The stability condition of a forward looking Taylor rule*

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Abstract
Stability condition is an essential topic of monetary policy rules. If the policy rule can not satisfy the stability condition, it is difficult to treat the policy rule as the policy implementation guidelines. This paper purposes to derive the stability condition of a forward-looking Taylor rule with and without interest rate smoothing. This paper also conducts the empirical analysis of the stability condition of a forward-looking Taylor rule with data of China.

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Keywords: Stability Condition; Forward-looking Taylor Rule; Expected Inflation; Expected Output Gap;

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The stability condition is an essential topic of monetary policy rules. If the policy rules can not satisfy the stability condition, that is, the targets can not be converged to their equilibrium values, it is difficult to treat policy rules as the policy implementation guidelines. In this sense, the premise of policy rules is that they satisfy the stability condition.

Since Taylor (1993) proposes a simple interest rate rule, the literature on monetary policy rules[1], especially interest rate rule, is increasing. Based on the backward-looking Taylor's rule, some researchers, for example, Rudebusch and Svensson (1999), Clarida, Gali and Gertler(2000), Orphanides (2001), Batini and Nelson (2001), extend the Taylor's rule to forward-looking versions[2]. Among them, the interest rate rule indicated by Clarida et al. (2000) attracts more attention in recent years. It describes how the central bank uses the instrument of interest rate in response to the gaps between the expected inflation and output and their respective target levels. This rule is often cited and estimated with data of different countries.[3] However, in Clarida et al. (2000), the stability condition of this forward-looking policy rule is just briefly conjectured[4].

The purpose of this paper is to derive the stability condition of Clarida et al.'s forward-looking Taylor rule (hereafter forward-looking Taylor rule) with and without interest rate smoothing based on the analysis of aggregate demand and aggregate supply. We also conduct the empirical analysis of the stability condition of forward-looking Taylor rule with data of China.

[1] Monetary policy rule can be divided into interest rate rule and monetary base rule. McCallum (1988,1990, 1993) presents a monetary base rule. But it is less popular than interest rate rule. In this paper, we only argue the stability condition of interest rate rule.

[2] Andrew Levin et al. (2003) conduct a survey of these forecast-based monetary policy rules.

[3] See, e.g. Teruyama (2001), Rafael Domenech, (2001), Xie (2002).

[4] In Clarida et al. (2000), after formalizing the monetary policy rules regarding the nominal and real interest target rates, the stability condition of these policy rules is briefly conjectured. "Roughly speaking, to the extent that lower interest rates stimulate economic activity and inflation (as implied by standard macroeconomic models and as perceived by policy-makers and market participants alike), interest rate rules characterized by $\beta > 1$ will tend to be stabilizing, while those with $\beta \leq 1$ are likely to be destabilizing or, at best, accommodative of shocks to the economy. A similar logic applies to the sign of γ, (i.e., stabilizing if γ >0; destabilizing if $\gamma \leq 0$)."

This paper is organized in four sections. Section 1 indicates the stability condition of forward-looking Taylor rule without interest rate smoothing. Section 2 shows the stability condition of forward-looking Taylor rule with interest rate smoothing. Section 3 conducts the empirical analysis with data of China. Section 4 provides the concluding remarks.

1. CASE 1: THE STABILITY CONDITION OF FORWARD-LOOKING TAYLOR RULE WITHOUT INTEREST RATE SMOOTHING

The baseline policy rule presented by Clarida et al. (2000) is formularized as follows:

$$i_t^* = i^* + \beta(E(\pi_{t+n}) - \pi^*) + \gamma(E(y_{t+q})), \qquad (1)$$

where i_t^* denotes the nominal interest rate target, i^* denotes the long-run equilibrium nominal interest rate, π_{t+n} denotes the annual rate of inflation between periods t and $t+n$, $E(\pi_{t+n})$ is the expected inflation rate between periods t and $t+n$. π^* denotes the inflation target, y_{t+q} denotes the average output gap between periods t and $t+q$. $\beta > 0$, $\gamma > 0$ are parameters.

