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Real Exchange Rate Fluctuations in a Small Open Economy Under Fixed and Flexible Exchange Rates

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This paper examines the implications of a standard macroeconomic model of a small open economy for real exchange rate fluctuations in different nominal exchange rate regimes. The two central questions are the following. First, does macroeconomic theory offer an explanation for the observed high level of real exchange rate fluctuations in the flexible exchange rate period? Second, are these fluctuations destabilizing with respect to domestic output or are they rather the symptom of the proper functioning of the real exchange rate as an automatic stabilizer?

1. Introduction

This paper examines the problem of real exchange rate fluctuations in a macroeconomic model of a small open economy. The two central questions are the following. First, does macroeconomic theory offer an explanation for the observed high level of real exchange rate fluctuations in the flexible exchange rate period? Second, are these fluctuations destabilizing with respect to domestic output, or are they rather the symptom of the proper functioning of the real exchange rate as an automatic stabilizer?

Our point of departure is the following "stylized fact". Exchange rate fluctuations – real as well as nominal – have increased dramatically since the end of the Bretton-Woods system and the transition to flexible exchange rates. There are two competing explanations for this phenomenon. The first one states that the increase in exchange rate fluctuations took place because of the transition to flexible exchange rates, the second one states that it reflects an increase in exogenous disturbances in the world economy and in discrepancies between major economies. Loosely speaking, according to

* Exchange rates have been rather volatile in recent years. However, as someone has observed, economists' opinions about exchange rates have been even more volatile. This is especially true for myself during the work on the present paper. People who have more or less sucessfully intervened in order to dampen the volatility of my opinions are: Manfred J. M. Neumann, Jürgen von Hagen and Eckhard Wurzel at the University of Bonn, Hans Genberg and the other participants at the Konstanz Seminar for Monetary Theory and Policy, 1984.

first explanation the exchange rate regime is the cause of the disease, according to second one it is rather the cure. A priori, both explanations are equally as likely and since this is an empirical issue the decision between them must ultimately be settled empirically. Nevertheless, there are also theoretical issues involved and this is what we are dealing with in this paper. We will examine the theoretical background of the first one of the two alternative explanations. If the dramatic increase in real exchange rate fluctuations is actually due to the transition to flexible rates then our standard macroeconomic models should give us clearcut implications in this respect, and if these implications fail to come forth the case for the first explanation will be considerably weakened. This leads us back to our two central questions, namely, do our macroeconomic models actually offer an explanation for high real exchange rate fluctuations, and do they imply that these fluctuations are destabilizing? We will try to answer them by means of a standard macroeconomic model of a small open economy.

The number of publications about the macroeconomic properties of different exchange rate regimes is now legion. Our reference section offers only a small selection. For instance, *Fischer* (1976), *Flood* (1979), *Turnovsky* (1983), and *Eaton/Turnovsky* (1984) have done studies which are related to the present one. Our analysis differs from theirs not so much in spirit but rather in that we concentrate on real exchange rate fluctuations. In their models this is ruled out since the exchange rate is tied to purchasing power parity.

We establish the following results. First, flexible exchange rates do not *per se* imply high volatility of real exchange rates. Rather, this depends on the flexibility of domestic output prices. Only if the price level within each period is predetermined (sticky) the fixed exchange rate system leads to smaller real exchange rate fluctuations. Second, with flexible output prices the relative degree of real exchange rate fluctuations in both regimes depends crucially on the origin of the exogenous disturbances. If output demand and money demand shocks predominate the flexible rate regime leads to greater real exchange rate stability. Finally, even if – with sticky prices – the flexible rate regime leads to higher real exchange rate fluctuations this does not necessarily imply higher output fluctuations. Rather, depending on the origin of the exogenous disturbances real exchange rate fluctuations may be stabilizing.

In the remainder of the paper we proceed as follows. In the following section we concentrate exclusively on the first of our two questions. We model an economy in which output prices are flexible and output supply is exogenously given. The second question is then examined in section three. There the situation is reversed, prices are inflexible and output is endogenous. Finally, the last section contains the conclusions.

