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MONETARY POLICY AND REAL EXCHANGE RATE DYNAMICS UNDER IMPERFECT CAPITAL MOBILITY

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1. INTRODUCTION

A real exchange rate is an important economic variable to measure the international competitiveness. An increase in real exchange rate improves domestic trade balance since domestic goods become more price competitive relative to foreign goods. This in turn increases real income. Although the stabilization of the real exchange rate has desirable effects on economic activity, it is true that most of the advanced countries has witnessed the frequent and erratic fluctuations since the period of generalized floating bagan. There is considerable debate concerning the causes and effects of this exchange rate volatility[1]. One of various sources is the monetary policy itself. A good example to this is the nominal exchange rate overshooting hypothesis proposed by Dornbusch (1976) and followed by many others[2]. In contrast with Dornbusch, Buiter and Miller(1981, 1982) dealt with the real exchange rate overshooting problem.

The magnitudes of exchange rate overshooting induced by change in monetary policy seems to be closely related to the degree of openness of asset markets. Accordingly, numerous studies have been written on this subject as conducted by Bilson (1979), Penati (1985), and Reisen and Yèches (1991). Particularly, Penati(1985) developed a model to determine the optimal degree of flexibility in attaining monetary targets associated with the real exchange rate and applied to the Spanish economy. In addition, Calvo, Leiderman, and Reinhart (1993) analyzed the characteristics of recent capital inflows and real exchange rate appreciation in Latin America, and then drew a conclusion that sterilized

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1) For a survey, see Williamson(1983), Gotur(1985), Krugman(1989), Montiel and Ostry(1992), Engel(1993), and Lizondo(1993).

2) Mathieson(1977), Driskill(1981), and Frenkel and Rodriguez(1982).

intervention is the most popular policy to offset the fluctuations of real exchange rates. Recently, Marsh and Tokarick (1992) has dealt with an issue to select the appropriate competitiveness indicators with empirical assessment based on five price indices.

The purpose of this paper is to examine the effects of change in monetary policy on real exchange rate dynamics under imperfect capital mobility. To achieve these ends, we revisit the elegant framwork proposed by Buiter and Miller and followed by Pikoulakis(1989) and Natividad-Carlos (1994). They built a simple open macroeconomic model associated with sticky domestic price, perfect capital mobility, and rational expectations in the asset markets. This implies that the uncovered interest arbitrage condition is satisfied in the asset markets. They argue that a reduction in rate of monetary growth causes immediate larger loss of competitiveness than that in the long-run level.

Our concern is whether or not this phenomenon can occur in an economy under imperfect capital mobility. To do this, Buiter and Miller model is extended to introduce explicitly the capital account equation into the model associated with imperfect capital mobility. Although the model is slightly modified to allow for the low capital mobility in the asset markets, the sizes of impact effects of slowdown in monetary growth on real exchange rate are turned out to be more significant when the degree of capital market integration is high.

This paper is organized as follows. Section 2 introduces the basic model, derives the dynamic reduced form of the model to use the comparative- dynamic analysis of change in monetary policy, which consists of explicit structural equations for the money market, goods market, and foreign exchange market. Section 3 examines the properties of equilibrium trajectories. More general method to obtain the solution paths are used in this Section. Section 4 analyzes the impact effects of monetary policy and experiments with parameterized numerical examples to gain some perspective on the quantitative nature. Effects of an increase in rate of interest equalization tax as a counterpart policy to prevent any loss of competitiveness after a monetary reduction are also examined in this section. Final Section states conclusions and outlines some suggestions for further research.

2. THE MODEL

We start the paper with the simple macroeconomic model built by Buiter and Miller(1981, 1982) in order to measure the dynamic effects of change in monetary policy on the international competitiveness. Their model consists of four building blocks such as a money market equilibrium condition, a commodity price-adjustment equation, a perfect capital mobility and substitutability condition, and an expectational assumption in the continuous time.

