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Flexible Exchange Rates, Capital Mobility Control and Macroeconomic Policies*

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I. Introduction

In the 1970's, by means of imposing borrowing ceilings, discriminatory reserve requirements between resident and non-resident deposit, restriction of non-resident bank deposits... etc., a lot of countries have some been trying to have real control over the capital movements. Recently, Arellano; Chu, et al. have set out simple stochastic models of the determination of optimal capital mobility control from the point of view of domestic output stability. In addition, Phylaktis and Wood examines how exchange rate adjustment is affected by the imposition of these restrictions. While all of these analyses might be quite useful, to date there has been no systematic analysis concerning whether the policy of capital mobility control will enhance or weaken the effectiveness of macroeconomic policies, and this is why this paper is written.

The paper will proceed as follows. In section II the theoretical

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framework is developed. Section III investigates the relationship between the policy of capital movement control and the effectiveness of fiscal and monetary policies under flexible exchange rates. Finally, section IV summarizes the main findings.

II. The Model

Except for the fact that the degree of capital mobility regulation and specification of the real supply of money have both been brought into analysis, the model to be used is basically the same as that of Fleming's. It can be described by the following three equations:

$$(1)\quad I(r)-S(y)+G+B(y,\ e)=0$$

$$(2)^{1}\quad L(y,\ r)=M/\{weP^{*}+(1-w)P\}$$

$$(3)\quad B(y,\ e)+AK(r)=0$$

where I : investment
r : interest rate
S : saving
y : domestic output
G : government expenditure
B : balance of trade
e : price of foreign exchange
L : real money demand
M : nominal money supply
w : the fraction of income spent on imports
P : the fixed foreign currency price of imports
P : the fixed domestic currency price of domestic goods
A : coefficient of capital mobility regulation
K : net capital inflow

Using subscripts to indicate partial derivatives, it will be assumed

[1] Inclusion of the exchange rate (e) as an argument in the real supply of money constitutes a major departure from the Fleming Model. Given the domestic currency price of domestic goods (P), the real supply of money will be decreased by devaluation because the domestic currency price of imports (eP^{*}) will increase. For a more detailed explanation, see, for examples, Turnovsky; Lai and Chen (1984).

as customary that, $I_r<0$, $0<S_y<1$, $0<-B_y<1$, $L_y>0$, $L_r<0$, $B_e>0$[2], $K_r>0$.

Equations (1), (2) and (3) are the equilibrium conditions for the commodity market, money market and foreign exchange market respectively. The equation (3) deserves further explanation. Following Arellano, the government authorities completely prohibit capital movement if A = 0, and no restrictions are imposed on capital mobility if A = 1. In reality, an intermediate situation of some degree of control is more likely, i.e., $0<A<1$.

III. Comparative Statics

Equations (1)-(3) determine three variables: y, r, e. Without loss of generality, we assume that $e=P=P^*=1$ initially. Differentiating (1)-(3) and solving the system for y/ G and y/ M yield

$$(4)\quad (\partial y/\partial G)_{flex}=(AK_r wM-L_r B_e)/\Delta>0$$

$$(5)\quad (\partial y/\partial M)_{flex}=B_e(AK_r-I_r)/\Delta>0$$

where *flex* denotes a flexible exchange rate system and

$$\Delta=-B_e\{S_yL_r+L_y(I_r-AK_r)\}+wM\{AK_r(S_y-B_y)+I_rB_y\}>0$$

Next, differentiating of $(\partial y/\partial G)_{flex}$ and $(\partial y/\partial M)_{flex}$ with respect to A gives

$$(6)\quad \partial\{(\partial y/\partial G)_{flex}\}/\partial A=(B_eL_r-wMI_r)(B_eL_yK_r-B_yK_rwM)/\Delta^2$$

$$(7)\quad \partial\{(\partial y/\partial M)_{flex}\}/\partial A=-(B_eL_r-wMI_r)B_eS_yK_r/\Delta^2$$

It follows apparently from (6) and (7) that

$$(8)\quad \text{sgn}\,[\partial\{(\partial y/\partial G)_{flex}\}/\partial A]=-\text{sgn}\,[\partial\{(\partial y/\partial M)_{flex}\}/A]=\text{sgn}\,(B_eL_r-wMI_r)$$

[2] $B_e>0$ indicates that the Marshall-Lerner condition is assumed to be satisfied.

