

Has the Monetary Policy in the South Korean Economy Been Effective?

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Abstract

This paper uses a revised Taylor rule to analyze the recent monetary policy of the Bank of Korea. The exchange rate is included in the rule. Two important concepts arise from this analysis: (a) the Taylor rule is applicable to the South Korean economy, and (b) including the exchange rate is appropriate when explaining and analyzing the South Korean economy. Another important notion is that the Bank of Korea should have implemented more drastic measures during the recession and over-heat periods. Recently, the South Korean economy has been enjoying significant economic growth; however, the result of this paper indicates that a tighter monetary policy should be implemented.

Keywords: monetary policy; South Korea; Taylor rule
JEL code: E52; E58

1. Introduction

Countries generally conduct monetary policies according to their own 'rules'. Recently, most countries have changed their monetary policies from monetary targeting to interest rate targeting. South Korea had been conducting monetary targeting and changed the instrumental target of their monetary policy from money supply to interest rate in 1998. Many factors were involved in introducing this policy, most notably the 1997 currency crisis and the unstable money supply.

The financial crisis that erupted in Asia in mid-1997 led to sharp declines in the currencies, stocks, and other asset prices of many Asian countries. In recent years, the economy of South Korea changed from being centrally planned and government-directed to more market-oriented. South Korea bounced back from the 1997-98 crisis with International Monetary Fund (IMF) assistance and carried out extensive financial reforms that restored economic stability.

In 1998, South Korea introduced full-fledged inflation targeting¹. With this change, the monetary policy rule has been discussed not only in South Korea but also all over the world. Taylor (1993), Ball (1998), and McCallum (1988) are good examples. Among them, the Taylor rule has been discussed and cited repeatedly. This short paper uses a revised Taylor rule and analyzes the recent monetary policy in South Korea.

This paper is structured as follows. Section 2 reviews the Taylor rule and proposes a revised version. Section 3 provides empirical analysis for the recent South Korean economy using the method mentioned in section 2. Section 4 analyzes the recent monetary policy in South Korea based on section 3. Finally, the paper ends with a brief summary and proposes some important points.

2. The Taylor Rule and Its Revised Version

The Taylor rule is a formula developed by John Taylor (1993). It was designed to provide "recommendations" for how a central bank should set short-term interest rates as economic conditions change to achieve both its goal for inflation and for stabilizing the economy. More concretely, the rule states that the real short-term interest rate should be determined based on two factors: (1) where actual inflation is relative to the targeted level that the central bank wishes to achieve, and (2) how far economic activity is above or below its "full employment" level. The rule

is now widely used in monetary policy rule estimations.

Taylor rule is formalized as follows:

$$i = \pi + \alpha y + \beta (\pi - \pi^t) + r^e \quad (1)$$

i is an the interest rate. y is the GDP gap. π is the inflation rate. π^t is the target inflation rate. r^e is the equilibrium real interest rate. This paper revises equation (1) as shown in (2) for empirical analysis.

$$i = (r^e - \beta \pi^t) + (1 + \beta) \pi + \alpha y \quad (2)$$

Three terms, $(r^e - \beta \pi^t)$, β , and α are estimated. If $\beta > -1$, the central bank manipulates the interest rate based on the inflation rate's movement. Similarly, if $\alpha > 0$, the central bank manipulates the interest rate based on the GDP gap's movement by countercyclical.

The South Korean economy has experienced both large fluctuations in some economic variables and sharp structural changes. Due to the changes, the monetary rule became complicated, and a simple policy described by other countries cannot fully capture all aspects of the central bank behavior. Estimating different types of monetary policy rules is important for analyzing the South Korean economy. Some excellent manuscripts stress that monetary policy-makers in some economies are more concerned about exchange rate movements than those in mature economies (Williamson, 2000), among other reasons, due to the degree of exchange rate pass-through to prices. This paper incorporates the exchange rate as the central bank's reaction function². The South Korean economy is open to the world, so it is affected more by the exchange rate than those of other countries. The revised version includes the variable and the growth of the exchange rate.