Equation (1) indicates that the nominal interest rate target is a function of long-run equilibrium nominal interest rate, the gap between expected inflation and its target level, and the output gap. It describes that the central bank uses the interest rate in response to the difference between the expected rate of inflation and the target rate of inflation and the output gap.

In form of real interest rate, equation (1) can be changed into the following equation,

$$r_t^* = r^* + (\beta - 1)(E(\pi_{t+n}) - \pi^*) + \gamma E(y_{t+q}), \qquad (2)$$

where $r_t^* \equiv i_t^* - E(\pi_{t+n})$ and $r^* \equiv i^* - \pi^*$. r_t^* denotes the (ex ante) real rate target and r^* is the long run equilibrium real rate.

Equation (2) is the deformation of equation (1). It indicates that the real interest rate target is a function of long-run equilibrium real interest rate, the deviation from expected inflation and output gap. In this paper, we define equation (2) as the forward-looking Taylor rule.

In Clarida et al. (2000), the stability condition of equation (2) is simply conjectured by intuition. But we think that only equation (2) can not be enough to get its stability condition. In order to find the stability condition of equation (2), $E(\pi_{t+n})$ and $E(y_{t+q})$ should be specified. We will specify $E(\pi_{t+n})$ and $E(y_{t+q})$ based on the analysis of aggregate demand and aggregate supply.

1.1. Specification of $E(\pi_{t+n})$

In terms of aggregate supply, we assume that the expected rate of inflation $E(\pi_{t+n})$ is expressed as

$$E(\pi_{t+n}) = -kr_{t-1}^{*} + l \tag{3}$$

where r_{t-1}^{*} is the real rate in period $t-1$. $k>0$ is a parameter and l is a constant. The purpose of choosing r_{t-1}^{*} is to find the stability condition of forward-looking Taylor rule. The time lag that real rate affects the investment is assumed to be $n+1$ period.

Equation (3) shows the central bank's expectation of private agents' expected inflation. It can be regarded as the most simplified form of expected inflation. If the interest rate increases, the private agents' equipment and housing investment will decline and the aggregate demand will correspondingly reduce. The decline of effective demand will generate the reduction of inflation. On the other hand, the decline of the effective demand leads to the contraction of production. It will increase the unemployment rate and decrease the increasing rate of wage. This might lead to the decrease of inflation. Therefore, the interest rate and the inflation rate have negative relationship as shown in equation (3).

Considering the equation (3), we assume that the premise of equation (2) is that central bank knows equation (3) and forms its inflation expectation.

1.2. Specification of $E(y_{t+q})$

Next we will specify $E(y_{t+q})$ in terms of aggregate demand.

According to the formula of output gap,

$$y_{t+q} = \frac{Y_{t+q} - Y^*_{t+q}}{Y^*_{t+q}} = \frac{Y_{t+q}}{Y^*_{t+q}} - 1,$$

We can get equation (4),

$$y_{t+q} + 1 = \frac{Y_{t+q}}{Y^*_{t+q}}, \qquad (4)$$

where Y_{t+q} and Y^*_{t+q} are actual and potential output in period $t+q$ respectively.

Taking the log form of equation (4), the approximate equation of y_{t+q} can be obtained,

$$\begin{aligned} y_{t+q} &\approx \log(y_{t+q} + 1) \qquad (5) \\ &= \log \frac{Y_{t+q}}{Y^*_{t+q}} \\ &= \log Y_{t+q} - \log Y^*_{t+q}. \end{aligned}$$

Taking expectation of (5) yields equation (6),

$$E(y_{t+q}) = E(\log Y_{t+q}) - E(\log Y^*_{t+q}). \qquad (6)$$

Next we specify $E(\log Y_{t+q})$ and $E(\log Y^*_{t+q})$ respectively.

