Research on the Relationship of CPI and Its Volatility: Based on the GARCH and SV Model

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Abstract
This paper use GARCH and SV model to evaluate the volatility of CPI and analysis the relationship between CPI and volatility. The results show China's CPI volatility has obvious characteristics of persistence. CPI rate has a positive effect on volatility of GARCH, it supports the Friedman-Ball hypothesis. Volatility of SV has a positive effect on CPI rate, it supports the Cukierman-Meltzer hypothesis.

Keywords: CPI; Volatility; SV-M Model; Impulse Response Analysis.

I INTRODUCTION

Theoretically, there are different point of views of relationship about inflation and its fluctuation. Firstly, it is thought that inflation will cause inflation fluctuation. In 1977, Friedman first proposed that positive correlation is existed between the inflation and inflation fluctuation, and he thought that, based on the big deviation of the public's expectations of inflation and the actual inflation, the higher inflation will lead to the fluctuation of inflation and low output levels \(^1\). In 1992, Ball developed his theory, and pointed out that their positive correlation was caused by the asymmetric information between the public and policy makers. At last, he established a model. The above views are called Friedman - Ball hypothesis. Secondly, it is thought that inflation fluctuation has an impact on inflation \(^2\). In 1986, Cukierman and Meltzer suggested that the central bank had two goals: pursuit of low inflation and boosting the economy by taking advantage of the inflation expectation level, however, under the condition that the accurate inflation expectation cannot be formed because of the public’s uncertainty about the reason of inflation, the monetary authority formulated policies to stimulate the economy to make the inflation fluctuation positively influence the inflation. This view is called Cukierman - Meltzer hypothesis \(^3\). In 1995, Holland refuted the Cukierman and Meltzer hypothesis, argued that, for stability, policy makers will take active measures to control the fluctuation of inflation with implementing tight monetary policy to make a negative relationship between inflation fluctuation and inflation \(^4\).

Theory of the relationship between inflation and inflation fluctuation is relatively rare in China, but there are still academics having launched the empirical analysis. In 2005, Mr. Zhao Liuyan and other academics thought that high inflation will be accompanied by a larger fluctuation based on the Markoff’s Regime Switching Analysis \(^5\). In 2007, Mr. Chen Tai-ming found that inflation fluctuation is negatively related to the rate of inflation through GARCH-M model by applying the annual low frequency data \(^6\). In 2006, Mr. Zhou Hongshan and other academics got the result that

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the relationship between China's inflation and fluctuation supported the Friedman - Ball hypothesis by taking advantage of the TGARCH and Granger causality test \[^7\]. In 2008, Mr. Hu Ridong and Su Zhifang’s conclusion of application linear and nonlinear regression model supported both of the Friedman - Ball hypothesis and the Cukierman - Meltzer hypothesis \[^8\][^9\]. In 2010, Mr. Liu Jin-quan and Sui Jian-li pointed out that the inflation rate and fluctuation have a long term memory, and significant Granger influence of inflation rate was on the inflation fluctuation \[^10\]. In 2011, Mr. Chen Tibiao and Rao Xiao-hui found that inflation and inflation fluctuation presented nonlinear U-type relationship by using data from 1990, which supported the Friedman - Ball hypothesis, while the Cukierman - Meltzer hypothesis in the left side of U-type was supported, and the Holland hypothesis on the right side was supported \[^11\]. Mr. He Qi-zhi and Fan Cong-lai in 2011, Zhang Huanming in 2013 also get the result empirically that price fluctuation has a significant positive influence on inflation \[^12]\[^13\].

Compared with previous empirical literatures, the above-mentioned articles were all using year-on-year CPI index to stand in the rate of inflation which could not reflect the latest dynamic price trend. Therefore, in this paper, the change rate of monthly CPI is used for the analysis. In the empirical analysis, for comparison, it also estimates the inflation fluctuation of GARCH model, and investigates its relationship with the rate of inflation.

