Inflation Uncertainty and Monetary Policy in China

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Abstract
This paper uses a stochastic volatility model, structural break tests with unknown point, and a counterfactual simulation method to discuss the significant decline in inflation uncertainty in China over 1978–2009. We attempt to quantify the contributions of better monetary policy and smaller structural shocks (including demand, supply and policy impacts) on the reduced inflation uncertainty. Empirical results in the present paper suggest that improved monetary policy accounts for only a small fraction of the reduction in inflation uncertainty from the pre-1997 period to the post-1997 period in China. The bulk of the significant moderation in inflation uncertainty arises from smaller shocks. This finding indicates that the quiescence of inflation in China over the past decade could well be followed by a return to a more turbulent inflation era. Therefore, the use of preemptive monetary policy to anchor inflationary expectations and keep moderate inflation uncertainty is warranted.

Key words: inflation, inflation uncertainty, monetary policy, stochastic volatility

JEL codes: E31, E52, E58, E61

I. Introduction

Since Friedman’s (1977) Nobel lecture on inflation and unemployment, the issue of the nature of inflation uncertainty and its relation to monetary policy-making has been subject to intense debate among researchers. Given the recent adoption of stable prices as the primary objective of long-run monetary policy in both developed and developing countries, an interesting question that has received attention is whether inflation uncertainty is a deeply inherent characteristic of the economy and is, therefore, invariant to policy changes.
If inflation uncertainty is not an inherent characteristic of the economy but varies over time, a more important question is what causes the changes in the uncertainty of inflation. Most early studies focus on the first question and find that inflation uncertainty rises as inflation rises (Ball and Cecchetti, 1990; Ball, 1992; Golob, 1994; Holland, 1995; Grier and Perry, 1998). However, several other studies suggest that the causal relationship between inflation and inflation uncertainty is not invariant to specific countries. Sauer and Bohara (1995) present evidence showing that the role of inflation uncertainty differs sharply between the USA and Germany. The research conducted by Hendry (2001) and Fountas et al. (2004) focusing on the issue of inflation uncertainty of the USA and the Europe and Narayan et al. (2009) relating to China’s inflation provide mixed results about the changing nature of inflation uncertainty in different countries. However, most studies only find a positive relationship between inflation and inflation uncertainty, with results providing no quantitative information regarding the contribution of monetary policy to the changing inflation uncertainty.

Roberts (2006) examines structural changes in US inflation uncertainty and investigates whether changes in monetary policy can account for the changes in inflation uncertainty. His results suggest that changes in monetary policy can explain most or all of the reduction in US inflation uncertainty, but the finding appears to be sensitive to econometric model specifications and only holds in a small New Keynesian-style model.

In the present paper, we also use a small New Keynesian-style model but address structural changes in China’s inflation uncertainty and consider whether changes in China’s monetary policy can account for the changes in inflation uncertainty. Our research is motivated by the fact that little study has been conducted to characterize the nature of possible structural changes in Chinese inflation uncertainty over China’s post-economic reform period, which has been a period distinguished by remarkable variations in inflation, profound changes in monetary policy, and by significant exogenous shocks to the economy. In particular, we observe that since the commencement of economic reform in 1978, China has witnessed remarkable changes in the pattern of inflation volatility, or, equivalently, inflation uncertainty.¹

The volatile inflation over the 1980s and 1990s and the current moderate fluctuation in price inflation reflect a trend over the past three decades towards moderation of the inflation cycle and, more generally, towards reduced inflation uncertainty. This change appears to coincide with China’s monetary policy reforms since the late 1990s. It is also consistent with the fact that various shocks to the economy have been smaller in the recent decade

¹ In this article, we use the terms uncertainty and volatility interchangeably.
than previously. The alternative explanations (i.e. better monetary policy and smaller structural shocks) might lead to distinct policy implications.

