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匯率目標區政策與經濟之穩定性：雙元匯率制度之分析

Exchange Rate Target Zone Policy and Economic Stability: Dual Exchange Rates model Analysis

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中文摘要

本文之主要目的為：探討雙元匯率在有特殊限制下，其對經濟穩定性之影響(即對物價、利率產出、商業匯率及金融匯率的穩定作用)。

故本文擬修改 Froot and Obstfeld (1991) 之模型為包含實質面隨機干擾項的模型；再結合目標區的研究方法，來探討以下之問題：當經濟體系面對實質面之經濟干擾時，中央銀行如何在商業匯率目標區政策、商業匯率自由浮動政策政策下作選擇。期在此修正模型下，發現一能使經濟穩定之最適政策指標。

本文之結論為：和傳統理論認為商業匯率和金融匯率穩定係互相抵觸的說法不同，就目標區理論而言，在某些狀況下兩者之穩定是相輔相成的；而係數 Ω_0 之正負扮演關鍵性的角色。

關鍵詞：匯率目標體制，雙元匯率目標區政策，隨機過程。

Abstract

Based on a simple stochastic macro model, this paper addresses the relative stabilizing performance of dual exchange rates system from the viewpoint of target zones. Contrast to the conclusion in dual exchange rate literatures, upon the shock of a change in commodity production, we find that the inverse movement in these dual rates is not always be hold under the commercial rate target zone policy. The elasticity of some specific factors is the crucial point for the desirability of targeting commercial rate: With $\Omega_0>0$, this policy tend to lower the variability of prices, interest rates, and commercial rate but raise the variability of output, financial rate's variability is uncertain. However, with $\Omega_0<0$, the policy will lead to a smaller output, commercial rate, and financial rate fluctuation at the expense of larger price and interest rate fluctuations.

Key words: Dual exchange rates system, Exchange-rate target zones, Stochastic processes.

1. The theoretical model:

In order to sharpen the salient feature of dual exchange rate policy, the modeling strategy we adopt is to keep the model as simple as possible. Basically, except that the analysis is confined the commercial exchange rate within a specific range, the theoretical model of this paper is modified from the Froot and Obstfeld (1991) model. Assume that economic agents form their expectations with rational manner, domestic and foreign countries' bonds are perfect substitution, we can use the following equations to represent this simple stochastic macro model:

$$y = \alpha p - \varepsilon\,; \tag{1}$$

$$y = [\eta\ (e^c + p^* - p) - \theta y] - \beta[r - \frac{E(dp)}{dt}] - \omega\,;\quad \eta,\theta,\beta > 0 \tag{2}$$

$$m - p = \phi y - \lambda r - v\,;\ \ \phi > 0, \lambda > 0 \tag{3}$$

$$[\eta'(e^c + p^* - p) - \theta' y] = 0 ; \quad (4)$$

$$r = r^* + r^*(e^c - e^f) + \frac{E(de^f)}{dt} ; \quad (5)$$

$$d\varepsilon = \sigma_\varepsilon dz_\varepsilon ; \quad (6)$$

$$d\omega = \sigma_\omega dz_\omega ; \quad (7)$$

$$dv = \sigma_v dz_v . \quad (8)$$

With the exception of the domestic (foreign) interest rate r (r^*), all variables are expressed in natural logarithms. The variables are defined as follows: y= real output; p (p^*)= domestic (foreign) price of goods; m= nominal money supply; e^c= commercial exchange rate, e^f = financial exchange rate, ε= random disturbance terms of aggregate supply side, ω= random disturbance terms of aggregate demand side, v= random disturbance terms of money demand. In addition, E denotes expectations operators and σ_i is the instantaneous standard deviation of movement of i.