Thus, as government authorities undertake stronger capital mobility regulations (A decreases), the effectiveness of fiscal and monetary policy will be enhanced or weakened according as whether the expenditure-switching effect (the vertical shift of the IS curve due to exchange rate depreciation) exceeds or falls short of the expenditure-reducing effect (the vertical shift of the LM curve).[3]

Under fixed exchange rates with complete sterilization (*fixs*), it can be easily verified that

$$(9)^4 \quad \operatorname{sgn}\left\{(\partial y / \partial e)_{fixs}\right\} = -\operatorname{sgn}(B_e L_r - wMI_r)$$

Again, under *fixs*, a devaluation will reduce domestic output if the expenditure-reducing effect exceeds the expenditure-switching effect (Chen; Lai and Chen 1984). This is the main characteristic of the "monetary" analysis of devaluation.

Combining (8) with (9) yields

$$(10) \quad \operatorname{sgn}\left[\partial\left\{(\partial y / \partial G)_{flex}\right\} / \partial A\right] = -\operatorname{sgn}\left[\partial\left\{(\partial y / \partial M)_{flex}\right\} / A\right] = -\operatorname{sgn}\left\{(\partial y / \partial e)_{fixs}\right\}$$

Thus, as government authorities undertake stronger capital mobility regulation (A decreases), the effectiveness of fiscal and monetary policy will be enhanced or weakened according as whether a devaluation increases or reduces the domestic output. On the other hand, equation (10) tells us that if increased capital mobility regulation strengthens the effectiveness of fiscal expan-

[3] By total differentiation of (1) and (2), we know that the vertical shift of the IS curve and the LM curve due to an exchange rate depreciation are $(-B_e/I_r)$ and $(-wM/L_r)$ respectively.

[4] Under *fixs*, equations (1), (2) in the text remain valid and equation (3) now is replaced by

$$B(y,e) + Ak(r) = F$$

where F is balance of payments. For this system, e is exogenous and the above three equations determine the three variables: y, r, and F. Differentiation of (1), (2) and the above equation gives

$$(\partial y / \partial e)_{fixs} = (B_e L_r - wMI_r) / \{(s+m)L_r L_y I_r\} \gtrless 0 \quad \text{if } B_e L_r - wMI_r \lesseqgtr 0$$

$$(\partial y / \partial G)_{fixs} = L_r / \{(s+m)L_r + L_y I_r\} > 0$$

$$(\partial y / \partial M)_{fixs} = I_r / \{(s+m)L_r + L_y I_r\} > 0$$

sion, the effectiveness of monetary expansion will be weakened and *vice versa*.

The economic reasoning regarding equation (10) can be interpreted as follows: for any macroeconomic policy x, it can be demonstrated that

$$(11)^5 \quad (\partial y/\partial x)_{flex} = (\partial y/\partial x)_{fixes} + (\partial y/\partial e)_{fixs} \cdot (\partial e/\partial x)_{flex} \quad ; x = G, M$$

This equation indicates that the macroeconomic policy efficacy under *flex* can be decomposed into two parts: (i) the impact effect, i.e., the effectiveness of macroeconomic policy under *fixs;* and (ii) the exchange rate induced effect, i.e., the induced effectiveness of macroeconomic policy via exchange rate changes.

Next, by differentiation of (11) with to A, and since $(\partial y/\partial x)_{fixs}$ and $(\partial y/\partial e)_{flex}$ are independent of A,[6] it follows that

$$(12) \quad \partial(\partial y/\partial x)_{flex} / \partial A = (\partial y/\partial e)_{fixs} \cdot \partial(\partial e/\partial x)_{flex} / \partial A.$$

A monetary expansion will result in a decrease in the interest rate and capital outflow under flexible exchange rates. When the authorities weaken their control on capital mobility, the capital outflow will increase. For the purpose of restoring balance of payments equilibrium, the magnitude of exchange rate depreciation will be increased $\partial(\partial e/\partial M)_{flex}/\partial A > 0$. As for the fiscal expansion, the opposite result will occur since it will result in an increase in the interest rate $\partial(\partial e/\partial G)_{flex}/\partial A < 0$. Putting these knowledge into (12), equation (10) can then be immediately derived.

IV. Concluding Remarks

This paper examines an important issue: whether the policy of capital mobility control will enhance or weaken the effectiveness

[5] Lai and Chen (1985) uses this relationship to explain two propositions offered by Fleming.

[6] See footnote 4.

of macroeconomic policies. In the foregoing analysis, we have demonstrated the following important findings:

(1) When the authorities step up their efforts in capital mobility control, whether the effectiveness of macroeconomic policies will increase or decrease depends crucially on whether the expenditure-switching effect exceeds or falls short of the expenditure-reducing effect.
(2) If the policy of capital mobility control strengthens the effectiveness of fiscal policy, the effectiveness of monetary policy will be weakened and *vice versa*.

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