Below is the estimate of the modified Taylor rule.

$$i_t = \alpha_0 + \alpha_1 \pi_t + \alpha_2 y_t + \alpha_3 xR_t + u_t \quad (3)$$

where xR_t is the growth of the exchange rate, u_t is the white noise error term, and t is time.

3. Empirical results of the modified Taylor rule

a) Data

i is the call rate (over night). π is the inflation rate (CPI). The Bank of Korea changed its targeting inflation rate from CPI to core CPI; however, CPI is used for data availability for analysis. Nominal South Korean won/U.S. dollar is used for exchange rate. The data are the monthly averages. The sample period is from January 2001 to June 2006. The Bank of Korea introduced inflation targeting in April 2001. All of the data are from International Financial Statistics (IMF). It can be thought that the central bank prepared for some period before introducing inflation targeting. Expanding the sample period is also necessary for empirical analysis.

Inflation targeting term is included in the constant term in the equation. The Bank of Korea has used inflation targeting since April 2001. The targeting rate is applied in each period³. GDP gap is defined as the difference between GDP growth rate and potential GDP growth rate. Potential GDP is calculated using Hodrik-Prescott filter method.

Before the equation (3) was regressed, unit root tests were performed. Unit roots cannot be found in all of the data⁴.

b) Results for the Revised Taylor rule

The estimation is conducted only by the terms inflation rate, GDP gap, and interest rate. The term and the exchange rate are omitted. First, basic Taylor rule is estimated. The result is shown in equation (4).

$$i_t = 9.8102 + 0.3600 \pi_t - 0.7827y_t + u_t \quad (4)$$

(14.8691) (2.9258) (-8.8163)

adj.R²: 0.4585; F-statistic: 40.6244

The result is interesting. All of the coefficients are significant. It is interesting to note that the coefficient of GDP gap is minus against the expectation. It appears that maintaining inflation targeting has been the highest priority. The objective of the Bank of Korea has been limited to inflation⁵. It can be said that the central bank has adopted a countercyclical policy.

Second, the term and exchange rates are included in the equation as the equation. Equation (3), the revised Taylor rule is estimated. The result is shown in equation (5).

$$i_t = 6.9968 + 0.2105 \pi_t - 0.2410y_t + 0.1510xr_t + u_t \quad (5)$$

(10.5600) (4.8111) (-3.2514) (11.5478)

adj.R²: 0.7748; F-statistic: 108.8688

It is clear that the exchange rate is significant and must have affected the decision-making process regarding interest rates in South Korea. The result is interesting and important. The movement is as expected. Moreover, including the term exchange rate makes the valued adjusted R squared high. It can be said that equation (5) explains the movement of interest rate more adequately.

4. Monetary Policy Implications

After the currency crisis erupted in Thailand with a series of speculative attacks on the baht, contagion spread rapidly to other economies in Asia. After the devaluation of the baht, investors believed that there would be similar financial or macroeconomic problems in other areas. As

the contagion spread to Korea, the possibility of a default by that country raised a potential threat to the international monetary system.

South Korea implemented drastic economic reforms with the aid of IMF after the currency crisis. These economic reforms helped South Korea maintain one of Asia's few expanding economies, with dramatic growth rates of about 10% in 1999 and in 2000. The slowing global economy and falling exports account for the drop in growth rates in 2001 to 3.3%, but in 2002 South Korea pulled out a 6.0% growth rate. Since then, the economy has been stable.

Using the results of equations (4) and (5), I compare the calculated interest rate from the original and revised the Taylor rule and the interest rate in reality. The results are shown in Figures 1 and 2. Figure 1 (original Taylor rule) shows the case for equation (4) and Figure 2 (revised one) is for equation (5). INTEREST is a real value in both figures. INTEREST* are calculated by (4) and (5).