Assume the expected investment of private sector and the interest rate has the negative relationship as shown by equation (7) because the investment will decrease if the interest rate increases.

$$E(I_{t+q}) = -\phi_1 r^*_{t-1} + \phi_2, \qquad (7)$$

where $E(I_{t+q})$ is the investment in period $t+q$. $\phi_1 > 0$ and $\phi_2 > 0$ are parameters.

For simplicity, we assume the expected output is a function of expected consumption, expected investment and time trend.

$$E(Y_{t+q}) = cE(Y_{t+q}) + E(I_{t+q}) + c'(t+q), \qquad (8)$$

where c is the propensity to consume and $c'(t+q)$ is the trend term.

Substitution of (7) into (8) results in

$$E(Y_{t+q}) = \frac{1}{1-c}\left[E(I_{t+q}) + c'(t+q)\ \right] \qquad (9)$$

$$= \frac{1}{1-c}\left[-\phi_1 r^*_{t-1} + \phi_2 + c'(t+q)\ \right],$$

Taking the log form of equation (9),

$$E(\log Y_{t+q}) = \left[\log\frac{1}{1-c} + \log(-\phi_1 r^*_{t-1} + c'(t+q) + \phi_2)\right], \qquad (10)$$

Relying on equation (10), we can get the linear approximate equation of $E(\log Y_{t+q})$,

$$E(\log Y_{t+q}) = -\theta_1 r^*_{t-1} + \theta_2(t+q) + \theta_3, \qquad (11)$$

where $\theta_1 > 0$, $\theta_2 > 0$, $\theta_3 > 0$ are parameters.

On the other hand, we assume the potential output (Y^*_{t+q}) is a function of time trend. The actual and potential output are assumed to have the same time trend. If these time trends are different from each other, the difference between $E(\log Y_{t+q})$ and $E(\log Y^*_{t+q})$ becomes infinite positively or negatively as $t \to \infty$. Therefore, similar to the equation (11), $E(\log Y^*_{t+q})$ can be formalized as follows,

$$E(\log Y^*_{t+q}) = \theta_2(t+q) + \theta_4, \qquad (12)$$

where $\theta_4 > 0$ is a parameter.

Substitution of (11) and (12) into (6) results in

$$E(y_{t+q}) = E(\log Y_{t+q}) - E(\log Y^*_{t+q}) \qquad (13)$$

$$= -\theta_1 r_{t-1}^* + (\theta_3 - \theta_4)$$

$$= -\theta_1 r_{t-1}^* + A$$

where $A = \theta_3 - \theta_4$.

1.3. Finding the Stability Condition

Next we will derive the stability condition of forward-looking Taylor rule in form of equation (2). Substitution of (3) and (13) into (2) yields equation (14),

$$r_t^* = r^* + (\beta - 1)[E(\pi_{t+n}) - \pi^*] + \gamma E(y_{t+q}) \quad (14)$$

$$= r^* + (\beta - 1)[-kr_{t-1}^* + l - \pi^*] + \gamma[-\theta_1 r_{t-1}^* + A]$$

$$= -[k(\beta - 1) + \gamma\theta_1]r_{t-1}^* + [r^* + (\beta - 1)(l - \pi^*) + \gamma A]$$

The steady state solution of real rate can be expressed in the from of (15),

$$r^* = -[k(\beta - 1) + \gamma\theta_1]r^* + [r^* + (\beta - 1)(l - \pi^*) + \gamma A],$$

$$r^* = \frac{(\beta - 1)(l - \pi^*) + \gamma A}{k(\beta - 1) + \gamma\theta_1}. \quad (15)$$

Therefore, the following dynamic equation can be obtained,

$$r_t^* - r^* = -[k(\beta - 1) + \gamma\theta_1](r_{t-1}^* - r^*) \quad (16)$$

$$= -[k(\beta - 1) + \gamma\theta_1]^t (r_0 - r^*).$$

Relying on equation (16), we can get the stability condition of forward-looking Taylor rule without interest rate smoothing. If $|(\beta - 1)k + \gamma\theta_1| < 1$, the real rate target, r_t^*, converges on the steady-state real rate, r^*, the forward-looking Taylor rule will tend to be stabilizing. If $|(\beta - 1)k + \gamma\theta_1| > 1$, r_t^* diverges from, r^*, the forward-looking Taylor rule is likely to be destabilizing.