2. Flexible output prices

a) The model

The model of this section consists of the following equations:

$$y_t = \bar{y} + u_t \tag{1}$$

$$y_t^d = \bar{y} + a_1 (m_t - p_t) + a_2 q_t + w_t \tag{2}$$

$$y_t = y_t^d \tag{3}$$

$$m_t = m_t^d = p_t - b_1 i_t + b_2 y_t + v_t \tag{4}$$

$$i_t = r^* + E_t s_{t+1} - s_t \tag{5}$$

where

$y_t\ (y_t^d)$	supply (demand) of domestic output
$\bar{y}$	normal output
$m_t\ (m_t^d)$	domestic money supply (demand)
p_t	domestic price level
$q_t = s_t - p_t$	real exchange rate
s_t	spot exchange rate
i_t	domestic nominal interest rate
r^*	foreign nominal (equal to real) interest rate
$E_t x_{t+1}$	conditional expectation of x_{t+1}, given all the relevant information available at t
u_t, v_t, w_t	white noise random disturbances (mutually independent)

$a_1, a_2, b_1, b_2 > 0$

Output supply fluctuates stochastically around an exogenously given long-run growth path which is designated by $\bar{y}$ ("normal output"). All trends and cycles have been removed so that $\bar{y}$ is a constant. Output demand depends positively on real balances and on the real exchange rate. The omission of the real interest rate as an argument in domestic output demand does not restrict the generality of the model. In fact, given our assumptions about the stochastic structure of the model the real interest rate and the real exchange rate are perfectly correlated so that one of the two is redundant. This can be demonstrated as follows. Suppose we had included the expected real interest rate in eq. (2) as follows:

$$y_t = \bar{y} + a_1 (m_t - p_t) + a_2 q_t - a_3 (i_t - E_t p_{t+1} - p_t) + w_t$$

Using the condition of uncovered interest parity and the definition of the real exchange rate, this can be manipulated to yield

$$y_t = \bar{y} + a_1 (m_t - p_t) + a_2 q_t - a_3 (r^* + E_t p_{t+1} - q_t) + w_t$$

In the following we will see that in both exchange rate regimes we have $E_t q_{t+1} = 0$ so that this equation reduces to

$$y_t = \bar{y} + a_1 (m_t - p_t) + (a_2 + a_3) q_t - a_3 r^* + w_t .$$

This is essentially equivalent to the output demand equation used in the paper. Eq. (4) describes equilibrium in the money market. Money supply is exogenous in the flexible exchange rate regime and endogenous with the fixed rate. Real money demand depends positively on domestic output and negatively on the domestic interest rate. We assume perfect international capital mobility so that uncovered interest parity holds (Eq. (5)). Finally, we assume that all the exogenous random disturbances are independent white noise processes with zero means and constant variances. This implies that their conditional expectations are zero as well. Formally we can write:

$$E_{t-1} u_t = E_{t-1} v_t = E_{t-1} w_t = 0$$

The model is homogeneous of degree zero in m_t, p_t, s_t, $E_t s_{t+1}$. A *permanent* rise of the money supply by, say, 5% thus results in a permanent rise of the price level and the spot exchange rate by the same percentage, leaving the real exchange rate unchanged. However, the same is not true for temporary changes in the money supply. Even if the price level and the spot exchange rate were to rise by the same amount, the expectation of the future spot rate would have to remain constant since the change in the money supply is confined to the current period, by definition of being temporary. From the condition of uncovered interest parity this would lower the domestic interest rate, raising the demand for real balances. This in turn would lower the price level and increase output demand through a real balance effect. Given that the supply of output is exogenous, restoration of equilibrium in the output market would require a drop of the real exchange rate. Thus we have shown that a temporary change of the money supply will not leave the real exchange rate unchanged. In other words, although prices are perfectly flexible, short-run changes in the money supply are nonneutral.

