe whether the influence of different trading days on the volatility is the same in a week; Table 5 summarises the results.

As shown in Table 5, after introducing the dummy variable into the variance, the coefficients $\zeta_2$, $\zeta_3$, $\zeta_4$ and $\zeta_5$ of the dummy variable term were all negative, and the coefficients of Tuesday and Thursday were not significantly 0, suggesting that different trading days in a week also affected stock fluctuations. While the CSI300 Index exhibited no asymmetric effect, the Shanghai Composite Index and the Shenzhen Component Index displayed asymmetric effect. However, the Shenzhen Component Index only rejects the hypothesis that $\gamma$ is equal to 0 at the significant level of 10%.

The volatility can be predicted only when the parameters have stability in the sample, which enables to compare which one of the models can elucidate the fluctuations and changes of the stock market in China. The stability test of the parameters was conducted by the Nyblom test. The Engle and Ng test proposed a set of tests—sign bias test, negative size bias test, positive size bias test, and joint test—to diagnose whether a symmetric or an asymmetric model is more appropriate for the analysis and prediction of a given sample [2]; in this study, this set of tests was used to diagnose ARMA-GJR-GARCH and ARMA-APARCH. Table 6 shows the obtained results:

Table 5. The estimated results of ARMA-GJR-GARCH and ARMA-APARCH with a dummy variable.
Table 6. Diagnostic test results of ARMA-GJR-GARCH and ARMA-APARCH.

|                | CSI300 Index                  | Shanghai Composite Index                  | Shenzhen Component Index                  |
|----------------|--------------------------------|-------------------------------------------|-------------------------------------------|
| LM(10)         | 0.9702(0.9005)                | 0.59(0.8635)                              | 0.6478(0.6001)                            |
| SBT            | 0.4195(0.5334)                | 0.043**(0.0526)                           | 0.1672(0.2965)                            |
| NSBT           | 0.5715(0.6419)                | 0.1985(0.1942)                            | 0.8984(0.9785)                            |
| PSBT           | 0.1576(0.1358)                | 0.9232(0.9182)                            | 0.6340(0.5413)                            |
| JT             | 0.1567(0.1736)                | 0.1549(0.1338)                            | 0.1208(0.2130)                            |

Nyblom test

|                | CSI300 Index                  | Shanghai Composite Index                  | Shenzhen Component Index                  |
|----------------|--------------------------------|-------------------------------------------|------------------------------------------|
| \(\alpha_1\)  | 0.1300(0.1777)                | 0.09115(0.1456)                          | 0.1460(0.1788)                           |
| \(\beta_1\)   | 0.1233(0.1707)                | 0.1338(0.12337)                          | 0.1897(0.1237)                           |
| \(\gamma\)    | 0.18(0.2194)                  | 0.1007(0.2234)                           | 0.2594(0.2194)                           |
| \(\nu\)       | —(0.2236)                     | —(—)                                     | —(0.2236)                                |
| \(\zeta_2\)   | 0.1884(0.2047)                | 0.2127(0.1235)                           | 0.1123(0.2042)                           |
| \(\zeta_3\)   | 0.1770(0.2463)                | 0.2347(0.1307)                           | 0.1222(0.2343)                           |
| \(\zeta_4\)   | 0.1980(0.2325)                | 0.2451(0.2231)                           | 0.1241(0.2235)                           |
| \(\zeta_5\)   | 0.2113(0.2001)                | 0.1897(0.2346)                           | 0.1789(0.2471)                           |

Note: All values in the table are P values. Nyblom’s test statistic has a threshold value of 0.75 at a 1% significance level and a threshold value of 0.47 at a 5% significance level.

Table 7. Diebold–Mariano test results

|                | ARMA-GJR-GARCH VS ARMA-APARCH |
|----------------|--------------------------------|
| CSI300 Index   | -2.374** (0.0176)              |
| Shanghai Composite Index | -7.962* (0.0000)              |
| Shenzhen Component Index   | 1.306 (0.1914)                |

Note: The value in the parentheses is the P value. The null hypothesis H0; the forecast accuracy is equal for both models, where the Stata software automatically generates the better of the two models.

Table 6 illustrates that the model with asymmetric effect can better reflect the rule and situation of the stock market fluctuation in China, and the results of Nyblom test revealed that the parameters in the model are stable, that is, the model presents a good stability in the given research sample.