Substitution of (15) into (3) and (13), we can get the long run equilibrium expected inflation and expected output gap.

$$E^*(\pi_{t+n}) = -kr^* + l \quad (17)$$

$$= \pi^* + \gamma \frac{kA + \theta_1 (l - \pi^*)}{k(\beta - 1) + \gamma\theta_1},$$

$$E^*(y_{t+q}) = -\theta_1 r^* + A \qquad (18)$$

$$= \frac{(\beta - 1)\left[\ kA - \theta_1 (l - \pi^*)\ \right]}{k(\beta - 1) + \gamma\theta_1}.$$

where $E^*(\pi_{t+n})$ is the long run equilibrium expected inflation in period $t+n$. $E^*(y_{t+q})$ is the equilibrium expected inflation in period $t+q$ in the long run.

If $\beta \neq 1$, $\gamma \neq 0$, $E^*(y_{t+q}) = 0$, from equation (18), the inflation target can be obtained,

$$\pi^* = l - \frac{kA}{\theta_1}. \qquad (19)$$

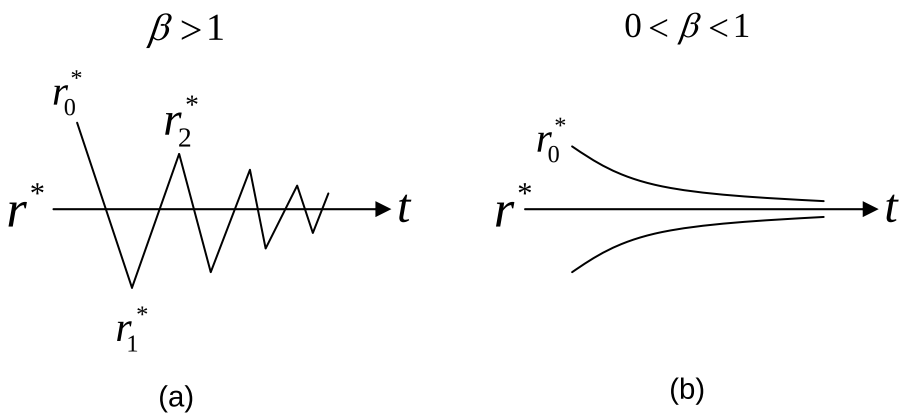
Substitution of (19) in (17) gives

$$E^*(\pi_{t+n}) = \pi^*. \qquad (20)$$

Thus, in the long run, $\pi^* = l - \frac{kA}{\theta_1}$ is the condition that the expected inflation is consistent with the inflation target.

1.4. Comparison Between Clarida et al.'s and Our Stability Condition

In Clarida et al. (2000), the stability condition of equation (2) is briefly conjectured. The forward-looking Taylor rule characterized by $\beta > 1$ and γ >0 will tend to be stabilizing, while those with $\beta \leq 1$ or $\gamma \leq 0$ are likely to be destabilizing. But according to our model specification, stability is possible with values of β slightly smaller than one. According to the equation (16), if $|(\beta - 1)k + \gamma\theta_1| < 1$ and $\gamma = 0$ hold**,** as shown in figures (a) and (b), under the condition $\beta > 1$, the real rate target, r_t^*, oscillatingly converges on the steady-state real rate, r^*, while under the condition $0 < \beta < 1$, the real rate target, r_t^*, asymptotically converges on the steady-state real rate, r^*. That is to say, the forward-looking Taylor rule characterized by $0 < \beta < 1$ also tends to be stabilizing.