In order to keep the model as simple as possible, similar to be adopted by Sutherland (1995), we set the equation (1) is the aggregate supply function in which aggregate production is specified to be positively related to commodity prices. The rationale for this setting can be justified by the facts that workers have imperfect information about price changes and wages are set with contracts.[1] Equation (2) is the aggregate demand function for commodities. It specifies that aggregate demand is the summation of the consumption, investment, government expenditure and balance of payment. Among them, we delete the government expenditure for simplification, and let the consumption is an increasing function of output, the investment is a decreasing function of real interest rate, $i - E(dp)/dt$. Then the aggregate demand is the function of balance of payment and real interest rate in (2). In here, we let $\eta = \eta'/(1-c)$, $\theta = \theta'/(1-c)$, $\beta = \beta'/(1-c)$, $\omega = \omega'/(1-c)$. Equation (3) is the money market equilibrium condition, stating that real money supply equals real money demand. Equation (4) is the equilibrium equation in current account, we set that the current account is the increasing function of commercial exchange rate and foreign commodity price, it is also the decreasing function of home country's income and commodity price. Another, we assume that Marshall-Lerner condition is exist, therefore raise the relative price between foreign and domestic commodities will improve the balance of payment to home country. Equation (5) is the capital account components of the foreign exchange market. It is worth noticing that the capital movement is setting as a function of the difference between the return on domestic bond, r, and the net return on foreign bonds, $r^* + r^*(e^c - e^f) + \frac{E(de^f)}{dt}$.[2] Equation (6)-(8) specifies that the stochastic aggregate supply, demand, and money demand shock ε, ω, v follow a Brownian motion process without drift.

From equation (1)-(4), we have the following

[1] See Miller and VanHoose (1998, Ch. 8) for a detailed explanation.

[2] See Gardner (1985), Lai and Chu (1986b), and Lai and Chang (1990) for a more detailed derivation.

matrix form:

$$\begin{pmatrix} 1 & -\alpha & 0 \\ 1 & 0 & \beta \\ \phi & 1 & -\lambda \end{pmatrix}\begin{pmatrix} y \\ p \\ r \end{pmatrix} = \begin{pmatrix} -\varepsilon \\ \beta(E(dp)/dt)-\omega \\ m+v \end{pmatrix}. \quad (9)$$

Using Cramer's rule, we get the following "pseudo" reduced forms:[3]

$$y=\frac{1}{\Delta}\left\{-\alpha\beta m-\alpha\beta\lambda\frac{E(dp)}{dt}+\beta\varepsilon+\alpha\lambda\omega -\alpha\beta v\right\}, \quad (10)$$

$$p=\frac{1}{\Delta}\left\{-\beta m-\lambda\beta\frac{E(dp)}{dt}-(\beta\phi+\lambda)\varepsilon +\lambda\omega-\beta v\right\}, \quad (11)$$

$$r=\frac{1}{\Delta}\left\{\alpha m-(1+\alpha\phi)\beta\frac{E(dp)}{dt}-\varepsilon+(1+\alpha\phi)+(1+\alpha\phi)\,\omega+\alpha v\right\}, \quad (12)$$

$$e^{c}=\frac{1}{\Delta}\left\{-\beta(1+\frac{\alpha\theta}{\eta})m-\beta\lambda(1++\frac{\alpha\theta}{\eta})\frac{E(dp)}{dt}[\frac{\theta}{\eta}\beta-(\beta\phi+\lambda)]\varepsilon+\lambda(1+\frac{\alpha\theta}{\eta})\omega-\beta(1+\frac{\alpha\theta}{\eta})v\right\}, \quad (13)$$

where $\Delta=-\alpha\beta\phi-\beta-\alpha\lambda<0$.

2. The variability pertaining to commercial exchange rare target zones

If the economic system's disturbance is from the aggregate supply side,[4] under this dual exchange regime, should the monetary authorities adopt the commercial exchange rate target zone or float commercial exchange rate policy to combat this disturbance source? Which one is the optimal policy for stabilizing economy? This is the main goal of this section to discuss.