We recast their model in perfect capital mobility, but instead introduce the asset markets explicitly incorporated with imperfect capital mobility. However the Buiter and Miller's money market condition and the commodity price-adjustment equation are used unchanged. Accordingly, the key difference between our model and theirs is our assumption of imperfect rather than perfect capital mobility. This will also alter our formulation of the rationally expected future exchange rate from that of the Buiter and Miller model.

2.1 The Money Market

As shown in the Dornbusch or Buiter and Miller models, the demand for real money balance depends on the domestic interest rate and real income. The stylized money market equilibrium condition has the following log-linear equation:

$$m - p = ky - \lambda i \tag{1}$$

where m, p, and y denote the logs of the nominal money stock, the price level at factor cost, and real output (income). Unlike the fixed-output model of Dornbusch, Buiter and Miller assumed that real output is endogeneous variable. k is the income elasticity of the demand for money and λ is the interest rate semi-elasticity of the demand for money. We ignore rate of indirect tax and nominal interest rate paid on domestic money which are introduced by Buiter and Miller. All parameters below, including k and λ, are assumed to be positive and finite except for the speed of adjustment in the asset markets.

2.2 The Goods Market

The demand for output is assumed to depend on the real interest rate and on the relative price of foreign and domestic goods. Assume that the country is small in the world market for its importables so that foreign price level is taken as given. Then the demand for output defined by Buiter and Miller has the following log-linear form:

$$y = -\gamma(i - \dot{p}) + \delta(e - p) \tag{2}$$

where $\dot{p}$ denotes the rate of change in domestic price level, d(log p)/dt, and e reflects the nominal exchange rate defined by domestic currency price of foreign exchange. Thus, $i - \dot{p}$ and $e - p$ denote the real interest rate and real exchange rate, respectively. Since the foreign price level p^* is assumed to be normalized at unity, so it does not appear explicitly in the model. Accordingly, international competitiveness is measured by $e - p$.

On the other hand, the rate of increase in the price of domestic goods $\dot{p}$ depends on the domestic output y and trend rate of inflation π as follows:

$$\dot{p} = \phi y + \pi \tag{3}$$

$$\pi = \dot{m}^{+} \tag{4}$$

Equation (3) represents the augumented Phillips curve. Logarithm of capacity output ($\bar{y}$) is set equal to zero by choice of units. The augmentation term π in (4) is identified with the right-hand side time derivative of the nominal money supply[3]. This implies that the domestic price level is sticky. Thus even if the money supply, m, were to make a discrete jump, the price level would not jump.

2.3 The Foreign Exchange Market

Buiter and Miller used the uncovered interest parity condition associated with interest rate equalization tax as a foreign-exchange market equilibrium condition. This means that they assume perfect capital mobility and perfect substitutability between domestic and foreign assets.

Unlike Buiter and Miller, we assume imperfect capital mobility but perfect substitutability. With this assumption the foreign exchange market equilibrium condition is derived from a net demand for foreign assets function and a trade balance function. The net demand for foreign assets is assumed to be a log-linear function of the expected net yield. Following Frenkel and Rodriguez(1982), we further assume that the capital flows occur at a finite rate in proportion to the uncovered differential between yields on domestic currency and foreign currency-denominated assets associated with rate of tax on capital inflows τ. Accordingly, the net capital inflow F is specified as

$$F = \beta(i - i^{*} - \chi - \tau) \tag{5}$$

where i^{*} and χ denote foreign nominal interest rate and expected rate of depreciation of nominal exchange rate, respectively. We also assume that the country is small in the world financial markets so that i^{*} is taken as given. On the other hand, β denotes the speed of adjustment which measures the degree of capital mobility. Consequently, when capital is perfectly mobile, $\beta \rightarrow \infty$, equation (5) reduces to the uncovered interest arbitrage condition like Dornbusch or Buiter and Miller models. When capital is completely immobile, $\beta \rightarrow 0$, then the mechanism of arbitrage in asset markets is completly inoperative. It is shown below that the magnitude of β is a key factor detetmining the dynamics of real exchange rate and hence international competitiveness. Assuming that the current