II Model and Data

(1) GARCH and GARCH-M Model

In 1986, Bollerslev proposed a generalized autoregressive conditional Heteroscedastic Model to describe the "fluctuation clustering" of time series. The form of model is:

\[
\begin{align*}
    r_t &= c + \rho_1 r_{t-1} + \cdots + \rho_m r_{t-m} + \varepsilon_t \\
    h_t &= \sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1}; \quad \varepsilon_t \mid \Omega_{t-1} \sim N(0, h_t)
\end{align*}
\]

It is known as the GARCH(1,1) model, in which (1) is called the mean equation, (2) is the fluctuation equation, and \( r_t \) can be regarded as the CPI growth rate in the paper. It can be seen that the variance \( \sigma_t^2 \) of the random error term is composed of three parts: the constant term, the residual sum of square (ARCH term) of the previous period and the forecast variance (GARCH term). Then the conditional fluctuation level of the sequence can be obtained through the GARCH model.

Although the pure GARCH model can effectively get the conditional fluctuation, but from viewing its mean equation, it can be seen that no matter how much is the fluctuation of the growth rate series \( r_t \), the \( r_t \) will not be affected, which is obviously not in line with the theory of economic cycle. Therefore, the GARCH model was transformed to GARCH-M model, namely:

\[
\begin{align*}
    r_t &= c + \rho_1 r_{t-1} + \cdots + \rho_m r_{t-m} + \varphi g(h_t) + \varepsilon_t \\
    h_t &= \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1}; \quad \varepsilon_t \mid \Omega_{t-1} \sim N(0, h_t)
\end{align*}
\]

In which, \( h_t \) is the conditional heteroscedasticity, \( g(h_t) \) is the function of \( h_t \), generally, \( g(h_t) = h_t^{0.5} \), that is the conditional standard error, which is as the measuring standard of the corresponding fluctuation index. The symbol of influence coefficient \( \varphi \) reflects the influence of
fluctuation rate on the growth rate. GARCH-M model generally uses the maximum likelihood method to estimate the parameters.

(II) SV and SV-M Model

Standard random fluctuation is introduced by Harvey and Jacquier in 1994. It is a kind of fluctuation analysis model which has a very good application prospect. Its model form is:

\[ r_t = \beta_0 + \sum_{i=1}^{p} \beta_i r_{t-i} + \exp(h_t/2)\varepsilon_t, \varepsilon_t \sim N(0,1) \]  \hspace{1cm} (5)

\[ h_t = \mu + \sum_{i=1}^{k} \varphi_i h_{t-i} + \sigma_i \eta_t, \eta_t \sim N(0,1) \]  \hspace{1cm} (6)

In which, \( r_t \) is the inflation rate at \( t \); \( \beta_t \) (\( i = 1, \cdots, p \)) is the autoregressive parameters of mean equation; \( \beta_0 + \sum_{i=1}^{p} \beta_i r_{t-i} \) is the mathematical expectation of the following period; \( h_t \) is the logarithm form (\( h_t = \ln(\sigma_t^2) \)) of potential fluctuation; \( \varepsilon_t \) is a martingale difference sequence, which generally assumed to be the white noise sequence, with \( \varepsilon_t \) and \( h_t \) being mutually independent; \( \mu \) and \( \varphi_i (i = 1, \cdots, k) \) stand for the autoregressive parameters of fluctuation equation; \( \eta_t \) is the disturbance, obeying the independent normal distribution, \( \varepsilon_t \) and \( \eta_t \) is also mutually independent. Similar to the GARCH-M, on the basis of basic SV model, SV-M (stochastic fluctuation in mean) was gained through introducing the fluctuation term to the mean equation as an influence factor of inflation expectation to indicate the function of the CPI fluctuation on the CPI growth rate.

\[ r_t = \beta_0 + \sum_{i=1}^{p} \beta_i r_{t-i} + d \exp(h_t) + \exp(h_t/2)\varepsilon_t, \varepsilon_t \sim N(0,1) \]  \hspace{1cm} (7)

\[ h_t = \mu + \sum_{i=1}^{k} \varphi_i h_{t-i} + \sigma_i \eta_t, \eta_t \sim N(0,1) \]  \hspace{1cm} (8)

At this time, the inflation rate is desired to be \( \beta_0 + \sum_{i=1}^{p} \beta_i r_{t-i} + d \exp(h_t) \), in which, \( d \) stands for the risk spillover coefficient, using to measure the influence of fluctuation on the CPI growth rate, \( d > 0 \) indicates that fluctuation has a positive effect on CPI, the values of \( d \) represent the influence degree of fluctuation when it increases one unit on the CPI.