Figure

2. CASE 2: THE STABILITY CONDITION OF FORWARD-LOOKING TAYLOR RULE WITH INTEREST RATE SMOOTHING

Case 1 indicates the stability condition of forward-looking Taylor rule without interest rate smoothing[5]. In this subsection, we will find the stability condition of forward-looking Taylor rule with interest rate smoothing. That is to say, we will find the stability condition of a forward-looking actual real rate rule. In the real world, the public does not know the nominal interest rate target i_t^* and real interest rate target r_t^*, but they know the nominal interest rate i_t and real interest rate r_t well. It is acceptable to consider that the public's investment and expected inflation depends on the real rate, r_t. In this paper, we use the form of interest rate smoothing presented by Clarida et al. (2000),

$$i_t = \rho i_{t-1} + (1-\rho) i_t^*, \qquad (21)$$

where i_t and i_{t-1} are the nominal interest rates in period t and $t-1$, $\rho \in [0,1)$ is an indicator of the degree of smoothing of interest rate changes. This equation postulates partial adjustment of i_t to the target i_t^*.

[5] The reasons why central banks have the behavior of interest rate smoothing and choose to move interest rates gradually include reducing the likelihood of financial sector crises (Goodfriend,1987), increasing policy effectiveness (Woodford,1999), avoiding policy reversals (Goodfriend, 1991, Goodhart, 1999), etc..

Let $i_t^* = r_t^* + E(\pi_{t+n})$, $i_t = r_t + E(\pi_{t+n})$ and $i^* = r^* + \pi^*$, substitution of (2) into (21) results in a forward-looking real rate rule,

(22)

$$r_t = -\rho E(\pi_{t+n}) + \rho[r_{t-1} + E(\pi_{t+n-1})] + (1-\rho)[r^* + (\beta-1)(E(\pi_{t+n}) - \pi^*) + \gamma(E(y_{t+q}))].$$

In this paper, we call equation (22) the forward-looking Taylor rule with interest rate smoothing.

In order to find the stability condition of equation (22), $E(\pi_{t+n})$, $E(\pi_{t+n-1})$ and $E(y_{t+q})$ should be explained. Here we replace r_{t-1}^* with r_{t-1}, equation (3) and (13) can be changed into the following forms,

$$E(\pi_{t+n}) = -kr_{t-1} + l, \qquad (3')$$

$$E(y_{t+q}) = -\theta_1 r_{t-1} + A. \qquad (13')$$

Substitution of equation $(3')$ and equation $(13')$ into (22) yields equation (23),

(23) $r_t = [\rho(k+1) - (1-\rho)(\beta-1)k - (1-\rho)\gamma\theta_1]r_{t-1} - \rho k r_{t-2} + (1-\rho)r^*$

$+ (1-\rho)(\beta-1)(l-\pi^*) + (1-\rho)\gamma A.$

Let $r_t = r_{t-1} = r_{t-2} = r^*$, we can get r^*,

$$r^* = \rho(k+1)r^* - \rho k r^* + (1-\rho)r^* + (1-\rho)(\beta-1)(-kr^* + l - \pi^*) + (1-\rho)\gamma(-\theta_1 r^* + A),$$

$$r^* = \frac{(\beta-1)(l-\pi^*) + \gamma A}{(\beta-1)k + \gamma\theta_1}. \qquad (24)$$

Let $x_t = r_t - r^*$, (23) can be changed into the following equation,

$$x_t = [\rho(k+1) - (1-\rho)(\beta-1)k - (1-\rho)\gamma\theta_1]x_{t-1} - \rho k x_{t-2} \qquad (25)$$

$$-(1-\rho)[(\beta-1)k + \gamma\theta_1]r^* + (1-\rho)(\beta-1)(l-\pi^*) + (1-\rho)\gamma A$$

Substitution of (24) into (25) results in a second-order difference equation,

$$x_t = ax_{t-1} - bx_{t-2},$$

$$x_t - ax_{t-1} + bx_{t-2} = 0, \qquad (26)$$

where $a = \rho(k+1) - (1-\rho)(\beta-1)k - (1-\rho)\gamma\theta_1$, $b = \rho k$.