The present paper attempts to quantify the respective contributions of better monetary policy and smaller shocks to the downward inflation uncertainty. We use three econometric methods; namely, a stochastic volatility model, structural break tests with unknown point, and a counterfactual simulation method. Empirical results suggest that improved monetary policy accounts for only a small fraction of the reduction in the volatility of inflation from the pre-1997 period to the post-1997 period in China. The bulk of the significant moderation in China’s inflation uncertainty arises from smaller random shocks. Our finding indicates that the quiescence of inflation in China over the past decade could well be followed by a return to a more turbulent inflation era, as in the 1980s and 1990s. Therefore, monetary authorities in China must be vigilant in reacting to the shocks that have the potential to induce high inflation uncertainty.

The present paper is organized as follows. Section II describes the data used in the present research and depicts the dynamics of inflation uncertainty over time. In Section III, we use a stochastic volatility model to provide preliminary evidence on the moderation of inflation uncertainty. Formal structural break tests and the results are discussed in Section IV. In Section V, a multivariate dynamic model is constructed and counterfactual simulations are conducted to quantify respective contributions of better monetary policy and smaller shocks to the reduced inflation uncertainty. Section VI provides the implications of our findings and some concluding remarks.

II. Data and Descriptions

In recent years, both the public and policy-makers in China have paid considerable attention to the consumer price index (CPI) issued by China’s National Bureau of Statistics (NBS). The CPI is the most closely watched price measure and of most interest for monetary policy analysis in China. Therefore, in the present paper, we use the growth rate of CPI published by the NBS to measure price inflation. Specifically, inflation is measured by the year-on-year growth rate of CPI spanning the first quarter of 1978 to the third quarter of 2009.

Figure 1 displays the quarterly data for the CPI inflation series. The figure shows that since the late 1970s, the dynamic evolution of inflation in China has witnessed remarkable cyclical behavior, characterized by booms and busts. In particular, Figure 1 suggests that Chinese inflation witnessed the first distinct increase in 1980–1981, followed by a second spike in 1985, and two striking peaks: one in the late 1980s and another in the mid-1990s. Since the late 1990s, inflation in China has been relatively low and stable, with a few periods
of deflation. Despite two local peaks of inflation occurring in 2004 and 2008 because of the transitory demand shock (e.g. shock to real estate market) and the supply shock (e.g. shock to food and energy prices), respectively, the most recent decade has been a less volatile inflation era than the 1980s and 1990s.

The fluctuations in Chinese CPI inflation over the past three decades have been accompanied by shifts in monetary policy regimes and changes in the nature of various shocks to the economy. To be specific, it is well known that the prices of most commodities in China were administered by government agencies and changed infrequently before the end of the 1970s. Since the beginning of the economic reforms in 1978, the government-set prices were gradually liberalized. In particular, the Chinese central government officially initialized a so-called “adjustment and reform” policy in 1979, aimed at promoting fast developments in industrial and agricultural sectors. Consequently, the prices of both agricultural products and industrial products increased considerably in the early 1980s, which inevitably passed through the production chain and generated higher consumer price inflation.

In conjunction with the growing prices, the growth rate of the real output in the early 1980s also increased to double digits. However, countercyclical macro policies (e.g. credit controls) were not implemented in a sufficient and timely manner. As Figure 2 shows, after a temporary drop in early 1982, the growth rates of M2 and domestic credit in China exhibited an upward trend in late 1982, with unprecedented levels of 40 percent in 1985 and nearly 50 percent in 1986. As a result, there was evidence of overheating, with a peak fluctuation in inflation during 1985–1986. The tightening credit controls in late 1986 dampened inflation,
but were effective for only a very short period. Because of the further liberalization and deregulation of prices in 1987, inflation rebounded to as high as 25 percent in 1988. In response to the extraordinary inflation peak, the Chinese central government tightened money and credit supply and reduced fixed investment substantively. The tighter monetary policy conditions towards the end of the 1980s stabilized inflation volatility significantly. Although the monetary policy in the late 1980s was effective in cooling down inflation and economic growth, it had an overtightening effect on the economy. As a result of the strict credit control in 1988 and 1989, the industrial sector witnessed substantive reduction in its output in the ensuing 3 years (1990–1992), which caused serious liquidity problems and capital scarcity for a large number of enterprises in China. As a result, both economic growth and inflation were reduced to a relative low level (below 5 percent) over 1990–1992.