Since the SV model is more complex than the GARCH model with its likelihood function cannot be directly obtained, MCMC method is selected to carry out the estimation in this paper. The factor obtained by MCMC method being based on the given initial value, via sampling and iterations of Gibbs until the posterior condition of parameters being steadily distributed, is called the parameter estimation value. Due to the fluctuation term being introduced in the mean equation of both of the GARCH-M and SV-M model, the conditional fluctuation will often not be correct with the estimation of this model. Therefore, in this paper, the estimation results of GARCH-M and SV-M model are first used to judge the influence of the CPI fluctuation on the CPI change rate, and to verify the existence of the Cukierman-Meltzer hypothesis and Holland's view; secondly, estimate the GARCH and SV model to obtain the conditional standard error (fluctuation) and use the statistical method to judge the mutual relationship between the conditional standard error (fluctuation) and the CPI growth rate.

(III) Data illustration

The study sample in the paper selects the monthly data from January 1987 to December 2013 from the database of the National Bureau of Statistics and “China Monthly Statistics”.
Month-on-month data was applied to carry out the analysis in the paper. But due to the seasonal characteristics, the X-12 Seasonal Adjustment Method is used to do some adjustment. After getting the fixed base price index $cpisa$ after seasonal adjustment, take logarithmic and one-order difference of $cpisa$ as the monthly inflation change rate, namely:

$$r_t = [\ln(cpisa_t) - \ln(cpisa_{t-1})] \times 100$$

![Figure 1. CPI year-on-year index and fixed-base index.](image)

According to the regular CPI in Figure 1, it can be seen that from 1987 to 2013, China's price level has been in a rising trend; but before 1996, the overall price level rose rapidly, and from 1996, especially during the period from 1997 to 2005, price change being very small; after 2005, it presented a slowly rising trend. And according to the year-on-year CPI, it can be seen that the fluctuation before 1996 was much intense, and presented two peaks, with one taking place in 1988-1989, during which the high inflation was mainly caused by the wage system reform, infrastructure expansion, and increasing amount of bank credit in township enterprises causing a great increasing market demands for money, the other one taking place in 1993-1995, during which the government give full freedom to the market and let the market supply and demand relations to freely guide the market, and on the one hand, the government made several policies like a variety of subsidies and wage raising to compensate for price difference, on the other hand, positive fiscal and monetary policies were implemented to stimulate the economic development in a rapid pace. However, the blind expansion of the credit scale, fast investment and other factors led to the price of production factors increased hugely, following with a general rise of price level, as a result, a serious inflation was produced.

Figure 2 and figure 3 reflects the trend of the fixed base CPI growth rate. According to month-on-month growth rate which does not take into account of seasonal factors in Figure 3, CPI has obvious seasonal cycle feature, with the growths in annual January before 1996 and annual February after 1996 being maximum, and that of in annual October being minimum. Figure 3 is the
result of regular CPI excluding seasonal factors, it can be seen that seasonal characteristics no longer exists. According to the month-on-month growth rate, the HP filter and the CPI index have similar trends, with both of them having two peaks before 1996 and growth rate after 1996 being very small.

Table 1 shows the statistical distribution characteristics of CPI year-on-year index and fixed base month-on-month growth rate in different stages. According to the standard error, it can be seen that both the year-on-year CPI index and the month-on-month growth rate before 1996 fluctuated much greatly, and became gentle after 1996. J-B statistics show that the series are all subject to normal distribution. In addition, according to the ADF unit root test, it has been found that CPI month-on-month growth rate presented a smooth series.

Table 1. Statistical description of CPI year-on-year index and month-on-month change rate on fixed base.