3) That implies $\dot{m}^{+}(t) = \lim_{\substack{T \to t \\ T > t}} \left(\frac{m(T) - m(t)}{T - t} \right)$. Refer to Buiter and Miller(1982) for further discussions.

account is determined only by the real exchange rate, the equilibrium condition in the overall balance of payments under a floating exchange rate regime is given by

$$\delta(e-p)+\beta(i-i^{*}-x-\tau)=0 \quad (6)$$

Equation (6) states that the sum of the current account and the capital account must equal zero.

We next assume the perfect foresight on the expected rate of depreciation such that $x = \dot{e}$. This means that the expected rate of change of the exchange rate x equals the actual rate of change[4]. Then, the rate of depreciation of nominal exchange rate is derived from equation (6) such that

$$\dot{e} = (i - i^{*} - \tau) + \eta\,(e - p) \quad (7)$$

where $\eta = \delta/\beta$. As shown below, this equation plays a central role in our model to determine the dynamics of nominal exchange rates, and hence the real exchange rates. Equation (7) states that the rate of depreciation of the nominal exchange rates is determined not only by the uncovered interest differential taken into account tax rate on capital inflows but also by the price competitiveness. Only when the speed of adjustment in asset markets β becomes infinite, the uncovered interest parity condition is held. It is interesting to see that if we introduce the Dornbusch's regressive expectations structure such as $x = \theta(\bar{e} - e)$, then equation(7) becomes $\dot{e} = \theta(\bar{e} - e) + \eta(e-p)$ by ignoring tax rate on capital inflow τ[5]. Here $\bar{e}$ is log of long-run nominal exchange rate, and θ is the coefficient of adjustment as a parameter.

For convenience, we further define two state variables ℓ and c as Buiter and Miller has done.

$$\ell = m - p \quad (8)$$

$$c = e - p \quad (9)$$

The real balance variable ℓ is assumed to be a backward-looking or predetermined variable while real exchange rate c, a forward-looking variable. Equa-

4) As for the specification of the expected rate of change of exchange rate, three types of the definition among others are frequently used in the model such as perfect foresight which is equivalent to rational expectations in a deterministic model, regressive expectations, and adaptive expectations. For further discussions, refer to Dornbusch(1976), Mathieson(1977), and Takagi(1991).

5) These kinds of similar models to determine the rate of nominal exchange rate can be found in Driskill and McCafferty(1985, p.331) and Blundell-Wignall and Masson(1985, p.141). Specifically, Driskill and McCafferty argues that the sign of η determines the overshooting or undershooting of the nominal exchange rate with their models taken into account wealth effects.

tions (1)~(9) excluding (5) and (6) thus complete the specification of the model.

2.4 The Dynamic Reduced Form Equation and Equilibrium

To derive the dynamic reduced form of the model, we first obtain the equilibrium income and interest rate values from equation (1), (2) and (3). Using these together with remaining equations (4), (7), (8), and (9), we have two dynamic equations of reduced form in rate of change in real money balance and real exchange rate as follows:

$$\begin{pmatrix} \dot{\ell} \\ \dot{c} \end{pmatrix} = \frac{1}{\Delta}\begin{bmatrix} \phi\gamma & \phi\lambda\delta \\ 1 & \delta(\phi\lambda - k) + \Delta\eta \end{bmatrix}\begin{bmatrix} \ell \\ c \end{bmatrix} + \frac{1}{\Delta}\begin{bmatrix} \phi\lambda\gamma & 0 \\ \lambda & -\Delta \end{bmatrix}\begin{bmatrix} \pi \\ i^{*} + \tau \end{bmatrix} \tag{10}$$

where $\Delta = \gamma(\lambda\phi - k) - \lambda$. This equation can be written more compactly as

$$\begin{pmatrix} \dot{\ell} \\ \dot{c} \end{pmatrix} = \mathbf{A}\begin{bmatrix} \ell \\ c \end{bmatrix} + \mathbf{B}\begin{bmatrix} \pi \\ i^{*} + \tau \end{bmatrix} \tag{11}$$