In the following we will examine the implications of the model for real exchange rate fluctuations in different exchange rate regimes, namely with a flexible and with a fixed exchange rate. As it is well known a fixed exchange rate is not feasible in the long run if monetary growth rates in the domestic and foreign country differ. Thus, in order to make the comparison

of both exchange rate regimes consistent in the model, we assume a situation where a fixed rate is feasible, i.e. we assume that there are not long-run discrepancies in the domestic and foreign monetary growth rates. The domestic country (being the small country) has adopted the growth rate of the foreign money supply.[1] The two exchange rate regimes then only differ in their short-run money supply rules, that is, in both regimes the trend path of money supply is identical, but with the flexible rate the money supply stays exactly on this path whereas with the fixed rate there are temporary deviations. In addition to this, we assume that the announced monetary target is perfectly credible so that targets and conditional expectations with respect to m_t coincide. This will formally be stated as follows. The *preannounced path* for the money supply in both regimes is

$$E_{t-1} m_{t+j} = 0 , \qquad j = 0, 1, 2, \ldots \tag{6}$$

With the flexible rate the monetary target is maintained exactly. That is, we have

$$E_{t-1} m_{t+j} = m_{t+j} = 0 , \qquad j = 0, 1, 2, \ldots \tag{7}$$

With the fixed rate the monetary target can only be maintained *on average* across a large number of periods. Within each single period there will be deviations from target due to foreign exchange intervention. Thus, the realizations of the money stock will in general be different from their preannounced values. For the first period we can write:

$$E_{t-1} m_t \neq m_t \tag{8}$$

The difference $E_{t-1} m_t - m_t$ is deviation from the money supply target. It is contingent on the realizations of the exogenous disturbances

b) The solution for fixed and flexible exchange rates

Now we turn to the solution of the model. With the flexible rate the endogenous variables are the real exchange rate and the price level. Eqs. (1) through (5) can be arranged to yield the following two equations for output and asset market equilibrium, respectively.[2]

$$a_2 q_t - a_1 p_t = u_t - w_t \tag{9}$$

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[1] *Fischer* (1983) has shown that abandoning the independence of the domestic money supply (with a fixed exchange rate) results in a welfare loss. We do not treat this aspect of the choice between fixed and flexible rates in this paper.

[2] By appropriate choice of units we have set $b_1 r^* - b_2 \bar{y} = 0$.

$$b_1 (E_t q_{t+1} - q_t) + b_1 E_t p_{t+1} - (1 + b_1) p_t = v_t + b_2 u_t \tag{10}$$

In order to find the rational expectations solution for these two equations we proceed as follows. In the first step we assume that the conditional expectations of the future real exchange rate and price level are zero:

$$E_t q_{t+1} = E_t p_{t+1} = 0 \tag{11}$$

In the second step we solve the model under this assumption and then show that it is consistent. If we substitute eq. (11) in eqs. (9) and (10) we get:

$$a_2 q_t - a_1 p_t = u_t - w_t \tag{12}$$

$$b_1 q_t + (1 + b_1) p_t = - v_t - b_2 u_t \tag{13}$$

The solution for the real exchange rate and the price level is:

$$q_t = f_1 u_t - f_2 v_t - f_3 w_t \tag{14}$$

$$p_t = - f_4 u_t - f_5 v_t + f_6 w_t \tag{15}$$

The coefficients are:

$$f_1 = (1 + b_1 - b_2)/B$$

$$f_2 = a_1/B$$

$$f_3 = (1 + b_1)/B$$

$$f_4 = (b_1 + b_2)/B$$

$$f_5 = a_2/B$$

$$f_6 = b_1/B$$

$$B = a_1 b_1 + a_2 (1 + b_1)$$

f_2 through f_6 are positive, the sign of f_1 is indeterminate. Applying the conditional expectation operator E_{t-1} to both sides of eqs. (14) and (15) we get

$$E_{t-1} q_t = f_1 E_{t-1} u_t - f_2 E_{t-1} v_t - f_3 E_{t-1} w_t = 0$$

$$E_{t-1} p_t = - f_4 E_{t-1} u_t - f_5 E_{t-1} v_t + f_3 E_{t-1} w_t = 0$$

This follows from the assumption that all exogenous disturbances are white noise.[3] Since these equations hold for any time period t our initial

[3] In addition to this, the white noise-property of the real exchange rate depends on the assumption that there is no cyclical component in the supply of output.

assumption in eq. (11) is consistent. Thus, eqs. (14) and (15) are indeed a rational expectations solution.

