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An empirical evaluation of China's monetary policies

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ABSTRACT

This paper investigates the responsiveness of the Chinese government's monetary policies in terms of the money supply and interest rates to economic conditions and the effectiveness of these policies in achieving the goals of stimulating economic growth and controlling inflation. We analyze the responsiveness and effectiveness by estimating the Taylor rule, the McCallum rule, and a vector autoregressive model using quarterly data in the period of 1992–2009. The results show that, overall, the monetary policy variables respond to economic growth and the inflation rate, but the magnitudes of the responses are much weaker than those observed in market economies. Money supply responded actively to both the inflation rate and the real output and had certain effects on the future inflation rates and real output. The official interest rates, on the other hand, responded passively to the inflation rate and did not respond to the real output. They do not have any effect on future inflation rates and real output either.

1. Introduction

Once a centrally planned economy, China has now implemented economic reforms to transform itself into a market-oriented economy and it has enjoyed an average annual real growth rate of about 10% for more than 20 years. After a few years of experimenting, the central bank of China announced in 1998 that it abandoned the traditional central-planning system of allocating funding to state-owned enterprises. Following the model in developed market economies, the central bank has been using the money supply and official interest rates as its main tools to implement its monetary policies. What was the role played by the central bank in the recent years of rapid growth? How effective were the monetary policies in promoting growth while maintaining stability? This paper sets out to answer these questions. Just as real economic variables and the inflation rate fluctuated over the last 20 years, so did the monetary variables. Such fluctuations in both economic variables and policy variables make it possible to conduct an empirical evaluation of the responsiveness and effectiveness of the government's monetary policies. The time is ripe for such an evaluation as we now have enough data for a reasonable analysis.

We address issues of how the money supply and official interest rates respond to macroeconomic variables such as the output, the inflation rate, and the real effective exchange rate. We explore which of the two monetary policy tools, money supply or official interest rates, play a more important role. We also examine how effective these monetary policies are in influencing future outputs and inflation rates. Regarding the former question of how responsive the monetary tools are, we adopt the frameworks of the Taylor rule and the MaCallum rule used widely in the literature to estimate the responses of the

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short-term official interest rate and the growth rate of the money supply to the real output and the inflation rate. We use time-varying-coefficient models as well as fixed-coefficient models to estimate the response coefficients in the Taylor rule and the MaCallum rule. For the latter task of analyzing the effectiveness of the policy variables, we adopt the standard vector autoregressive (VAR) model, examine the impulse response functions of the economic variables to the policy variables, and analyze the variance decomposition of the forecasting errors of the VAR model.

Our results indicate that, overall, the monetary policy variables do respond to and have some effect on the economic growth, the inflation rate, and the real effective exchange rate as in Western market economies. However, the relationships among monetary policy variables and macroeconomic activities tend to be weaker than those in Western market economies. More importantly, unlike what's been found in the Western economies, it is the growth rate of money supply that played a more crucial role in fine-tuning the economy, while the official interest rates played a very passive role. In the first 2 years of the sample period of 1992–2009, the money supply was too large and can be blamed for the ensuing high inflation in 1993–1994. The sharp decline in the money supply in 1994 was effective in bringing down inflation. For the remaining years of the sample period, the money supply had clear negative responses to both the inflation rate and the real output, in line with the MaCallum rule. The official interest rates passively responded to the inflation rate with a delay in the first half of the sample period and changed little in the second half of the sample period. Overall, the official interest rates had little effect on both the inflation rate and real output.

The rest of this paper is organized as follows. Section 2 begins with a brief review of the literature on the evaluation of monetary policies. It then provides a brief account of China's macroeconomic background, the government's emphasis on different goals in various periods, and the literature on China's monetary policies. This is followed by summary statistics and graphic illustrations of key macroeconomic variables for the sample period of 1992–2009. Section 3 investigates the responsiveness of the monetary policy variables to the economic conditions by estimating the Taylor rule and the McCallum rule equations. Section 4 presents an econometric analysis of the effectiveness of the monetary policy variables, using impulse response functions and variance decomposition of forecast errors, which characterize the importance of each variable in predicting future values of its own and other variables in the VAR system. Section 5 interprets the econometric results from a historical perspective. The last section concludes the paper.

2. Literature, economic background, and data

2.1. A brief review of related literature

Monetary policy evaluation has been an active research area in economics because of its immense importance. The literature is dominated by research on developed economies, especially the US. We briefly review the most relevant studies below and mention other related work in the following sections as the discussion proceeds.

After a relatively quiet period following Sargent and Wallace (1975) who argue that monetary policy can be ineffective under rational expectations and Lucas (1976) who critiques the naive predictions of non-structural models estimated with historical data, research on policy evaluation resumed in the late 1980s and 1990s. One of the active strands in the literature begins with Taylor (1993) who proposes a rule for central banks to set a nominal target interest rate that is increasing in the expected inflation-rate gap and the output gap. The rule describes how central banks raise (reduce) the target interest rate when the expected inflation is higher (lower) than the desired target inflation rate and when the actual output is greater (smaller) than the natural output. The Taylor rule and its variations have been estimated empirically for the US and other countries by economists around the world. Taylor (1993) first estimates the Taylor rule equation for the US. Clarida et al. (1998) provide international evidence. Taylor (2001) extends the rule to include exchange rate as one of the economic variables the official interest rate responds to. Kuzin (2006) uses the framework to analyze the inflation battling experience of the German central bank. Esanov et al. (2005) evaluate Russia's monetary policy. Kim and Nelson (2006) use a model with time-varying coefficients to estimate forward-looking monetary policy rules. Xie and Luo (2002) is the first study of China's monetary policy that used the Taylor rule.[1]

Similar to the Taylor rule for the official interest rate targeting, the McCallum (1988) rule describes the growth rate of the money supply. The original McCallum rule describes the growth rate of the money supply as a function of the growth rates of GDP and money velocity. More recent studies revise the McCallum rule so that the money supply growth targets the expected inflation-rate gap and the output gap, parallel to the Taylor rule. An example is Esanov et al. (2005). The revised McCallum rule describes how central banks reduce (increase) the money supply when the expected inflation is higher (lower) than the desired target inflation rate and when the actual output is greater (smaller) than the natural output.

There is also a body of literature on monetary policy rules based on vector autoregressive (VAR) models. Important studies include Sims (1992), Bernanke and Blinder (1992), Cristiano et al. (1999). They conclude that the federal funds target rate and the non-borrowed reserves are typical monetary policy variables in the US, while innovations to money supply are not ideal variables to represent monetary policy shocks.

[1] There have been a flurry of studies, mostly in Chinese journals, following Xie and Luo on the Taylor rule in China with extended sample periods. All these papers estimate fixed-coefficient Taylor rule models and conclude that the Taylor rule does not describe China's monetary policy well.