Assume that steady state values of real liquidity $\bar{\ell}$ and real exchange rate $\bar{c}$ can be obtained from equation (11) by setting $\dot{\ell} = \dot{c} = 0$. Then the long-run equilibrium is given by

$$\begin{pmatrix} \bar{\ell} \\ \bar{c} \end{pmatrix} = \begin{pmatrix} -\lambda & -\dfrac{\lambda\delta}{\delta + \gamma\eta} \\ 0 & \dfrac{\gamma}{\delta + \gamma\eta} \end{pmatrix}\begin{pmatrix} \pi \\ i^{*} + \tau \end{pmatrix} \tag{12}$$

The long-run equilibrium of real money balance $\bar{\ell}$, therefore, changes whenever rate of monetary growth π changes but long-run price competitiveness $\bar{c}$ remains unchanged. In contrast, when foreign interest rate i^{*} or rate of tax on capital inflows τ increases, $\bar{\ell}$ decreases but $\bar{c}$ increases.

On the other hand, the behavioral equations of other state variables can be derived as follows:

$$\begin{bmatrix} i \\ y \\ \dot{p} \\ \dot{e} \end{bmatrix} = \frac{1}{\Delta}\begin{bmatrix} (1-\gamma\phi) & -\delta k \\ -\gamma & -\lambda\delta \\ -\phi\gamma & -\phi\lambda\delta \\ (1-\gamma\phi) & -(\delta k - \Delta\eta) \end{bmatrix}\begin{bmatrix} \ell \\ c \end{bmatrix} + \frac{1}{\Delta}\begin{bmatrix} -k\gamma & 0 \\ -\lambda\gamma & 0 \\ -(\lambda + k\gamma) & 0 \\ -k\gamma & -\Delta \end{bmatrix}\begin{bmatrix} \pi \\ i^{*} + \tau \end{bmatrix} \tag{13}$$

Note that equations (10), (12), and (13) are turned out to be slightly modified with η associated with β which is measuring the degree of capital mobility, compared with Buiter and Miller model. However, the properties of equilibrium trajectories have significantly different aspects.

3. PROPERTIES OF EQUILIBRIUM TRAJECTORIES

We first consider the dynamic stability. Determinant of the coefficient matrix associated with state variables in equation (11) is $|A| = (\phi/\Delta)(\delta + \gamma\eta)$.

Thus, a necessary and sufficient condition for the stationary equilibrium of this model to be a saddlepoint is $\Delta<0$. The sign of Δ depends on the size of λ and ϕ. Following Buiter and Miller and Pikoulakis, we assume $\Delta<0$ throughout to ensure $|A|<0$. This assumption means that an autonomous increase in aggregate demand will raise output at a given level of compititiveness. Accordingly, we have one stable characteristic root and one unstable characteristic root in which equilibrium time path is saddlepoint.

Next, we will drive the solution paths for the $\dot{\ell}$ and $\dot{c}$ in equation (10). To meet this end, we shall use more general method developed by Dixit(1980) and Buiter(1984) than the conventional method to calculate the eigenvalues directly from the characteristic equations. If the $n \times n$ matrix $\mathbf{A}$ has distinct eigenvalues in $\dot{\mathbf{x}} = \mathbf{A}\mathbf{x}$ wher $\mathbf{x}$ is an n−vector of deviations of all the variable from their equilibrium levels chosen to be zero, it can be diagonalized by n similarity transformation, i.e., there exisits a non−singular matrix $\mathbf{M}$ such that