<table>
<thead>
<tr>
<th>Index</th>
<th>Period</th>
<th>Mean Value</th>
<th>Std. Error</th>
<th>Min.</th>
<th>Max.</th>
<th>J-B Statistic</th>
<th>ADF Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPI year-on-year index</td>
<td>1987-1995</td>
<td>112.515</td>
<td>8.456</td>
<td>101.000</td>
<td>128.400</td>
<td>10.118***</td>
<td>-2.474</td>
</tr>
<tr>
<td></td>
<td>1996-2013</td>
<td>102.293</td>
<td>2.808</td>
<td>97.800</td>
<td>109.800</td>
<td>15.442</td>
<td>-2.969**</td>
</tr>
<tr>
<td></td>
<td>1987-2013</td>
<td>105.701</td>
<td>7.227</td>
<td>97.8</td>
<td>128.400</td>
<td>193.275***</td>
<td>-2.759*</td>
</tr>
<tr>
<td>CPI month-on-month change rate</td>
<td>1987-1995</td>
<td>0.959</td>
<td>0.875</td>
<td>-1.143</td>
<td>3.081</td>
<td>3.670</td>
<td>-3.255**</td>
</tr>
<tr>
<td></td>
<td>1996-2013</td>
<td>0.174</td>
<td>0.399</td>
<td>-0.904</td>
<td>1.888</td>
<td>35.533***</td>
<td>-7.055***</td>
</tr>
<tr>
<td></td>
<td>1987-2013</td>
<td>0.434</td>
<td>0.704</td>
<td>-1.143</td>
<td>3.081</td>
<td>160.857***</td>
<td>-3.927***</td>
</tr>
</tbody>
</table>

Note: Intercept are used in all the ADF tests; *, **, *** indicate significant probabilities at the level of 10%, 5%, 1% respectively.

III Empirical analysis

（1）Estimation of GARCH-M and SV-M model

In this paper, the estimation results of GARCH-M and SV-M models are used to judge the
impact of CPI fluctuation on the CPI growth rate to verify existence of the Cukierman-Meltzer hypothesis and Holland view, in which, the GARCH-M model estimated via eviews6.0 software. Table 2 shows the results of GARCH-M model, it can be seen that variable coefficient $h_t^{0.5}$ reflecting the impact of the CPI fluctuation on the CPI growth is 0.144, but not significant in 10% probability level, which overthrown the Cukierman-Meltzer hypothesis and Holland's view.

Table 2. Estimation results of GARCH-M model.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient Value</th>
<th>Std. Error</th>
<th>Z Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$c$</td>
<td>0.027</td>
<td>0.089</td>
<td>0.302</td>
<td>0.763</td>
</tr>
<tr>
<td>$r_{t-1}$</td>
<td>0.751</td>
<td>0.037</td>
<td>20.188</td>
<td>0.000</td>
</tr>
<tr>
<td>$h_t^{0.5}$</td>
<td>0.144</td>
<td>0.188</td>
<td>0.763</td>
<td>0.446</td>
</tr>
<tr>
<td>$\alpha_0$</td>
<td>0.142</td>
<td>0.018</td>
<td>8.059</td>
<td>0.000</td>
</tr>
<tr>
<td>$\varepsilon_{t-1}^2$</td>
<td>0.636</td>
<td>0.121</td>
<td>5.273</td>
<td>0.000</td>
</tr>
<tr>
<td>$h_{t-1}$</td>
<td>0.009</td>
<td>0.055</td>
<td>0.168</td>
<td>0.866</td>
</tr>
</tbody>
</table>

Winbugs software is applied to estimate the SV-M model in the paper. AR(1)-SV(1)-M model was selected to be the basic SV-M model by considering that it is a steady process for the CPI growth which also has self-correlation, namely in the (7) and (8), make $p=1, k=1$. According to the proposal of Kim and Shephard (1998) on the SV model parameter distribution, in the code, make $\phi_1 = 2\phi - 1$, prior distribution of parameters $\mu, \phi, h, \sigma_\eta$ are $\mu \sim N(0,0.01), \phi \sim \text{Beta}(20,1.5), h \sim N(\mu, \sigma_\eta^2), 1/\sigma_\eta^2 \sim \text{gamma}(2.5, 0.025)$. According to table 3, it can be seen that the posterior mean value of the risk spillover coefficient is 2.566. Due to the value $d$ measuring the impact of CPI fluctuation on the CPI growth rate being positive with significant statistics, it can be judged that the relationship between the CPI growth rate and fluctuation supports Cukierman-Meltzer hypothesis.