Both results are instructive. The South Korean economy had recovered from the Asian currency crisis of 1997. South Korea recovered rapidly and experienced large growth since then until 2002. Around 2002, the results indicate that the Bank of Korea should have implemented a tighter

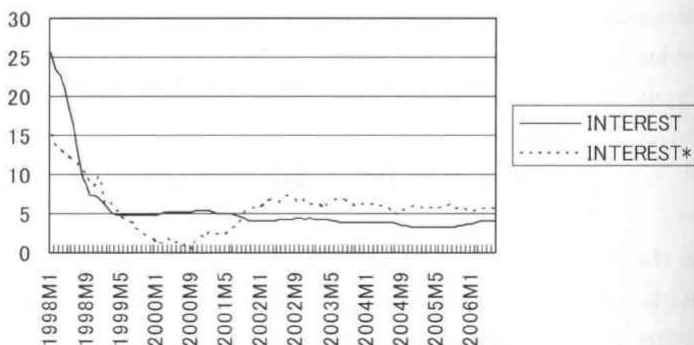


Figure 1

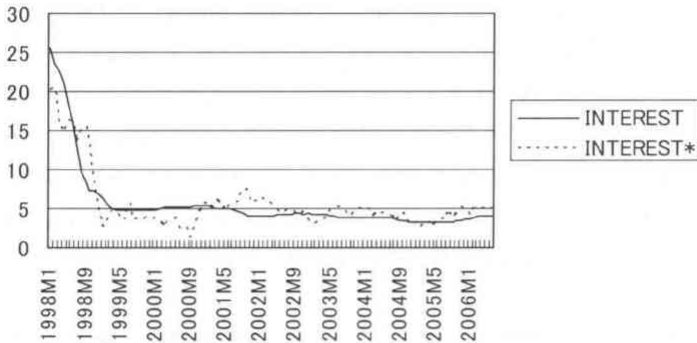


Figure 2

monetary policy. After that, South Korea experienced recession in 2003. Figure 2 shows that the Bank of Korea should have loosened the monetary policy. Recently, the South Korean economy has been enjoying relatively high economic growth. However, both results show that a tighter monetary policy would be preferable.

The calculations also show that the Bank of Korea has conducted adequate monetary policy from the view of these Taylor rules. The departure of the "ideal" interest rate from the interest rate in reality is not large in equation (5). Bank of Korea has been successfully controlling the inflation rate.

5. Conclusion

This paper analyzed the recent monetary policy of the Bank of Korea, using the revised Taylor rule. This analysis provides two important points.

One is that the Taylor rule is applicable to the South Korean Economy. The analysis also shows that it would be better to include the exchange

rate. The results tell us that it is necessary to consider the exchange rate when analyzing the Korean economy. Another important finding is that the Bank of Korea should have taken more drastic measures. Around 2002, the result shows that the Bank of Korea should have conducted tighter monetary policy. Later, South Korea experienced a recession in 2003. The result shows that it should have loosened the monetary policy then. Recently, the South Korean economy enjoyed a strong economic growth. However, the results indicate that a tighter monetary policy is preferable.

Finally, this analysis is limited by some problems. Many criticisms have been leveled at the Taylor rule. Despite using a revised version, most of the criticisms still apply. In particular, this paper used backward-looking variables. There are some merits to this, but there lies some serious problems at the same time. Other monetary policy rules have been presented recently. Some recent studies show that the Taylor rule possesses desirable properties in terms of generating determinacy and E-stability of rational expectations equilibrium under sticky prices. These 'rules' may be applicable and may show better results.

Notes

1. By 1997, South Korean monetary targeting had been M2. However, it became MCT (M2 + CDs + Money in Trust).
2. Ball (1998) suggested that in a small, open economy the central bank could use a weighted average of the nominal interest rate and the exchange rate as an instrument.
3. The targeting rate has not been constant and there is a band (upper and lower limit). The central rate is applied to each period.
4. ADF test was applied. All the data was significant at 1% level.
5. Another possibility is that real-time output data differ significantly from the ex-post data, yielding a biased estimation. I tried some methods, for example the AIC test, but this did not change the result. There may be some

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possibility that using forward-looking variables would be more appropriate. However, there are also problems in using these variables.

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