For the solution with the fixed exchange rate we proceed in the same way. The endogenous variables are now the real exchange rate and the money supply. Since the exchange rate is held fixed we can set

$$s_t = 0 \tag{16}$$

This implies that the real exchange rate can only change if the price level changes:

$$q_t = -p_t \tag{17}$$

The model can now be arranged as follows:

$$(a_1 + a_2)\, q_t + a_1 m_t = u_t - w_t \tag{18}$$

$$q_t + m_t = v_t + b_2 u_t \tag{19}$$

The solution is:

$$q_t = g_1 u_t - g_2 v_t - g_3 w_t \tag{20}$$

$$m_t = g_4 u_t + g_5 v_t + g_6 w_t \tag{21}$$

The coefficients are:

$$g_1 = (1 - a_1 b_2)/a_2$$

$$g_2 = a_1/a_2$$

$$g_3 = 1/a_2$$

$$g_4 = (b_2 (a_1 + a_2) - 1)/a_2$$

$$g_5 = 1 + g_2$$

$$g_6 = g_3$$

g_2, g_3, g_5, and g_6 are positive, the sign of g_1 and g_4 depends on the parameters. In the following we assume that the inequality $a_1 b_2 < 1$ holds, so that we have $g_1 > 0$. Notice that again the solution implies $E_{t-1} q_t = E_{t-1} p_t = 0$.

c) Exchange rate regimes and real exchange rate fluctuations

We compare the two exchange rate regimes by their implied variance of the real exchange rate. Using eqs. (14) and (20) we get the following variances. For the flexible rate:

$$\text{var}\,(q_t) = f_1^2\,\text{var}\,(u_t) + f_2^2\,\text{var}\,(v_t) + f_3^2\,\text{var}\,(w_t)\,, \tag{22}$$

For the fixed rate:

$$\text{var}\,(q_t) = g_1^2\,\text{var}\,(u_t) + g_2^2\,\text{var}\,(v_t) + g_3^2\,\text{var}\,(w_t)\,, \tag{23}$$

Ceteris paribus the variance of the real exchange rate in the first regime will exceed the variance in the second if, for $i = 1, 2, 3$, the absolute value of the coefficient f_i exceeds the coefficient g_i, and vice versa. Comparing the coefficients we get:

Output supply disturbances: $f_1 \gtreqless g_1$
Money demand disturbances: $f_2 < g_2$
Output demand disturbances: $f_3 < g_3$

Now we can state our first two results. First, neither exchange rate regime leads to unconditionally lower real exchange rate fluctuations. The reason is that the relative size of the parameters relating to the output supply disturbances, f_1 and g_1, can not be determined a priori. On the other hand, for money demand and output demand disturbances the flexible exchange rate unequivocally leads to a lower variance of the real exchange rate. This yields the second result, namely, if the variance of the output supply disturbances is sufficiently small relative to the variances of the other disturbances, the model implies *greater* real exchange rate stability with a *flexible* exchange rate.[4]

These results can be illustrated as follows. Eqs. (1), (2), and (3) can be solved for the price level as follows:

$$p_t = c_1 q_t + m_t + c_2\,(w_t - u_t)\,, \tag{24}$$

where $c_1 = a_2/a_1$, $c_2 = 1/a_1$. This relation is depicted as the OM-curve in Figs. 1 and 2. Eqs. (4) and (5) yield the AM-curve for asset market equilibrium:

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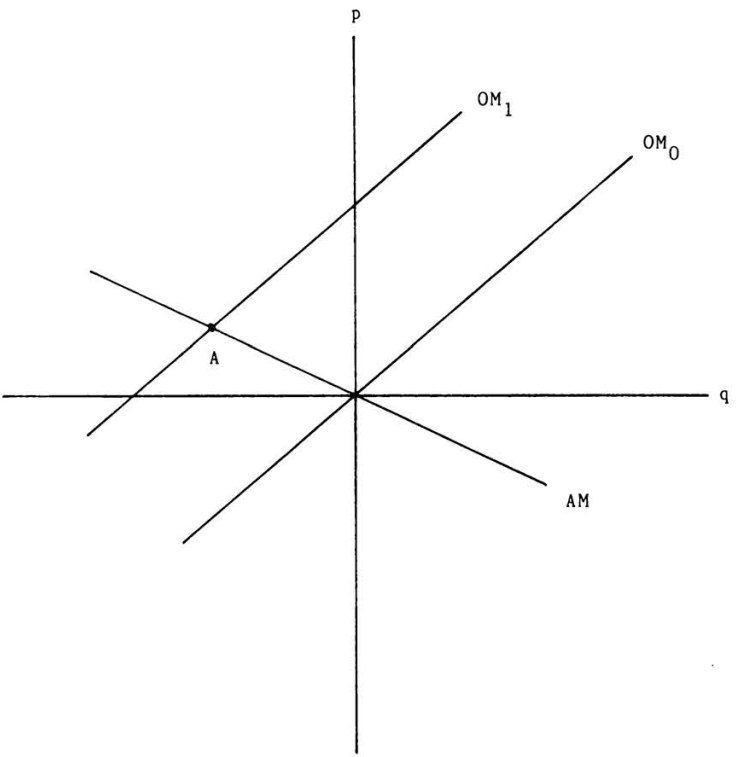
[4] We can also compare price level fluctuations in both exchange rate regimes. From the definition of the fixed rate, $p_t = -q_t$, we get the following equation for the price level in the fixed rate regime, $p_t = -g_1 u_t + g_2 v_t + g_3 w_t$, which has to be compared to eq. (17). Only with respect to output demand shocks we get a clear result, namely $g_3 > f_6$. The relative impact of the other disturbances depends on the specific parameter constellation.

(25) $$p_t = -c_3 q_t + c_4 (m_t - v_t - b_2 u_t)$$

where $c_3 = b_1/(1 + b_1)$, $c_4 = 1/(1 + b_1)$. The slope of the AM-curve is between zero and minus one. With the fixed exchange rate we get a third equation which describes all combinations of p_t and q_t for which the spot exchange rate is constant:

(26) $$p_t = -q_t$$

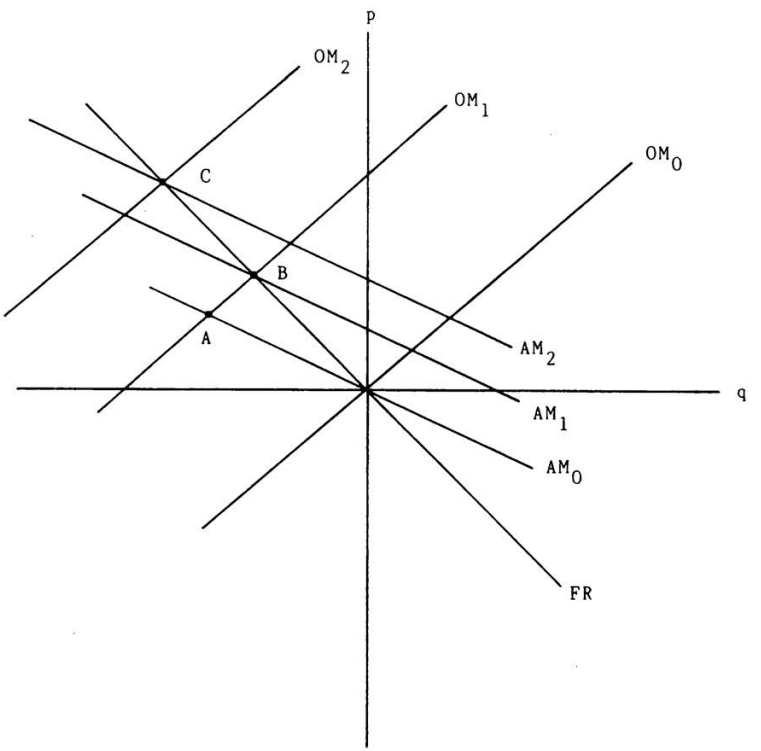
Figure 1



This is the FR-curve, it has a slope of minus one. In Figs. 1 and 2 we examine the effect of an exogenous increase in output demand starting from long-run equilibrium. In Fig. 1 we have the case of a flexible exchange rate. If output demand increases (positive disturbance w_t) the OM-curve shifts upwards from OM_0 to OM_1, the AM-curve stays in place. In the new equilibrium (point A) we have a higher price level and an lower real exchange rate.