Since we only consider the aggregate supply side disturbance, this means that $\varepsilon\neq 0$, but $\omega=v=0$, then (10)-(13) will become as follows:

$$y=\frac{1}{\Delta}\left\{-\alpha\beta m+\beta\varepsilon-\alpha\beta\lambda\frac{E(dp)}{dt}\right\}, \quad (14)$$

$$p=\frac{1}{\Delta}\left\{-\beta m-(\beta\phi+\lambda)\varepsilon-\lambda\beta\frac{E(dp)}{dt}\right\}, \quad (15)$$

$$r=\frac{1}{\Delta}\left\{\alpha m-(1+\alpha\phi)\beta\frac{E(dp)}{dt}-\varepsilon\right\}, \quad (16)$$

$$e^{c}=\frac{1}{\Delta}\left\{-\beta(1+\frac{\alpha\theta}{\eta})m+[\frac{\theta}{\eta}\beta-(\beta\phi+\lambda)]\varepsilon -\beta\lambda(1+\frac{\alpha\theta}{\eta})\frac{E(dp)}{dt}\right\}, \quad (17)$$

Since the equation (15) is a stochastic differential equation, it states that the level of prices is related to both fundamentals and expectations of the future prices. The general solution for p is:

$$p=-\frac{\beta}{\Delta}m-\frac{1}{\Delta}(\beta\phi+\lambda)\varepsilon+A_1e^{s\varepsilon}+A_2e^{-s\varepsilon}, \quad (18)$$

where A_1, A_2 are parameters, $s=\sqrt{\frac{-2\Delta}{\beta\lambda\sigma_\varepsilon^2}}$.

Comparing equation (15) with (18) yields the expectation of the price movement:

$$\frac{E(dp)}{dt}=\frac{-\Delta}{\beta\lambda}(A_1e^{s\varepsilon}+A_2e^{-s\varepsilon}). \quad (19)$$

Plugging (19) into (14), (16), (17), we can obtain a general solution for the output, interest rate and

[3] Note that $E(dp)/dt$ is an endogenous variable.

[4] We can also consider another disturbance sources, such as the aggregate demand or money demand shock, but the procedure and result of these shocks are similar to those in this condition, we delete these for condensation. However, the detailed procedure of these sections is available upon request from the authors.

commercial rate which exhibit within the target zone:

$$y = -\frac{\alpha\beta}{\Delta}m + \frac{\beta}{\Delta}\varepsilon + \alpha\left(A_1 e^{s\varepsilon} + A_2 e^{-s\varepsilon}\right), \quad (20)$$

$$r = \frac{\alpha}{\Delta}m - \frac{1}{\Delta}\varepsilon + \frac{(1+\alpha\phi)}{\lambda}\left(A_1 e^{s\varepsilon} + A_2 e^{-s\varepsilon}\right); \quad (21)$$

$$e^c = -\frac{\beta(\eta+\alpha\theta)}{\eta\Delta}m + \left[\frac{\beta\theta - \eta(\beta\phi+\lambda)}{\eta\Delta}\right]\varepsilon$$

$$\left(\frac{\eta+\alpha\theta}{\eta}\right)\left(A_1 e^{s\varepsilon} + A_2 e^{-s\varepsilon}\right). \quad (22)$$

Assume that the authorities stand ready to adjust the money supply at the level of upper commercial rate $\bar{e}^c$ and lower commercial rate $\underline{e}^c$, while commercial rate stays in the interior of the band, the monetary authorities do not alter the money stock. Based on this intervention rule, the dynamic locus of e^c can be expressed as:

$$e^c = \begin{cases} \bar{e}^c & ;\varepsilon \ge \bar{\varepsilon}^+ \\ -\frac{\beta(\eta+\alpha\theta)}{\eta\Delta}m + \Omega_0\varepsilon + \frac{\eta+\alpha\theta}{\eta}\left(A_1 e^{s\varepsilon} + A_2 e^{-s\varepsilon}\right); & ;\bar{\varepsilon}^- \ge \varepsilon \ge \underline{\varepsilon}^+ \\ \underline{e}^c & ;\underline{\varepsilon}^- \ge \varepsilon \end{cases} \quad (23)$$

where $\Omega_0 = \frac{\beta\theta - \eta(\beta\phi+\lambda)}{\eta\Delta}$.

Where $\bar{\varepsilon}$ and $\underline{\varepsilon}$ are the corresponding values when the monetary authorities decrease and increase money supply, respectively. $\bar{\varepsilon}^+$ and $\bar{\varepsilon}^-$ represent the right and left hand side limits of $\bar{\varepsilon}$, respectively; while $\underline{\varepsilon}^+$ and $\underline{\varepsilon}^-$ represent the right and left hand side limit of $\underline{\varepsilon}$, respectively.