Table 3. Estimation results of SV-M model.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean Value</th>
<th>Std. Error</th>
<th>MC Error</th>
<th>Median</th>
<th>G-R Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_0$</td>
<td>-0.187</td>
<td>0.078</td>
<td>0.005</td>
<td>-0.183</td>
<td>1.020</td>
</tr>
<tr>
<td>$\beta_1$</td>
<td>0.130</td>
<td>0.081</td>
<td>0.004</td>
<td>0.127</td>
<td>1.020</td>
</tr>
<tr>
<td>$d$</td>
<td>2.566</td>
<td>0.613</td>
<td>0.040</td>
<td>2.561</td>
<td>1.010</td>
</tr>
<tr>
<td>$\mu$</td>
<td>-1.821</td>
<td>0.402</td>
<td>0.006</td>
<td>-1.816</td>
<td>1.000</td>
</tr>
<tr>
<td>$\phi$</td>
<td>0.957</td>
<td>0.021</td>
<td>0.000</td>
<td>0.959</td>
<td>1.010</td>
</tr>
<tr>
<td>$\sigma_\eta$</td>
<td>0.264</td>
<td>0.167</td>
<td>0.008</td>
<td>0.256</td>
<td>1.020</td>
</tr>
</tbody>
</table>
There are many ways to measure the CPI fluctuation, the conditional fluctuation rate is applied in the paper, that is to get the conditional fluctuation by estimating the GARCH model and the SV model, and then judge the relationship between it and CPI growth rate by using statistical analysis method.

Eviews has directly given the level of conditional fluctuation measured by the conditional standard error, while the SV model estimated by the winbugs gains the series value $h_t$, then the CPI fluctuation rate can be obtained through $\sigma_t = (\exp(h_t))^{0.5}$. By comparing the CPI fluctuation series and their filter trend showed in Figure 4 and Figure 5 estimated by two models, the CPI conditional fluctuation rate based on GARCH model is tending to be reduced after 1996 with the difference being not too obvious, the average monthly fluctuation rate before 1996 being 0.595, and that of after 1996 being 0.488; while the CPI conditional fluctuation rate before 1996 based on SV model is much bigger than that of after 1996 with the average monthly fluctuation rate before 1996 being 0.622 and that of after 1996 being 0.386. However, it can be seen from Figure 3 and Table 1, the actual situation is that the fluctuation level after 1996 decreased obviously with the standard error of CPI growth rate during 1987-1995 showing in Table 1 being 0.875 and that of during 1996-2013 being 0.399, which forming an over one-time difference. Therefore, in terms of this point of view, the fluctuation series estimated by SV model is much more accurate than that of by GARCH model.

![Image](image.png)

Figure 4. CPI fluctuation trend of GARCH model.
In order to establish the VAR model for determination, AIC and SC criteria shall be used to confirm the most suitable lag order k in VAR (k) model. It is found according to the ADF and PP unit root test that series $\sigma_{t1}$ (fluctuation of the GARCH model) and series $\sigma_{t2}$ (fluctuation of the SV model) are stable in the 10% probability level. After respective establishment of the VAR model of $\sigma_{t1}$ and the CPI growth rate $r_t$, 2 and 3 lag periods are selected for the VAR model of $\sigma_{t1}$ and $r_t$, and 3 and 4 lag periods are selected for that of $\sigma_{t2}$ and $r_t$. In order to ensure the reliability of results, the two lag periods will be tested simultaneously with the results being shown in table 4.