In Fig. 2 we illustrate the same situation with a fixed exchange rate. The initial shift of the *OM*-curve is as above. The temporary equilibrium (point A) lies to the left of the *FR*-curve which means that the spot rate has fallen. Consequently, exchange market intervention has to push the *AM*-curve upwards until its intersection with the new *OM*-curve lies on the *FR*-curve (point B). This in turn pushes the *OM*-curve even further upwards through a real balance effect, which necessitates further intervention, and so on and so forth. The final equilibrium is at the intersection of OM_2 and AM_2 (point C). This shows that exchange market interventionen has a destabilizing effect on both the real exchange rate and the price level. Clearly, this result depends on the size of the real balance effect in output demand, that is, on the size of the coefficient a_1. Inspection of the coefficients f_2, g_2, f_3, and g_3 shows that for $a_1 > 0$ the flexible rate will always lead to lower real exchange rate fluctuations. As a_1 approaches zero this advantage decreases and at $a_1 = 0$ it finally disappears.

Figure 2



3. Inflexible output prices

a) The model

From the previous section we obviously did not obtain what we hoped for, namely an explanation for the observed high level of real exchange rate fluctuations in the recent history of the flexible exchange rate system. In addition to this, since output was assumed to be exogenous we were unable to examine the stabilizing or destabilizing effects of real exchange rate fluctuations. For this reason we will alter the specification of our model in this section. Eq. (1) will be dropped and replaced by a different equation which models the price setting behavior of firms. Up to now we assumed that output is exogenous and prices are endogenous, now the situation is reversed. We adopt the Keynesian assumption that in the short run prices are inflexible and output is endogenous. More specifically, we assume that in every period the price level is predetermined and output is demand determined. Output market equilibrium is established through quantity adjustment rather than price adjustment.[5] Our new assumption is that firms have to set prices before the beginning of each period, i.e. before the random disturbances u_t, v_t, and w_t can be observed. Furthermore we assume that prices are set so that *expected output* is *equal to normal output*. Formally: Before the beginning of each period the price level is set to the value $\bar{p}_t$ which satisfies the equation $E_{t-1} y_t = \bar{y}$. Using eq. (24) for the equilibrium price level, we get

$$\bar{p}_t = E_{t-1} m_t + c_1 E_{t-1} q_t \,. \quad [6] \tag{27}$$

Equilibrium output is then determined by the output demand equation (2), evaluated at the predetermined price level:

$$y_t = \bar{y} + a_1 (m_t - E_{t-1} m_t) + a_2 (q_t - E_{t-1} q_t) + w_t \tag{28}$$

A comparison of eqs. (1) and (28) shows that output fluctuations $y_t - \bar{y}$ are no longer exogenous but depend endogenously on the other disturbances. The model of this section now consists of eqs. (4), (5), (27), and (28). In addition to this we maintain our assumptions on monetary targeting from eqs. (6), (7), and (8).

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[5] With this change in assumptions we move into the world of the "overshooting-model" of *Dornbusch* (1976).

[6] This simple price setting assumption is sufficient for the purposes of this paper. The relevant aspect is that prices are inflexible in the sense that they cannot move to establish equilibrium.

b) Exchange rate regimes and real exchange rate fluctuations

First we solve the model for the flexible rate case where we assume $m_t = 0$. The endogenous variables are output and the real exchange rate. As above it can be shown that the conditional expectation of the real exchange rate is zero. Using this, the model can be reduced to the following two equations:

$$y_t - a_2 q_t = \bar{y} + w_t \tag{29}$$

$$b_2 y_t + b_1 q_t = b_1 r^* - v_t \tag{30}$$

The solution is:

$$y_t = \bar{y} - (a_2/C)\, v_t + (b_1/C)\, w_t \tag{31}$$

$$q_t = -(1/C)\, v_t - (b_2/C)\, w_t \tag{32}$$

$C = b_1 + a_2 b_2$ is the determinant of the system. The price level is constant. Since $E_{t-1} m_t = E_{t-1} q_t = 0$, eq. (27) implies $p_t = 0$.