Now we proceed to solve the undetermined variables: A_1, A_2, $\bar{\varepsilon}$ and $\underline{\varepsilon}$. These unknown parameters are determined by two continuity conditions and two smooth pasting conditions. Since the agents know that the monetary authorities will intervene in the money market when the commercial rate reaches the upper and lower bounds of the commercial rate target zone, they will rebalance their portfolio in advance. Thus, the continuity condition prevents the commercial rate from jumping discretely when the monetary authorities intervene in the money market. Furthermore, the smooth pasting condition means that at the edges of the band the commercial rate dynamic locus is tangential to the horizontal lines.[5] These conditions are:

$$e^c_{\bar{\varepsilon}^+} = e^c_{\bar{\varepsilon}^-}, \quad (24)$$

$$e^c_{\underline{\varepsilon}^+} = e^c_{\underline{\varepsilon}^-}, \quad (25)$$

$$\frac{de_{\bar{\varepsilon}^-}}{d\varepsilon} = 0, \quad (26)$$

$$\frac{de_{\underline{\varepsilon}^+}}{d\varepsilon} = 0. \quad (27)$$

Substituting equation (23) into (24) - (27) yields:

$$\bar{e}^c = \frac{-\beta(\eta+\alpha\theta)}{\eta\Delta}m + \Omega_0\bar{\varepsilon} + \frac{\eta+\alpha\theta}{\eta}\left(A_1 e^{s\bar{\varepsilon}} + A_2 e^{-s\bar{\varepsilon}}\right), \quad (24a)$$

$$\underline{e}^c = \frac{-\beta(\eta+\alpha\theta)}{\eta\Delta}m + \Omega_0\underline{\varepsilon} + \frac{\eta+\alpha\theta}{\eta}\left(A_1 e^{s\underline{\varepsilon}} + A_2 e^{-s\underline{\varepsilon}}\right), \quad (25a)$$

$$\Omega_0 + \frac{\eta+\alpha\theta}{\eta}\left(sA_1 e^{s\bar{\varepsilon}} - sA_2 e^{-s\bar{\varepsilon}}\right) = 0, \quad (26a)$$

$$\Omega_0 + \frac{\eta+\alpha\theta}{\eta}\left(sA_1 e^{s\underline{\varepsilon}} - sA_2 e^{-s\underline{\varepsilon}}\right) = 0. \quad (27a)$$

It follows from equations (26a) and (27a) that the smooth pasting conditions can be solved for A_1 and A_2 as functions of $\bar{\varepsilon}$ and $\underline{\varepsilon}$:

[5] Flood and Garber (1991) provide an intuitive explanation for the smooth pasting condition.

$$A_1 = A_1(\bar{\varepsilon},\underline{\varepsilon}) = \frac{-\Omega_0\eta(e^{-s\underline{\varepsilon}} - e^{-s\bar{\varepsilon}})}{s(\eta+\alpha\theta)(e^{s(\bar{\varepsilon}-\underline{\varepsilon})} - e^{-s(\bar{\varepsilon}-\underline{\varepsilon})})}, \tag{28}$$

$$A_2 = A_2(\bar{\varepsilon},\underline{\varepsilon}) = \frac{\Omega_0\eta(e^{s\bar{\varepsilon}} - e^{s\underline{\varepsilon}})}{s(\eta+\alpha\theta)(e^{s(\bar{\varepsilon}-\underline{\varepsilon})} - e^{-s(\bar{\varepsilon}-\underline{\varepsilon})})}. \tag{29}$$

With the assumption of $\bar{e}^c = -\underline{e}^c$ and $m = 0$ initially and equations of (28) and (29), the continuity conditions in equations (24a) and (25a) can be rewritten as:

$$\bar{e}^c = \Omega_0\bar{\varepsilon} + \frac{\eta+\alpha\theta}{\eta}\left[A_1(\bar{\varepsilon},\underline{\varepsilon})e^{s\bar{\varepsilon}} + A_2(\bar{\varepsilon},\underline{\varepsilon})e^{-s\bar{\varepsilon}}\right], \tag{24b}$$

$$-\bar{e}^c = \Omega_0\underline{\varepsilon} + \frac{\eta+\alpha\theta}{\eta}\left[A_1(\bar{\varepsilon},\underline{\varepsilon})e^{s\underline{\varepsilon}} + A_2(\bar{\varepsilon},\underline{\varepsilon})e^{-s\underline{\varepsilon}}\right]. \tag{25b}$$

