The Analysis of Characteristics about Yield Fluctuation Based on Guizhou Moutai Stock
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**Abstract:** In view of Guizhou Moutai shares rose in the past three years, A GARCH model was established by Eviews software in this paper. The yield fluctuation characteristics of Guizhou Moutai were analyzed through stationarity test. The estimating equation of yield fluctuations was got. We found that there was positive, linear and correlation relationship between trading volume and yields, and the volume decline caused by the earnings volatility smaller than the volume rise caused by the fluctuation of the same size. By the results of this article, the volume to the stock yield played a role, it will help our understanding of corporate profitability and share price volatility characteristic and trend prediction, and it also has important practical significance.

**Keywords:** GARCH model; Share price; the yield.

INTRODUCTION

The stock market volatility is an important subject in the field of modern finance, while the Chinese stock market is one of the world’s most volatile markets, so it is particularly important to the study of Chinese stock market volatility. Now think about the stock market volatility research mainly has two directions: one is the research about the cause of volatility, which study the issue of why volatility; another is the research on volatility inherent law, namely the volatility characteristics of the study.

And research for volatility model mainly has two kinds, one kind is autoregressive conditional heteroscedasticity (ARCH) model (including the GARCH model), another kind is stochastic volatility (SV) model. Zhen-long Zheng [1] thought in the prediction period is relatively short, GARCH (1, 1) model contains information is more, the strongest predictive power, reflected the most comprehensive information. Single [2] pupil of the empirical research system by using the GARCH model analyzed the characteristics of the volatility in the stock price of Chinese stock market, found that the volatility of the stock market of our country has asymmetry and leveraged. Haidi [3] through research analysis when market or investor is perfectly rational, positive correlation between expected returns and volatility relations; And when the market or investors showed not completely rational, volatility is negatively related to the expected returns are often present a relationship; And when the rational investors and irrational investors in the market close, to forecast earnings volatility is weak. Dai Qingwen [4] through from the financial analysis of listed companies, proves that profitability is the core of the financial information a comprehensive evaluation of listed companies, earnings per share and net assets yield is the most significant impact on stock yield of financial indicators. Hu Hao [5] use a series of deep, analysis and comparison of the Shanghai stock market, the Shanghai stock market and Shenzhen stock markets are showing obvious volatility clustering, asymmetry and rush thick tail. Shanghai rush fat-tailed features than Shenzhen, and Shenzhen is bigger than Shanghai's volatile, risk is also higher.

GARCH model introduction

If a stationary random variable can be expressed as the return of order p process, namely \( x_t \sim \text{AR}(p) \), the variance of the random error term available error square of q order distribution lag model (DLM) description:

\[
x_t = \beta_0 + \beta_1 x_{t-1} + \beta_2 x_{t-2} + \cdots + \beta_p x_{t-p} + \mu_t
\]

\[
\sigma_t^2 = E(\mu_t^2) = \alpha_0 + \alpha_1 \mu_{t-1}^2 + \alpha_2 \mu_{t-2}^2 + \cdots + \alpha_q \mu_{t-q}^2
\]
Say $\mu_t$ to q order process of the ARCH, remember to do $\mu_t \sim ARCH(q)$, including (1) type called average equation, (2) type called ARCH equation.

Among them, in order to ensure the stability, (1) should also meet the conditions, the characteristic equation

$$1 - \beta_1 L - \beta_2 L^2 - \cdots - \beta_p L^p = 0$$

(3)

ARCH (q) model (2) is about $\sigma^2_t$ distributed lag model. To avoid the lag of $\mu^2_t$ too much, can be used to join $\sigma^2_t$ lagging way, namely:

$$\sigma^2_t = \alpha_0 + \alpha_1 \mu_{t-1} + \lambda_1 \sigma^2_{t-1}$$

(4)

This model for the generalized autoregressive conditional heteroscedastic model, using GARCH (1, 1), where $\mu_{t-1}$ is called the ARCH, $\sigma^2_{t-1}$ is called GARCH, (4) shall meet $\alpha_0 > 0, \alpha_1 \geq 0, \lambda_1 \geq 0$.

Guizhou Moutai stock yield fluctuation characteristics analysis

Stock yields a statistical description

Guizhou Moutai increase a lot in the last three years, for growth stocks, have very high research value, this article from the "great wisdom" 365 on July 21, 2017, to find until June 19, 2018 deal closing price as the research object, a total of 222 data.

We can see from the diagram, the sequence of yield of the Guizhou Moutai has obvious aggregation, a high yield after getting higher yields, a low yield after getting lower yields.
Can get some basic statistics, Guizhou Moutai yield sequence according to the basic statistics shown in the figure, the yield sequence has obvious peak phenomenon (kurtosis = 4.584347), back to starboard (partial degree is 0.60876), at the same time, JB statistics p value is zero, Guizhou Moutai yield sequence is not normal distribution.

Then we autocorrelation and partial autocorrelation test was carried out on the data, get the results as shown in figure-3, we can find that, the sequence of the autocorrelation coefficients (AC) is not quickly approaching with 0, but the volatility happened near the zero, thus we know, the original data sequence is smooth sequence.

From the above we can know, on the yield of Guizhou Moutai is smooth time series. So we can use equation (5) to the fitting.

$$r_t = \mu_r + \epsilon_t$$  \hspace{1cm} (5)
Can be seen from the figure estimated results, intercept items are not significant when significance level of 0.1 (p = 0.0857 under the significance level of 0.1, t_{0.05/2} = 2.617 > 1.726329). Possible factors exist different variance influence as a result, so the GARCH effect inspection.

From the sequence of yield of the Guizhou Moutai and volume of GARCH estimation results showed that the mean equation, GARCH equation of the ARCH and GARCH coefficients are significant. There was positive correlation relationship between revenue and volume of Guizhou Moutai. And RESID (1)^2 and GARCH (1) the coefficient of one is a negative, that volume decline caused by the earnings volatility than smaller volume rise caused by the fluctuation of the same size. Therefore, can come to Guizhou Moutai yields GARCH equation is:

\[
\begin{align*}
\{ y_t = & -5507 .510 + 73 .82705 \ y_{t-1} + \mu_t \\
\sigma^2_t = & 265327467 + 0.6019983 \ y_{t-1}^2 - 0.189242 \sigma^2_{t-1}
\end{align*}
\]

We can draw: \( \mu_t = y_t + 5507 .510 - 73 .82705 \ y_{t-1} \)

Therefore, can come to Guizhou Moutai earnings equation estimation formula is:

\[
r_t = y_t + 5507 .510 - 73 .82705 \ y_{t-1} + \epsilon_t
\]
Among them, where yield was represented by $r_t$, the volume was represented by $y_t$, $\mu_t$ is the non-serial correlation of random disturbance, the amount of random error was represented by $\varepsilon_t$.

CONCLUSION
Through the above empirical analysis, the sequence of yield of the Guizhou Moutai is smooth, it can be seen that there is linear relationship between yields and the volume, so you can think the volume, of the impact of income is positive correlation, and the volume decline caused by the earnings volatility than smaller volume rise caused by the fluctuation of the same size. Guizhou Moutai price yields with historical trading data there exists a linear relation, the day before the two days of trading data has a certain influence on still. By the research result of this paper, Guizhou Moutai price yield has close relation with historical trading data, so you can trade through the historical data to predict Guizhou Moutai price yield, the price of this results in Guizhou Moutai yield and trading prediction plays an important role, and the yield of other stock and trade situation forecast also to have certain reference significance.

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