Now we turn to the fixed rate case where the endogenous variables are output and the money supply. Without solving the model explicity it can be shown that the real exchange rate is constant. First, with a fixed exchange rate and predeterminded prices the real exchange rate is predetermined. If there is a credible commitment to keep the spot exchange rate fixed, it is predetermined, that is, we have $s_t = E_{t-1} s_t$. Hence, the right hand side of the identity $q_t = s_t - p_t$ is predetermined and we have $q_t = E_{t-1} q_t$. Now it is straightforward to show that the real exchange rate must be constant. We substitute $E_{t-1} q_t = q_t$ and $E_{t-1} m_t = 0$ in eq. (27) to get $-q_t = c_1 q_t$, which can only be fulfilled for $q_t = 0$. Thus, we have the result that with inflexible output prices real exchange rate fluctuations in the flexible rate regime are necessarily higher than in the fixed rate regime.

c) Exchange rate regimes and output fluctuations

Now we have found a clearcut answer to our first question but we still remain with our second question, namely, does greater stability of the real exchange rate in the fixed rate regime imply smaller output fluctuations? Or conversely, are the real exchange rate fluctuations which are connected with the flexible rate regime destabilizing for domestic output? In order to answer this question we first have to find the complete solution of the model with the fixed rate. Using the fact that q_t is predetermined, we arrive at the following two equations:

$$y_t - a_1 m_t = \bar{y} + w_t \tag{33}$$

$$-b_2 y_t + m_t = -b_1 r^* + v_t \tag{34}$$

The solution is:

$$y_t = \bar{y} + (a_1/D)\, v_t + (1/D)\, w_t \tag{35}$$

$$m_t = -(1/D)\, v_t + (b_2/D)\, w_t\,, \tag{36}$$

where $D = 1 - a_1 b_2$ is the determinant of the system. If we have $D < 0$ only "perverse" intervention can stabilize the exchange rate, that is, if there is upward pressure on the exchange rate the money supply has to be increased, and vice versa. To rule out this case we will maintain our assumption from the first part of the paper that D is positive.[7] The variance of output with the flexible rate is

$$\text{var}\,(y_t) = (a_2/C)^2\, \text{var}\,(v_t) + (b_1/C)^2\, \text{var}\,(w_t)\,, \tag{37}$$

and with the fixed rate

$$\text{var}\,(y_t) = (a_1/D)^2\, \text{var}\,(v_t) + (1/D)^2\, \text{var}\,(w_t)\,. \tag{38}$$

Comparison of the coefficients on the right hand side of both equations yields the following results. With respect to output demand disturbances var (y_t) will be smaller in the flexible rate regime. With respect to money demand disturbances the relative size of the variance in both regimes depends on the structural parameters. The general conclusion can be stated as follows: Although real exchange rate fluctuations are higher in the flexible rate regime this does not necessarily imply higher fluctuations of domestic output.

This result can be illustrated as follows. Eq. (28) shows that output fluctuations have two components. First, autonomous fluctuations w_t, second, induced fluctuations from unexpected movements in the money supply and the real exchange rate. The two exchange rate regimes differ in the latter component. For the flexible rate the money supply is constant, whereas for the fixed rate the real exchange rate is constant. With the flexible rate eq. (28) reduces to

$$y_t = \bar{y} + a_2 q_t + w_t\,, \tag{39}$$

with the fixed rate to

$$y_t = \bar{y} + a_1 m_t + w_t\,. \tag{40}$$

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[7] With $D = 0$ the fixed exchange rate regime is not feasible.