The characteristic equation of (26) is

$$\lambda^2 - a\lambda + b = 0. \qquad (27)$$

When $a^2 - 4b > 0$, equation (27) has real roots,

$$\lambda_1 = \frac{a + \sqrt{a^2 - 4b}}{2}, \qquad (28)$$

$$\lambda_2 = \frac{a - \sqrt{a^2 - 4b}}{2}. \qquad (29)$$

The stability condition is $|\lambda| < 1$, that is to say, $-1 < \lambda_2 < \lambda_1 < 1$.

Substitution of (24) and (25) into $-1 < \lambda_2 < \lambda_1 < 1$ gives

$$-1 < \frac{a - \sqrt{a^2 - 4b}}{2} < \frac{a + \sqrt{a^2 - 4b}}{2} < 1,$$

$$-(b+1) < a < b+1.$$

Thus, the stability condition is $-(b+1) < a < b+1$. That is to say, when $[\ \rho(k+1) - (1-\rho)(\beta-1)k - (1-\rho)\gamma\theta_1\ ]^2 - 4\rho k > 0$, the stability condition of forward-looking Taylor rule with interest rate smoothing is $-(\rho k+1) < \rho(k+1) - (1-\rho)(\beta-1)k - (1-\rho)\gamma\theta_1 < \rho k + 1$.

When $a^2 - 4b < 0$, equation (27) has imaginary roots, $\frac{a}{2} \pm \frac{\sqrt{4b - a^2}}{2}$.

Therefore, the stability condition is $\sqrt{\left(\frac{a}{2}\right)^2 + \left(\frac{\sqrt{4b - a^2}}{2}\right)^2} = \sqrt{b} < 1$.

That is to say, when $[\ \rho(k+1) - (1-\rho)(\beta-1)k - (1-\rho)\gamma\theta_1\ ]^2 - 4\rho k < 0$, the stability condition of forward-looking Taylor rule with interest rate smoothing is $\sqrt{\rho k} < 1$.

3. DOES THE FORWARD-LOOKING TAYLOR RULE TEND TO BE STABILIZING IN CHINA?

In order to understand whether the forward-looking Taylor rule tends to be stabilizing or not in China, the empirical analysis of the stability condition will be conducted by using China's quarterly data for the period 1992:1-2001:4. The empirical analysis will be conducted with four steps. First step is to estimate the values of β, γ and ρ. Here we use the estimated values in Xie and Luo (2002). The second step is to estimate the value of k. The third step is to estimate the value of θ_1 and the fourth step is to calculate the value of stability condition.

3.1. Estimating Values of β, γ and ρ

In Xie and Luo (2002), the parameters $\alpha, \beta, \gamma, \rho$ is estimated with China's quarterly data for the period 1992:1-2001:4. The collection of data is as follows. ①Interest rate. The data from 1992 to 1995 is the interbank offered rate of Shanghai Financing Center and the data from 1996 to 2001 is the 7-days interbank offered rate. ② Potential GDP. It is estimated by the method of linear trend. Three quarter dummy variables are introduced. ③ Inflation. The inflation data is the quarterly consumer price index (CPI).

The equation estimated by Xie and Luo is from Clarida et al. (2000, pp. 153). The estimated equation is as follows.

$$i_t = (1-\rho)\alpha + (1-\rho)\beta\pi_{t+n} + (1-\rho)\gamma y_{t+q} + \rho i_{t-1} + \varepsilon_t, \qquad (30)$$

where $\alpha = i^* - \beta\pi^*$, $\varepsilon_t \equiv -(1-\rho)\{\beta(\pi_{t+n} - E[\pi_{t+n} \mid \Omega_t]) + \gamma(y_{t+q} - E[y_{t+q} \mid \Omega_t])\}$, Ω_t is the information set at the time the interest rate is set.