Substituting equation (28) and (29) into (24b) and (25b), we can infer that:

$$\bar{\varepsilon} = -\underline{\varepsilon}. \tag{30}$$

Equation (30) reveals an important implication: when the random market fundamentals follows a Brownian motion without drift and $m = 0$ initially, the symmetrical price bounds can be alternatively expressed by the symmetrical market fundamental bounds.[6]

Substituting $\bar{\varepsilon} = -\underline{\varepsilon}$ into equation (28) and (29), we have:

$$A_1 = -A_2 = \frac{-\Omega_0\eta}{s(\eta+\alpha\theta)[2\cosh(s\bar{\varepsilon})]}. \tag{31}$$

Combining equation (31) with (18), (20), (21) and (22) and remembering $m = 0$ initially yield the closed dynamic loci of output, prices, interest rate, and commercial rate within the bands:

$$y = \frac{\beta}{\Delta}\varepsilon - \frac{\alpha\Omega_0\eta\sinh(s\varepsilon)}{s(\eta+\alpha\theta)\cosh(s\bar{\varepsilon})}, \tag{32}$$

$$p = -\frac{(\beta\phi+\lambda)}{\Delta}\varepsilon - \frac{\Omega_0\eta\sinh(s\varepsilon)}{s(\eta+\alpha\theta)\cosh(s\bar{\varepsilon})}, \tag{33}$$

$$r = -\frac{1}{\Delta}\varepsilon - \frac{\Omega_0\eta(1+\alpha\phi)\sinh(s\varepsilon)}{\lambda s(\eta+\alpha\theta)\cosh(s\bar{\varepsilon})}, \tag{34}$$

$$e^c = \Omega_0\varepsilon - \frac{\Omega_0\sinh(s\varepsilon)}{s\cosh(s\bar{\varepsilon})}. \tag{35}$$

Base on equations (32) - (35), we can graph the output, price, interest rate, and commercial rate loci within the bands, which are labeled the TZ schedule in the relevant figures.

If the monetary authorities do not set a commercial rate band in the dual exchange rate regime, implying $\bar{e}^c \to \infty$ and $\underline{e}^c \to -\infty$, the edges of the market fundamental have the properties $\bar{\varepsilon} \to \infty$ and $\underline{\varepsilon} \to -\infty$. With this relation, from equations (28) and (29) we have $A_1 = A_2 = 0$. Then it follows from equation (18) and (20)-(22) that the dynamic behavior of y, p, r and e^c in the regime of a dual exchange rate is:

$$y = \frac{\beta}{\Delta}\varepsilon, \tag{32a}$$

$$p = -\frac{(\beta\phi+\lambda)}{\Delta}\varepsilon, \tag{33a}$$

$$r = -\frac{1}{\Delta}\varepsilon, \tag{34a}$$

$$e^c = \Omega_0\varepsilon. \tag{35a}$$

Equations (32a)-(35a) reveal that, if the monetary authorities do not set any edge for the commercial rate, public agents will expect that the instantaneous change in price is nil. Then, it

[6] See Svensson (1992) for a detailed intuitive explanation.

follows from equation (14)-(17) that y, p, r and e^c are determined by the market fundamentals completely. According to equation (32a)-(35a), we can depict the dynamic loci of y, p, r and e^c under the float commercial rate regime, which are labeled the FF schedule in the relevant figures.