After establishing that the ARMA-GJR-GARCH and ARMA-APARCH models passed the Nyblom parameter stability test, the Diebold–Mariano test was used to compare the forecasting ability of the forecasting model. We divided into in-sample data and out-of-sample data, of which the first 1435 samples were used as in-sample data to estimate the model, and the last 80 data were used as out-of-sample data for forecasting.

Nevertheless, the measurement method of the volatility is difficult to show significantly, making it difficult to evaluate the volatility model. For solving this problem, a proxy variable was tailored for the volatility to replace it and comprehensively compared between the selected proxy variable and the
volatility predicted by the model to speculate the feasibility of using this model. However, it should be noted that when the standard method is used to compare the predictive value of conditional variance, the accuracy of the estimated value is worth considering if imperfect or unbiased volatility proxy variables are used.

To solve this problem, Alizadeh proposed some solutions and methods. For example, the natural logarithm series of the difference between the highest price and the lowest price per day \( \ln(\sup i t p_t - \inf i t p_t) \) (\( p_t \) is the daily closing price of index \( i \) at time \( t \)) to measure the volatility; they considered it a relatively reasonable method because compared with the square series of the rate of return, the measurement error of the log series will be smaller. Assumedly, the price of an asset undergoes a large fluctuation on a certain day and, finally, its closing price is very close to the closing price of the previous day. If the square of the daytime rate of return is used as the measured value, even the daytime price fluctuates markedly, the value obtained is very low. However, if the natural logarithmic series of the difference between the highest price and the lowest price is used, the price fluctuations are more precisely reflected, and the high volatility of the trading day can be presented.

Secondly, market microstructural effects (such as bid-ask spreads) could exert an impact on the time series, and logarithmic series performance overcomes this weakness to make the value appear more robust. Meanwhile, the logarithmic series distribution is very close to the normal distribution, and the Gaussian maximum likelihood estimation model can be used.

Table 7 summarises the results of the DM test. The ARMA-GJR-GARCH model exhibited better forecasting ability than APGARCH when studying the asymmetric day-of-the-week effects of the volatility of the CSI300 Index and Shanghai Composite Index, and both rejected the assumption that the forecasting ability is equal at a significant level of 5%. However, for the Shenzhen Component Index, the forecasting ability of GJR-GARCH and APGARCH is basically the same without significant difference.

6. Conclusions
This paper investigated the volatility of the three major indices—the CSI300 Index, the Shanghai Composite Index and the Shenzhen Component Index—which are known as the barometer of China’s stock market and determined the presence of the day-of-the-week effects in China’s stock market. Monday’s yield is markedly higher than the yield of other trading days in a week, namely the ‘Monday positive effect’; Monday’s volatility is also the largest in a week, which can be primarily attributed to the fact that the release time of China’s macroeconomic policy is mostly on Friday, which also exhibits the characteristics of the ‘policy market’ of China’s stock market. Tuesday’s yield is the lowest in a week, showing a ‘Tuesday negative effect’. In most cases, Friday’s volatility is the lowest in a week.

Secondly, this paper uses the set of tests proposed by Engle and Ng to conduct a diagnostic test on the ARMA-GJR-GARCH and ARMA-APARCH models. The ARMA-GJR-GARCH and ARMA-APARCH models are better than ARMA-GARCH. After introducing dummy variables into the model, this study found that different trading days within a week exhibited an impact on earnings volatility. However, whether this impact could be attributed to investors’ awareness of this financial anomaly and taking certain measures to avoid it, follow-up studies are warranted.

This paper reveals that the asymmetry effect of the CSI300 Index is not apparent, but there exists an obvious asymmetry effect in the Shanghai Composite Index and the Shenzhen Composite Index. In addition, the \( \gamma \) coefficient is positive, which implies that the negative news exerts a stronger impact on the stock market than the positive news with the same impact intensity.

In recent years, with the gradual improvement of China’s financial market, the prediction of the volatility plays a vital role in securities evaluation, option pricing, risk management and other research fields and the decision making of industry executives. In addition, for the CSI300 Index and the Shanghai Composite Index, the forecasting ability of the ARMA-GJR-GARCH model is stronger than that of the ARMA-APARCH model, whilst for the Shenzhen Component Index, no significant
difference exists between the two models. Thus, when the relevant industry institutions are conducting securities evaluation, option pricing and risk management activities, they should consider the influence ability of the asymmetric day-of-the-week effect of returns and volatility. More importantly, how much weight should be assign to this factor should be considered. The questioning of such issues makes it more valuable for further exploration and research in this research field in the future.

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