Table 1 reports GMM estimates of parameters $\alpha, \beta, \gamma, \rho$. The set of instruments includes one-period lagged output gap, inflation rate, interest rate and GDP growth rate.

Table 1

α	β	γ	ρ	$\bar{R}^2$
1.84 (0.68)	0.81 (2.76)	2.84 (1.49)	0.82 (8.49)	0.87

t-value is reported in parentheses.

3.2. Estimating the Value of k

Next we report estimates of equation (3) and ($3'$). The data of inflation and interest rate are the same as that in subsection 3.1. Here we use π_{t+1} instead of $E(\pi_{t+1})$.

The regression equation is as follows,

$$E(\pi_{t+1}) = -0.3476 r_{t-1} + 6.1406 \ , \qquad (31)$$

$$(-2.1362) \qquad (1.3758)$$

$$R^2 = 0.9526, \ \bar{R}^2 = 0.9513, \ D.W. = 0.8955,$$

Therefore, $k = 0.3476$. $t-value$ is given in parentheses.

3.3. Estimating the Value of θ_1

Next we report estimates of equations (13) and ($13'$). The data period of GDP and the interest rate is 1992□ 01-2001□ 04. Here we use $LN(Y_{t+1})$ instead of $E(\log Y_{t+1})$.

The regression equation is as follows,

$$E(\log Y_{t+1}) = -0.0395 r_{t-1} + 0.0414 t + 8.5347 \ , \qquad (32)$$

$$(7.6109) \qquad (22.4153) \quad (113.985)$$

$$R^2 = 0.9881, \ \bar{R}^2 = 0.9874, \ D.W. = 2.1186,$$

Therefore, $\theta_1 = 0.0395$. $t-value$ is given in parentheses.

3.4. Does the Forward-looking Taylor rule Tend to be Stabilizing in China?

Since $\beta = 0.81$, $\gamma = 2.84$, $k = 0.3476$, $\theta_1 = 0.0395$, $\rho = 0.82$,

$| k(\beta - 1) + \gamma\theta_1 | = 0.046 < 1$,

Hence, the stability condition of forward-looking Taylor rule without interest rate smoothing, $| k(\beta - 1) + \gamma\theta_1 | < 1$, is fulfilled.

On the other hand, in case of interest rate smoothing,

$$[\ \rho(k+1) - (1-\rho)(\beta-1)k - (1-\rho)\gamma\theta_1\ ]^2 - 4\rho k = 0.0631 > 0,$$

$$-(\rho k + 1) = -1.285,$$

$$\rho(k+1) - (1-\rho)(\beta-1)k - (1-\rho)\gamma\theta_1 = 1.0969,$$

$$\rho k + 1 = 1.285,$$

$$-1.285 < 1.0969 < 1.285.$$

Therefore, the stability condition of forward-looking Taylor rule with interest rate smoothing, $-(\rho k + 1) < \rho(k+1) - (1-\rho)(\beta-1)k - (1-\rho)\gamma\theta_1 < \rho k + 1$, is also fulfilled.

In summary, the forward-looking Taylor rule tends to be stabilizing in China. In implementation of monetary policy, the central bank of China can treat forward-looking Taylor rule as a guideline. But this estimation result has limits because we use the interbank offered rate as the proxy variable of deposit rate which is still largely administratively determined in China.

4. CONCLUDING REMARKS

The stability condition is an essential topic of monetary policy rule. In this paper we derive the stability condition of forward-looking Taylor rule presented by Clarida et al. and find that stability is possible with values of β slightly smaller than one. We also provide the stability condition of forward-looking Taylor rule with interest rate smoothing. In terms of interbank offered rate, the empirical analysis shows that the forward-looking Taylor rule with and without interest rate smoothing tends to be stabilizing in China and in a sense China can treat forward-looking Taylor rule as a guideline.

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