Since the effect of output disturbance to commercial rate (Ω_0) is ambiguous: If the elasticity of interest rate to money demand (λ) or the elasticity of real commercial rate to net export (η) become larger, it will make Ω_0>0. The other will make Ω_0<0. Then when the government executed commercial rate target zone policy in the dual exchange rate regime, the positive or negative of Ω_0 will affect this policy's stability capability. The reason is that the execution of target zone policy will make the public agents change their expectation in the price movement, and this expectation is central to the story. From (19) and (31), we know:

$$\frac{E(dp)}{dt} = \frac{-\Omega_0 \eta \Delta[\sinh(s\varepsilon)]}{\beta\lambda s[\cosh(s\bar{\bar{\varepsilon}})]}. \qquad (36)$$

From (36), we can see that how the positive or negative of Ω_0, go through the expectation of price movement, to affect the variability of relevant macro variables as follows. If the effect of output disturbance to commercial rate is positive (Ω_0>0), based on equations (32)-(35), we can graph the output, price, interest rate, and commercial rate loci within the bands, which are labeled the TZ schedule in Figure 1, Figure 2, Figure 3, and Figure 4, respectively. Similarly, According to equations (32a)-(35a), we can depict the dynamic loci of y, p, r, and e^c under the float commercial rate regime, which are labeled the FF schedule in Figure 1, Figure 2, Figure 3, and Figure 4, respectively.

In Figure 2-4, for a given fluctuation in ε within the interval $\bar{\varepsilon}$ and $\underline{\varepsilon}$, price, interest rate, and commercial rate variability under a regime of the commercial rate target zone are smaller than those under the regime of a float commercial rate. Hence, the commitment that the monetary authorities intend to defend a commercial rate zone will stabilize p, r, and e^c. This is the famous "honeymoon effect" in the target zone literature. However, it is clear from Figure 1, in response to a change in ε, the output variability under the regime of a commercial rate target zone is greater than that under the regime of a float commercial rate. More precisely, a commercial rate target zone tends to destabilize, rather than stabilize y only. These results indicate an important policy implication that, when the monetary authorities undertake a commercial rate target zone policy, the economy benefits from lower price, interest rate, and commercial rate variability at the expense of higher output variability.

The intuition behind these results is obvious. When the economy experiences a shock in output supply (for example, the oil price rising abruptly), As indicated in (14) and (17), p, r, and e^c will increase in response, only the output, y, decrease a lot. When e^c is higher and closer to the upper bound of the commercial rate band, the probability that it will reach the upper edge is higher. Accordingly, the probability of a future intervention to *decrease* the money supply to defend the band is higher, implying that future lower price is expected by the public agents (i.e., $E(dp)/dt<0$). This changing in expectations will in turn lead to a decrease in y, p, r and e^c since it will lower commodity demand.[7] Obviously, the adjustment of p, r and e^c originating from expectations will lessen the adjustment of both variables originating from the change in fundamentals, thereby narrowing the range of variation. However, the adjustment of y originating from expectations will enhance the adjustment originating from the change in fundamentals, hence the range of variation of y is increased. The same reasoning must hold at the bottom of the band.

Contrarily, from equation (32)-(35) and (32a)-(35a) in $\Omega_0<0$ condition, we can depict the dynamic loci of y, p, r and e^c under the two different regimes as above, which are labeled the TZ and FF schedule in Figure 5, Figure 6, Figure 7, and Figure 8, respectively. It is quite clear in Figures 5-8 that, if the economy faces aggregate supply shocks, the commercial rate target zone policy will stabilize output, commercial rate at the expense of high price and interest rate variability.

The inferences in Figures 1-4 can be applied to Figures 5-8. Given that the economy experiences a rise in the aggregate supply, thus p, r will increase in response. However, as indicated in equation (14) and (17), y, e^c will decrease in this condition. When e^c is lower and closer to the lower bound of the commercial rate band, the probability that it will reach the lower edge is higher. Accordingly, the probability of a future intervention to *increase* the money supply to defend the band is higher, implying that future higher commercial rate is expected by the public agents (i.e., $E(dp)/dt>0$). The change in expectations further leads to an increasing in y, p, r and e^c, since it will boost commodity demand.[8] Obviously, the adjustment of y and e^c emerging from expectations will lessen the adjustment of both variables emerging from the change in fundamentals, thereby narrowing the range of variation. However, the adjustment of p and r originating from expectations will enhance the adjustment originating from the change in fundamentals, hence the range of variation of p and r are increased. The same reasoning must hold at the ceiling of the band.