In the spring of 1992, the speech on the subject of “promoting Chinese economic development with all efforts” by the Chinese leader Deng Xiaoping (known as the “South China Tour Speech”) marked a new round of fast economic development in China. To encourage investment, the central government aggressively loosened credit control and the growth rate of money supply reached above 50 percent in 1993 (see Figure 2). The proactive monetary policy led to Chinese inflation increasing in 1992 and reaching a peak in 1994. Following a number of tightening policy measures in 1994, inflation started to decelerate in 1995 and further decreased in the late 1990s. Since the end of the 1990s, China has experienced three periods of mild deflation, in 1998–2000, 2001–2003 and 2009, with relatively stable inflation in the new century.

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It should be noted that CPI inflation rose in mid-2004 and again in early 2008, presumably because of investment booms in these periods (in particular, the boom in the real estate market). The deflation in 2009 was mainly caused by the recent global financial crisis. The deflation in this period is transitory, as evident in Figure 1, which reflects the timely response of China’s implementation of a stimulus package of RMB4tn to rebalance the economy.

China’s inflation has followed a trend over the past three decades towards moderation of inflation uncertainty. The reduction in inflation uncertainty is evident from the standard deviation of the CPI inflation shown in Table 1. During the 1980s, the standard deviation of the CPI inflation was 6.94. It rose to 8.29 in the 1990s but dropped substantively to 2.47 in the 2000s.

These changes in Chinese inflation uncertainty appear to comove with monetary policy shifts in China over the same period. Therefore, the recent significant decline in Chinese inflation uncertainty might be attributed primarily to monetary policy shifts. Alternatively, the reduced inflation uncertainty might simply be caused by a run of good luck (i.e. smaller shocks). This explanation seems to be consistent with the fact that various shocks to the economy have been smaller in the recent decade than in the 1980s and 1990s. To identify some alternative explanations, we embark on tests for a structural change in inflation uncertainty in the next two sections, followed by a counterfactual analysis in Section V.

### III. Stochastic Volatility Model

To depict the changing nature of inflation uncertainty in China, we use a stochastic volatility model, as in Stock and Watson (2002), to compute the smoothed estimates of instantaneous stochastic volatility (SV) in the CPI inflation series. In the SV model, both the underlying coefficients and the volatility of the CPI inflation are allowed to change over time. By

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construction of the model, the SV estimates reflect how much inflation uncertainty exists in each time period, which provides useful information about the levels of inflation uncertainty at different times.

Let $\pi_t$ denote the rate of inflation and follow a time-varying autoregressive (AR) process. The SV model can be specified as follows:

\[
\pi_t = \theta_t(L)\pi_{t-1} + h_t \epsilon_t, \quad (1)
\]

\[
\theta_t(L) = \theta_{0,t} + \theta_{1,t} L + \ldots + \theta_{p,t} L^{p-1} \quad (2)
\]

\[
\theta_{0,t} = \theta_{0,t-1} + c_1 \eta_t, \quad i = 1, 2, \ldots, p \quad (3)
\]

\[
\ln h_t^2 = \ln h_{t-1}^2 + \xi_t, \quad (4)
\]

where $\theta_{0,t}$ denotes time-varying autoregressive coefficients, $\theta_t(L)$ is the polynomial in the lag operator, $p$ is the optimal lag order (determined by the Akaike Information Criterion) in the AR process, $h_t^2$ denotes instantaneous innovation variance of the CPI inflation, and $\epsilon_t$, $\eta_t$, and $\xi_t$ are random shocks. Note that in this setup, $\epsilon_t$ and $\eta_t$ are Gaussian i.i.d. (0,1) stochastic shocks, and $\xi_t$ is distributed independently of the other disturbances. To capture a possible break in the volatility (i.e. uncertainty) of inflation, we follow Stock and Watson (2002) and use a mixture-of-normals model for $\xi_t$.

For the computations of the time-varying parameters, we use standard Markov chain Monte Carlo methods. It is effectively an iteration process, with iteration between the conditional distributions of $\pi_t$, $\theta_{0,t}$ and $h_t$, respectively. The first two of the three distributions are normal (by assumption), whereas the third is non-normal. The non-normal distribution is approximated by the distribution of $\ln \epsilon_t^2$ with a mixture-of-normals distribution. Given the smoothed parameter values and the approximated distributions, the SV of inflation is computed using the corresponding instantaneous stochastic standard deviation.

