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Monetary policy rules for a developing country: Evidence from Pakistan

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ABSTRACT

This paper estimates forward-looking monetary policy rules to examine the interest rate setting behavior of the State Bank of Pakistan. Considering the external constraints on monetary policy, core inflation and a country-specific measure of the output gap, we demonstrate that the State Bank of Pakistan reacts to changes in inflation, the output gap and the federal funds rate.

1. Introduction

Following the seminal work by Taylor (1993), considerable research has been done to establish the extent to which a monetary policy rule can explain the dynamics of policy rates. Since the end of the 1990s, the analysis of monetary policy rules in developing countries has become increasingly important after economic reforms and subsequent transitions to new policy regimes. However, these countries have specific characteristics that differ from those of developed countries.

Monetary policies in developing countries are influenced by the world's major central banks, i.e., the Federal Reserve Bank, the European Central Bank and the Bank of Japan. Due to the existence of external constraints, central banks in developing countries stabilize exchange rates. Hence, the analysis of monetary policy rules in these countries requires a model specification different from that of developed countries.

Monetary policy rules estimated for developing countries are typically based on the assumption that the length of their business cycles is comparable to that in developed countries. However, business cycles are much shorter in developing countries than in developed countries (Rand & Tarp, 2002).

Previous empirical studies concerning monetary policy rules used headline inflation to examine the interest rate setting behavior of central banks. According to these policy rules, a central bank that seeks to stabilize inflation will increase its policy rate in response to a rise in inflation regardless of whether this rise is temporary or permanent. However, in reality central banks do not react to a temporary rise in inflation.

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Since the beginning of the 1990s, the State Bank of Pakistan, has undergone various reforms. In the post-reform period, the monetary policy framework was characterized by a transition from direct instruments to indirect instruments. The Bank was empowered to formulate and conduct an independent monetary policy. Since the above-mentioned issues are not considered by previous studies on monetary policy rules in developing countries,[1] this paper takes these observations into account and provides a comprehensive empirical analysis of monetary policy rules in Pakistan. In this paper, we propose a forward looking monetary policy rule for Pakistan consisting of core inflation, a country-specific measure of the output gap, and the federal funds rate.

We review the previous work on monetary policy rules in the next section. In Section 3, we propose forward-looking monetary policy rules for Pakistan. We describe the estimation methodology and data selection in Section 4 and present our empirical evidence on different specifications of monetary policy rules in Section 5. We set out our conclusions in Section 6.

2. Previous studies of monetary policy rules for developed and developing countries

In order to examine the behavior of central banks in the United States, Japan and some European countries, Clarida, Gali, and Gertler (1998a) estimated forward-looking monetary policy rules by using the Generalized Method of Moments (GMM). They found that the central banks in the United States, Germany and Japan have pursued an implicit form of inflation targeting. The United Kingdom, France and Italy were constrained by their European Monetary System commitments and the Bundesbank had a strong influence on monetary management within these countries. In another study, they estimated a similar forward-looking monetary policy reaction function for the post-war US economy.[2] They found the pre-Volker rule to be accommodating for fluctuations in inflation and output and the Volker–Greenspan rule to be stabilizing. Following Clarida et al. (1998a) and Clarida, Gali, and Gertler (1998b), the GMM has widely been used to examine the central bank behavior in developed countries. Using data for the United States, the United Kingdom and Japan, Chadha, Lucio, and Giorgio (2004) extended their analysis to examine the joint role of asset prices and exchange rates. They demonstrated that monetary policy makers use asset prices and the exchange rate not only as part of their information set but also to set policy rates. By using the GMM and cointegration techniques, Mésonnier and Renne (2004) estimated the reaction function of monetary policy in the euro area. They found the presence of a systematic element in the monetary policy that prevailed in the euro area over the last two decades. Auray and Fève (2003) examined the behavior of the nominal interest rate and inflation by using a sticky price model with an exogenous money growth rule in the United States. They found a relationship between the nominal interest rate and inflation similar to that described by the Taylor rule.

A limited number of empirical studies have estimated monetary policy rules for emerging and developing countries. Most of them focused on countries having an inflation-targeting framework. By taking into consideration variable inflation targets, Yazgan and Yilmazkuday (2007) demonstrated that the forward-looking Taylor rule provides a reasonable description of central bank behavior in Israel and Turkey. Torres (2003) examined Taylor-type monetary policy rules for Mexico and found that its monetary policy had been consistent with that of an inflation-targeting regime. Some studies found a high responsiveness of policy rates to changes in the exchange rate and the foreign interest rate. Using a standard open economy reaction function, Mohanty and Klau (2004) showed that in many emerging market economies the interest rate responds strongly to exchange rate shocks. Malik (2007) estimated a VAR model to identify the objectives of monetary policy in Pakistan and showed that monetary policy there depends on the foreign interest rate. Berument and Tasçi (2004) estimated a forward-looking monetary policy rule for Turkey and found that the Turkish Central Bank responds to changes in foreign exchange reserves and output.

3. Monetary policy rule specifications

Following Clarida et al. (1998a), we define the loss function of a central bank in a developed country as minimizing the deviation of inflation and output from their respective target levels:

$$i_t^* = \bar{i} + \beta[E(\pi_{t+k}|I_t - \pi^*)] + \gamma[E(x_{t+q}|I_t)] \tag{1}$$

where i^* and $\bar{i}$ represent the desired level of the nominal interest rate and the long run equilibrium nominal interest rate, respectively. $E(\pi_{t+k}|I_t - \pi^*)$ is the expected deviation of the k period ahead inflation rate (π_{t+k}) from the target rate (π^*) and $E(x_{t+q}|I_t)$ is the q period ahead expected real output gap. I_t is the set of information available to the central bank at time t. The parameters β and γ measure the sensitivity of the interest rate to variations in inflation and the output gap, respectively. The monetary policy is characterized as stabilizing inflation if $\beta > 1$ and accommodative otherwise. The central bank stabilizes output only if $\gamma > 0$. Since central banks usually smooth changes in interest rates, we can describe this as follows:

$$i_t = (1 - \rho)i_t^* + \rho i_{t-1} + \varepsilon_t \tag{2}$$

[1] Berument and Tasçi (2004), Esanov, Merkl, and Vinhas (2005), Malik and Ahmed (2007), Yazgan and Yilmazkuday (2007), and Virmani (2004).
[2] Clarida et al. (1998b).