Finally, we will continuous discussing what's the adjustment path of the financial exchange rate. Substituting the value of r in (16) into (5), we obtain:

$$e^f=1-\frac{\alpha}{r^*\Delta}m+\frac{1}{r^*\Delta}\varepsilon+e^c+\frac{1}{r^*}\frac{E(de^f)}{dt}. \tag{37}$$

From equation (37), we can clearly understand that the dynamic path of commercial rate will affect the dynamic path of financial rate

[7] Equation (14)-(17) reveals that a fall in $E(dp)/dt$ will reduce y, p, r and e^c.

[8] Equation (14)-(17) reveals that a upper in $E(dp)/dt$ will increae y, p, r and e^c

too.

Moreover, we need to derive the closed dynamic locus of financial rate from (37). Firstly, plugging a general solution for commercial rate of equation (22) into equation (37) and solve it, then we can derive the general solution for financial rate:

$$e^f = 1 - \frac{1}{\Delta}\left[\frac{\alpha}{r^*} + \frac{\beta(\eta + \alpha\theta)}{\eta}\right]m + \Lambda\varepsilon + A_1 e^{s\varepsilon} + A_2 e^{-s\varepsilon} + B_1 e^{\delta\varepsilon} + B_2 e^{-\delta\varepsilon}, \qquad (38)$$

where A_1, A_2, B_1, B_2 are parameters, and $\Lambda = \Omega_0 + \frac{1}{r^*\Delta}$, $\delta = \sqrt{\frac{2r^*}{\sigma_\varepsilon^2}}$.

Secondly, since we have obtained the solution of A_1 and A_2 from the equation (31), the same procedure could be used to solve the remainder undetermined variables B_1 and B_2. Plugging (31) into (38), these unknown parameters are also determined by two continuity conditions and two smooth pasting conditions which similar to describe in the above, and their values as follows:

$$B_1 = B_2 = 0. \qquad (39)$$

Equation (39) shown that the financial rate's expectations will do not affect the dynamic path of the financial rate under the dual exchange rate regime. This result does not surprise to all of us, since the movement of financial rate does not any restrict under this commercial rate target zones, the expectations of financial rate still fixed even the public have the regime collapsed expectations.

Let m=0, and plugging the value of A_1, A_2, B_1, B_2 which shown in (31) and (39) into the equation (38), we will obtain the closed dynamic locus of financial rate as follows:

$$e^f = \begin{cases} 1 + \frac{1}{r^*\Delta}\varepsilon + \bar{e}^c; & \varepsilon \geq \bar{\varepsilon}^+ \\ 1 + \Lambda\varepsilon - \frac{\Omega_0 \sinh(s\varepsilon)}{s\cosh(s\bar{\varepsilon})}; & \bar{\varepsilon}^- \geq \varepsilon \geq \underline{\varepsilon}^+ \\ 1 + \frac{1}{r^*\Delta}\varepsilon + \underline{e}^c; & \underline{\varepsilon}^- \geq \varepsilon \end{cases} \qquad (40)$$

Similar to the procedure as above, from the equation (40), we can graph the dynamic locus of e^f under the commercial rate target zones or float commercial rate regime, which is labeled the TZ or FF schedule in the figure 9 and figure 10. Moreover, the effect of output disturbance to financial rate (Λ) is ambiguous: since $1/_{r^*\Delta}$ is negative, the value of Λ will depend on the value of Ω_0. If Ω_0>0, it will make Λ positive or negative, the other will make Λ<0 always. Therefore, similar to the effect in the other variables as above, when the government executed commercial rate target zone policy in the dual exchange rate regime, the positive or negative of Ω_0 will affect this policy's stability capability to the financial rate too. The reason is obvious, since from (39), the financial rate's expectations will not be affected under the dual exchange rate regime, then the execution of commercial rate target zone policy only make the public agents change their expectation in the price movement, and this expectation is central to the story.

If Ω_0>0, since it will make the slope of financial rate locus' market fundamental (Λ) positive or negative, based on equation (40), we can graph this locus within the bands, which is labeled the *TZ* schedule in Figure 9 and Figure