The estimates of the SV of the Chinese CPI inflation are plotted in Figure 3. The figure provides graphical evidence of the change in inflation uncertainty. It shows that the volatility of inflation first distinctly increased in the early 1980s, with the most striking peak in the mid-1990s, followed by a notable spike in the late 1980s. Since the end of the 1990s, inflation uncertainty has dramatically moderated. Despite a transitory growth in inflation volatility in 2009, the level of inflation uncertainty (measured by the instantaneous standard deviation) over the most recent decade appears to be much less than that in the prior two decades.

Overall, the results from the SV model suggest that the moderation in volatility in the post-1990s is pronounced for CPI inflation. The volatility seems to have fallen sharply in the late 1990s. However, to draw this conclusion with confidence we need to employ formal
IV. Formal Structural Break Tests

The SV estimates in the previous section provide an intuitive method of depicting potential structural shifts over time in inflation uncertainty (volatility). However, this approach does not allow us to draw firm conclusions about the significance of the structural breaks. Therefore, in this section, we perform formal tests to investigate the statistical nature and the timing of potential structural breaks in the instantaneous volatility of the underlying inflation series.

Theoretical advances in the literature of unknown structural break tests, in particular the important contributions by Andrews (1993), Andrews and Ploberger (1994) and Hansen (1997), enable us to identify changes and the associated timing in the underlying model with considerable precision. In the present paper, we use the supreme likelihood ratio (LR) test of Andrews (1993) and the exponential and average – LR tests of Andrews and Ploberger (1994) to test for unknown structural breaks in the stochastic volatility of the Chinese CPI inflation. All three tests are designed to test for the same null hypothesis of no structural break in the underlying parameters of interest. The corresponding p-values of these tests are computed using Hansen’s method (1997).

By construction, the Andrews’ (1993) supreme LR statistic is the maximum LR statistic.
for testing a break through all possible break points over a specified searching range, say \( t \), which is given by:

\[
\sup LR = \sup_{t} LR_{t}(\tau)_{i} \in [t_{\min}, t_{\max}],
\]

where \( LR_{t}(\tau)_{i} \) denotes the sequential LR statistic testing for the null hypothesis of no structural break in the underlying parameter. We set a customary searching interval \( \tau \in [0.15, 0.85] \) of the full sample \( T \) to allow a minimum of 15 percent of effective observations contained in both pre-break and post-break periods. The Andrews and Ploberger’s (1994) average and exponential statistics are given by averaging and taking the exponential of the sequential LR-statistic. Note that for computational convenience the heteroskedasticity robust versions of the statistics are computed throughout the tests based on the residuals under the null hypothesis of no structural break.

The numerical estimation results are summarized in Table 2, which reports the Andrews–Ploberger family of statistics and the associated \( p \)-values for the structural break tests over the full sample for the first quarter of 1978 to the third quarter of 2009. All three statistics test for stability of inflation uncertainty over time. The results in Table 2 suggest statistically significant evidence of instability in the volatility of the CPI inflation, with \( p \)-values of all the statistics smaller than 1 percent. The associated structural break point is in the second quarter of 1997.

The Andrews–Ploberger statistics in Table 2 suggest that inflation uncertainty in China experienced a significant structural break in mid-1997. Separating the entire sample of 1978–2009 by this break point, we find that the volatility of the CPI inflation is 7.44 over the pre-1997 period, dropping sharply to 2.49 over the post-1997 period. This reduction coincides with the graphical evidence provided in the forgoing section.

An important question to be resolved then is whether this drastic reduction in inflation uncertainty arises from a run of good luck (i.e. smaller shocks) or improved monetary

### Table 2. Results of Andrews–Ploberger Unknown Break Point Tests

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Probabilities</th>
<th>Break date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sup LR</td>
<td>76.22</td>
<td>0.000</td>
</tr>
<tr>
<td>Exp LR</td>
<td>35.05</td>
<td>0.000</td>
</tr>
<tr>
<td>Ave LR</td>
<td>30.47</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Source:** The author’s calculation.