From these equations we can derive alternative expressions for the variance of output. First we consider the flexible rate regime. The variance of y_t will not only depend on the variances of q_t and w_t but also on their covariance, which is *negativ* from eq. (32). Thus, with respect to output demand disturbances the fluctuations of the real exchange rate have a stabilizing influence on the fluctuations of output. From eq. (37) we get

$$\text{var}\,(y_t) = (1/(1 + a_2 b_2 / b_1))^2 \,\text{var}\,(w_t) < \text{var}\,(w_t)\,,$$

which shows that the variance of output with real exchange rate fluctuations is smaller than the autonomous variance of output demand disturbances, i.e. smaller than it would be without real exchange rate fluctuations. Next we turn to the fixed rate regime. Eq. (36) shows that the covariance of m_t and w_t is positive and thus has a destabilizing influence on output. From eq. (38) we get:

$$\text{var}\,(y_t) = (1/(1 - a_1 b_2))^2 \,\text{var}\,(w_t) > \text{var}\,(w_t)\,.$$

The variance of output with intervention is larger than the autonomous variance of output demand disturbances and is thus larger than the variance of output without intervention. As in the first section of our paper this result depends on the presence of a real balance effect in output demand.

4. Conclusion

The overall impression is that we have found no clear-cut answers to our two central questions. The implications of our theoretical models with respect to real exchange rate fluctuations and exchange rate regimes are mixed. The amount of fluctuations depends on the degree of output price flexibility and on the origin of the exogenous disturbances. Only in one case we get a clear result, namely, if output prices are sticky. With respect to the destabilizing effects of real exchange rate fluctuations the implications of our models are mixed as well. As for the choice between different exchange rate regimes, our analysis implies that the case for either exchange rate regime is not very strong from a macroeconomic point of view. In particular, we have found no clear-cut implications as to which exchange rate regime is optimal, the flexible rate or the fixed rate. In this respect our findings are in line with the major part of the literature on the subject.

Summary

The two central questions of this paper are as follows. First, does macroeconomic theory offer an explanation for the observed high level of real exchange rate fluctuations in the flexible exchange rate period? Second, are these fluctuations destabilizing

with respect to domestic output, or are they rather the symptom of the proper functioning of the real exchange rate as an automatic stabilizer? We establish the following results. First, the transition from fixed to flexible exchange rates does not per se imply greater volatility of real exchange rates. Rather, this depends on the flexibility of domestic output prices. Second, with flexible output prices the relative degree of real exchange rate fluctuations in both regimes depends crucially on the origin of the exogenous disturbances. Third, even if – with sticky prices – the flexible rate regime leads to higher real exchange rate fluctuations this does not necessarily imply higher output fluctuations. Rather, depending on the origin of the exogenous disturbances real exchange rate fluctuations may be stabilizing.

Zusammenfassung

Diese Arbeit befaßt sich mit den beiden folgenden Fragen. Erstens, liefert die gängige makroökonomische Theorie eine Erklärung für das hohe Niveau der realen Wechselkursfluktuationen, das wir seit der Einführung flexibler Wechselkurse beobachten? Zweitens, üben diese Fluktuationen einen destabilisierenden Einfluß auf die Konjunktur eines Landes aus, oder sind sie vielmehr Symptom der Tatsache, daß Wechselkurse die Rolle automatischer Stabilisatoren erfüllen? Es ergeben sich folgende Resultate. Erstens, der Übergang von fixen zu flexiblen nominalen Wechselkursen impliziert nicht per se höhere Fluktuationen der realen Wechselkurse. Vielmehr hängt dies vom Grad der Flexibilität der Outputpreise ab. Zweitens, wenn das Outputpreisniveau hinreichend flexibel ist, so hängt das relative Ausmaß der realen Wechselkursfluktuationen in beiden Wechselkursregimes kritisch davon ab, in welchem Markt die exogenen Störungen, die die Ökonomie destabilisieren, ihren Ursprung haben. Drittens, auch in den Fällen, in denen flexible Wechselkurse eindeutig zu höheren Fluktuationen der realen Wechselkurse führen, ist nicht notwendig eine Destabilisierung der Konjunktur die Folge. Vielmehr hängt dies wieder vom Ursprung der exogenen Störungen ab.

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