**Table 4. Granger causality relationship between CPI growth rate and its fluctuation.**

<table>
<thead>
<tr>
<th>Fluctuation Rate</th>
<th>Lag Phases</th>
<th>Null Hypothesis</th>
<th>F Statistic</th>
<th>Significant Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>GARCH</td>
<td>2 phases lagged</td>
<td>$r$ Non Grainger effect $\sigma_{t1}$</td>
<td>9.009</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\sigma_{t1}$ Non Grainger effect $r$</td>
<td>0.191</td>
<td>0.826</td>
</tr>
<tr>
<td></td>
<td>3 phases lagged</td>
<td>$r$ Non Grainger effect $\sigma_{t1}$</td>
<td>5.781</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\sigma_{t1}$ Non Grainger effect $r$</td>
<td>0.389</td>
<td>0.761</td>
</tr>
<tr>
<td>SV</td>
<td>3 phases lagged</td>
<td>$r$ Non Grainger effect $\sigma_{t2}$</td>
<td>1.870</td>
<td>0.134</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\sigma_{t2}$ Non Grainger effect $r$</td>
<td>6.513</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>4 phases lagged</td>
<td>$r$ Non Grainger effect $\sigma_{t2}$</td>
<td>1.123</td>
<td>0.345</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\sigma_{t2}$ Non Grainger effect $r$</td>
<td>5.164</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Results of table 4 show that the CPI growth rate fluctuation estimated by the GARCH model in
the lag phase 2 and 3 at the 5% significant probability level is not the Granger cause of the CPI growth rate, while the CPI growth rate is the Granger cause of the CPI fluctuation, which supports the Friedman-Ball hypothesis and denies the Cukierman-Meltzer hypothesis, and is in line with the conclusion of Mr. Zhou Hongshan (2006), Mr. Xu Zhihong (2008) and others obtained by GARCH model. The CPI growth rate fluctuation estimated by the SV model in the lag phase 3 and 4 is both the Granger cause of the CPI growth rate, namely, the CPI growth rate will cause changes in the CPI fluctuation, which is consistent with the SV conclusion. The result further verified the relationship of China's inflation and inflation fluctuation in support of the hypothesis of Cukierman-Meltzer and CPI fluctuation being not the Granger cause of the CPI growth rate, which is consistent with the conclusions of GARCH-M model, namely, the fluctuation will not cause changes in the growth rate, which is in line with the conclusions of Mr. Liu Jinquan (2010), and Mr. Zhang Huanming (2013). In order to verify, the impulse response function investigation is applied to do further verification with the result showing in Figure 6 to Figure 9.

![Figure 6. Impact response of CPI growth rate on $\sigma_{t_1}$](image1.png)

![Figure 7. Impact response of $\sigma_{t_1}$ on CPI growth rate.](image2.png)
Figure 6 and Figure 7 are the response diagrams of $\sigma_{t_1}$ and $r_t$ respectively at one impact of opposing side. One impact of the fluctuation of the CPI growth rate can be found. The CPI growth rate in the second period has the negative response and the reaction in the third period is decreased which basically closing to zero with basically no response even applying the lagging. The impact of the CPI growth rate fluctuation on CPI growth rate in the first period responses positively, and stronger in the second period, while has been reduced in the third period till basically no response in and after the fifth period. It indicates that the relationship between the CPI fluctuation and the CPI growth rate estimated by GARCH model is consistent with the Friedman-Ball hypothesis and the test results of the previous Granger causality. Figure 8 and Figure 9 are the response diagrams of $\sigma_{t_2}$ and $r_t$ respectively at one impact of opposing side. One impact of the fluctuation of the CPI growth rate can be found. The CPI growth rate in the second period has a strong positive response with the

Figure 8. Impact response of CPI growth rate on $\sigma_{t_2}$.

Figure 9. Impact response of $\sigma_{t_2}$ on CPI growth rate.
reaction in the third period being decreased, increasing in the fourth period and reducing in afterward period with response still being positive. The impact of the CPI growth rate fluctuation on CPI growth rate in the first period has a week positive response, and it becomes decreased in the second period, and even reduced to be minus in the third period, but it returns to be positive like in the first period and keeps unchangeable with a very week response. It indicates that the relationship between the CPI fluctuation and the CPI growth rate estimated by SV model just supports the Cukierman-Meltzer hypothesis and the test results of the Granger causality.

IV Conclusion
In the paper, firstly, time series GARCH-M model and SV-M model are applied to judge whether the relationship between China's CPI growth rate month on month and CPI fluctuation support the Cukierman-Meltzer hypothesis and Holland's view. Secondly, the GARCH model and the SV model are used to estimate the fluctuation series of China's CPI growth rate month on month, and comprehensively study the mutual relationship between CPI growth rate and CPI fluctuation through the Granger causality test and impulse response analysis. Results show that China's CPI fluctuation is obviously continuous. Relationship between China's CPI growth rate month on month and its fluctuation based on GARCH model results shows to support the Friedman-Ball hypothesis, and that of based on the SV model results shows to support the Cukierman-Meltzer Hypothesis.

References