**Notes:** Probabilities are calculated using Hansen’s (1997) method. Sup LR, Exp LR and Ave LR denote supreme LR, exponential LR and average LR statistics, respectively. Q2, second quarter.
policy. Different sources of the great moderation in inflation uncertainty have distinct policy implications. If better monetary policy accounts for the moderation, the quiescence of inflation in China can be maintained as long as monetary authorities keep improving systematic monetary policy implementation. If the smaller shocks explain the reduction in inflation uncertainty, the moderate inflation uncertainty could well be followed by a return to a more turbulent inflation era. To quantify the contributions of the respective explanations for the moderation in China’s inflation uncertainty, in the following section we construct a multivariate dynamic model and implement counterfactual simulations.

V. Counterfactual Simulations

1. Background

The empirical results in Section IV indicate that CPI inflation uncertainty was significantly reduced in 1997. On the one hand, this distinct structural change coincides and is consistent with the strengthening role of the People’s Bank of China (PBOC, the central bank of China) in implementing monetary policy in the mid-1990s. In retrospect, the PBOC lost most of its functions as a central bank before 1978 due to the destructive Cultural Revolution (1966–1976). Although the PBOC assumed its responsibility as a central bank in 1983, its status as a modern central bank was not legally confirmed until the Law of the People’s Republic of China on the People’s Bank of China was enacted in March 1995.

Since then, there have been significant improvements in China’s monetary policy. For instance, the establishment of a unified interbank money market in 1996 has facilitated liquidity adjustment for the PBOC. In 1997, China announced “The Regulations on the Monetary Policy Committee of the People’s Bank of China,” which clarifies the rights and responsibilities of the monetary policy committee in the central bank. In 1998, the PBOC replaced quota management of credit with assets-to-liabilities ratio management. Open market operations also resumed in 1998. Hence, the PBOC can adjust its intermediate target by issuing central bank bills and using repurchasing agreements to make collateralized loans to primary dealers.

In January 1999, the central bank of China abolished its branches at provincial and municipal levels and set up 9 regional branches to promote policy efficiency, to protect the PBOC from interferences of local governments and to prevent potential moral hazards in financial sectors. Since the end of the 1990s, the PBOC has been utilizing a composite measure of quantity-based (e.g. money supply) and price-based (e.g. interest rates) tools for implementing its policies, with the quantity-based tool being a predominant policy instrument. The reforms over the past decade have turned the PBOC into a standard modern
central bank that relies on comprehensive tools to adequately accomplish its goals.

On the other hand, the moderation in inflation uncertainty also appears to coincide with changes in the nature of structural shocks to the Chinese economy. Both the demand shocks and supply shocks in China appear to be much smaller than they were in the 1980s–1990s. For example, the large demand shocks in the early 1980s and the mid-1990s induced by price liberalization and the real estate market boom, respectively, are in stark contrast to the quiescence over the most recent decade. Smaller shocks might also contribute to the moderation in inflation uncertainty. To address quantitative contributions of the alternative explanations to the change in inflation uncertainty, in the following subsection, we specify a multivariate dynamic model and conduct counterfactual simulations.

2. Counterfactual Simulations

In this subsection, we conduct a counterfactual analysis based on a reduced-form vector autoregression (VAR) model to establish a possible connection between systematic monetary policy changes (and shocks) and the moderation in inflation uncertainty. The baseline model is the New Keynesian-type of monetary policy analysis, discussed in Clarida et al. (1999), Estrella and Fuhrer (2003), Roberts (2006) and Zhang et al. (2008, 2009). One important feature of our model is that the growth rate of monetary aggregate (the growth rate of M2) rather than the interest rate is used as a monetary policy indicator. Although the PBOC recently promoted the development of market-based interest rates as policy instruments, quantity-based monetary instruments remain as the main instruments of the PBOC, as explicitly stated in the periodical reports of the PBOC and shown in Burdekin and Siklos (2008) and Geiger (2008). Therefore, our baseline VAR model incorporates quarterly data for the growth rate of real GDP, inflation, and the growth rate of M2, to capture the dynamics among real economic output, inflation and monetary policy.

In the counterfactual analysis, we impose the second quarter of 1997 as a break date and use the VAR model estimated over the first quarter of 1978 to the second quarter of 1997 and the third quarter of 1997 to the third quarter of 2009 to simulate a series for the CPI inflation for the different samples. We attempt to assess whether changes in monetary policy (the VAR parameters) or the random shocks can account for the observed reduction in the CPI inflation uncertainty.

Specifically, each VAR model has the form:

\[ Y_t = \Phi_t(L)Y_{t-1} + \epsilon_t, \quad \text{var}(\epsilon_t) = \Sigma, \quad (6) \]

where \( Y_t \) is a vector time series and the subscript \( i = 1, 2 \) denotes the first and second subsample; \( \Phi_t(L) \) denotes the polynomial of the lag operator with the optimal lag order determined by information criteria. The estimates of the parameters and the innovation
variance matrix in Equation (6) are then used to generate inflation series over different periods. Note that the simulation process assumes the structural innovations (denoted $e$) implied by the reduced VAR model follow vector Gaussian white noise, which links to the shocks in Equation (6) through $\Sigma_e = A_{n}^{-1}\Sigma (A_{n}^{-1})'$, where $A_{n}$ is the implicit contemporaneous parameters vector in the counterpart structural VAR model to Equation (6) and are recovered using the standard Cholesky decomposition method.

The simulated series are used to estimate standard deviations of inflation. By using different $\Phi$ and $\Sigma$, it is possible to compute the counterfactual inflation uncertainty that would have arisen had either $\Phi$ or $\Sigma$ taken different values. For example, $\sigma(\hat{\Phi}_1, \hat{\Sigma}_1)$ is the estimated inflation uncertainty in period 1, and $\sigma(\hat{\Phi}_2, \hat{\Sigma}_2)$ is the inflation uncertainty that would have occurred had the lag dynamics been those of the second period and the error variance matrix been that of the first period. Other cases are defined analogously.

Table 3 summarizes the VAR-based estimates of inflation uncertainty for the four possible permutations of estimated VAR coefficients and variance matrices. The columns labeled $\sigma(\hat{\Phi}_1, \hat{\Sigma}_1)$ and $\sigma(\hat{\Phi}_2, \hat{\Sigma}_2)$, respectively, contain the VAR-based estimate of the first and second period sample inflation uncertainty, which are quite close to the respective sample estimates discussed in section IV. The columns labeled $\sigma(\hat{\Phi}_1, \hat{\Sigma}_2)$ and $\sigma(\hat{\Phi}_2, \hat{\Sigma}_1)$ contain the counterfactual estimates. The counterfactual combination of first-period dynamics and second period shocks ($\sigma(\hat{\Phi}_1, \hat{\Sigma}_2)$) produces an estimated volatility of 3.038, which is close to the second-period estimate (2.290). In contrast, the second-period dynamics and first period shocks ($\sigma(\hat{\Phi}_2, \hat{\Sigma}_1)$) produce an estimated inflation volatility of 5.16, which is close to the first period persistence estimate.

According to these estimates, had the structural shocks of the post-1997 period occurred in the pre-1997 period, the CPI inflation would have been much less volatile. In short, the smaller structural shocks embedded in the reduced-form VAR account for 85 percent of the moderation in inflation uncertainty ((7.262–3.038)/(7.262–2.290)). The contribution of the dynamic propagation of the system induced by better monetary policy to the reduced inflation uncertainty is much smaller than the shocks. A slightly larger contribution (40 percent) of the improved monetary policy to the moderation of inflation uncertainty is obtained if $\sigma(\hat{\Phi}_2, \hat{\Sigma}_1) = 5.160$ is used in the calculation (i.e. (7.262–5.160)/(7.262–2.290)). In either case, the reduced

<table>
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<th>$\sigma(\hat{\Phi}_1, \hat{\Sigma}_1)$</th>
<th>$\sigma(\hat{\Phi}_2, \hat{\Sigma}_1)$</th>
<th>$\sigma(\hat{\Phi}_1, \hat{\Sigma}_2)$</th>
<th>$\sigma(\hat{\Phi}_2, \hat{\Sigma}_2)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard deviation (%)</td>
<td>7.262</td>
<td>2.290</td>
<td>3.038</td>
<td>5.160</td>
</tr>
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</table>

Notes: The first 100 observations of the simulated series are discarded to avoid sensitivity; simulated sample sizes are consistent with the respective subsamples.
inflation uncertainty is predominated by the smaller shocks.

The foregoing analysis is based on the reduced VAR model. It might be more attractive to specify an explicit structural VAR model as in Stock and Watson (2002) so that a more precise contribution of monetary policy change for the reduced inflation uncertainty can be identified. However, the estimation and identification of such a structural system would rely on a priori knowledge of a set of key parameters. As Stock and Watson (2002) acknowledge, even for models of the US economy, there is considerable disagreement about the values of these parameters.

For China’s economy, there are neither reference values available for such a structural system nor for any alternative structural systems in a similar context. The construction and identification of such a multivariate structural model need to take into account different transmission mechanisms of monetary policy from other countries, as comprehensively discussed in Geiger (2008). We leave this investigation to future research. Nevertheless, the counterfactual analysis does conclude that the smaller shocks, rather than better monetary policy, are the main driving force of the significant reduction in inflation uncertainty.

VI. Conclusions and Policy Implications

Inflation in China has been remarkably stable during the past decade, a dramatic shift from the pattern in the previous two decades. Associated with this change, the level of inflation uncertainty has also experienced a significant structural break, which has mainly been induced by smaller structural shocks. The improved monetary policy only accounts for a small fraction of the moderation in inflation uncertainty. Our findings are confirmed by the stochastic volatility model, structural instability tests of unknown point, and the counterfactual simulation method.

It should be noted that the causes of the significant reduction in China’s inflation uncertainty do not tend to be exhaustive, but one does not find a compelling case in the published literature for other causes. However, our estimates suggest that the systematic improvements in the PBOC’s monetary policy since the mid-1990s have contributed perhaps 15–40 percent of the decline in inflation uncertainty. There might be, of course, some other explanations for this result. For example, increased globalization and other sources of increased competition might have lowered the sensitivity of domestic inflation to alternative shocks, and, hence, inflation becomes more certain than it was before. However, the evidence for this is limited and inconclusive (Mishkin, 2007).

The finding in the present paper implies that the large moderation in China’s inflation
Inflation uncertainty could be temporary and the result of smaller macroeconomic shocks. From this regard, the quiescence of inflation in China over the past decade could well be followed by a return to a more turbulent inflation era. It is likely that high and volatile inflation would strike China in the absence of a determined effort by the monetary authorities to control inflation. Even if policy-makers are able to conduct anti-inflation policies in a timely manner, they might not necessarily reduce inflation uncertainty permanently. The key issue is how well the central bank can trade off between inflation uncertainty and business cycle uncertainty (Stock and Watson, 2003).

This tradeoff has further implications for the conduct of monetary policy in China. For the past decade, achieving high and stable economic growth has been the main goal of the Chinese Government and is regarded as more important than preventing inflation in the PBOC’s monetary policy-making process. The most recent measure taken to rebalance the economy using the unprecedented stimulus package is an example of this. The adoption of unbalanced weights for economic growth and inflation is partly the result of the relatively low and stable inflation in China over the corresponding period.

The present research warns that inflation uncertainty in China is more a threat than a problem and one especially serious in the period ahead given the recent accommodative policies ignited during the 2007–2008 global financial crisis. To avoid the return of a more volatile inflation era, the central bank of China should employ preemptive monetary policy with optimal weights on inflation and economic growth. The effectiveness of preemptive monetary policy and the calculation of the optimal weights on inflation and economic growth depend on a well-designed forecasting system, for instance, using the Euler equation, a monetary policy reaction function, and the New Keynesian Phillips curve. Alternative large-scale structural econometric models, such as the Federal Reserve’s FRB/US system, might also be used and modified to forecast the performance of key economic variables in China. The construction of such forecasting systems capturing distinctive features of the Chinese economy for systematic conduct of monetary policy is clearly warranted.

References


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