$$\mathbf{M}\mathbf{A}\mathbf{M}^{-1} = \mathbf{V} \tag{14}$$

where $\mathbf{M}$ is an $n \times n$ matrix whose rows are linearly independant left-eigenvectors of A. V is a diagonal matrix whose diagonal elements are the characteristic roots of A. Then partitioning the transformation matrix conformably with $\mathbf{x}$, Buiter(1984) has derived the following solution path for the non−predetermined variables:

$$q(t) = -\mathbf{M}_{22}^{-1}\,\mathbf{M}_{21}\,\mathbf{x}(t) - \mathbf{M}_{22}^{-1}\int_t^{\infty} e^{v_1(t-s)} Dz(s)ds \tag{15}$$

where $D = M_{21}B_1 + M_{22}B_2$. Here the transversality condition is assumed to be satisfied. Moreover, if the $z(t)$ are constant for all time t and $\bar{x}$ and $\bar{q}$ are steady state values, then equation (15) reduces to the Dixit's formula simplified as follows:

$$q(t)-\bar{q} = -\mathbf{M}_{22}^{-1}\mathbf{M}_{21}(\mathbf{x}(t)-\bar{\mathbf{x}}) \tag{16}$$

The solution path for the predetermined variables corresponding to equation (16) is simply given by

$$\mathbf{x}(t) = \mathbf{M}_{11} e^{\lambda_1 (t - t_0)} \mathbf{M}_{11}^{-1} \mathbf{x}(t_0) \tag{17}$$

Thus in view of equations (16) and (17), the equilibrium trajectories of sate variables converge to their long−run equilibrium values.

4. DYNAMIC EFFECTS OF MONETARY POLICY

The short−run and long−run effects of change in monetary policy can be easily derived by comparative−dynamic analysis. Not only to capture the size of change in real exchange rate but also to compare this with Buiter and Miller's results, we investigate the dynamic effects through the parameterized numerical examples. To do this, we first use the same value of parameter chosen by Buiter and Miller and Pikoulakis(1989)[6] and then replace these values by plausible values for the Korean economy. Their assumed values of parameters are as follows:

$$\lambda = 2,\ k = 1,\ \phi = \gamma = \delta = 0.5.$$

Notice that with these values, $\phi\lambda - k$ in equation(10) and (11) turns out to be zero. This implies that the stability condition for saddlepoint is satisfied unambiguously. If we choose $\beta=2$, then the corresponding characteristic roots are $v_1 = -0.3377$ and $v_2 = 0.4627$ since trace and determinant of A in equation (11) are given by 0.1250 and −0.1563, respectively[7]. This means that $\dot{\ell} = 0$ locus is negatively sloped while $\dot{c} = 0$ locus is positively sloped. The value of left−eigenvectors of A defined by equation (14) is given by

$$\mathbf{M} = \begin{bmatrix} \mathbf{M}_{11} & \mathbf{M}_{12} \\ \mathbf{M}_{21} & \mathbf{M}_{22} \end{bmatrix} = \begin{bmatrix} 0.9202 & 0.3914 \\ -0.6480 & 0.7616 \end{bmatrix}$$

Assume that the economy is initially in equilibrium so that $\pi(t) = i^*(t) = \tau(t) = 0$ for all time $t < 0$, and $\ell(0) = c(0^-) = 0$. In this case, the saddlepath is given by $c(0) - \bar{c}(0) = (0.6480 / 0.7616)(\ell(0) - \bar{\ell}(0))$ if $\beta=2$. This can be alternatively derived as Buiter and Miller has done. That is,

6) Pikoulakis chose $\lambda = 6$ instead of $\lambda=2$.

7) The eigenvalues (v_1, v_2) related with $\beta=5$ and $\beta=\infty$ are(−0.3835, 0.3585) and (−0.4215, 0.2965), respectively. These values are also shown in Table 2.

$$c(0) - \bar{c}(0) = \left(\frac{v_1 - \phi\gamma \Delta^{-1}}{\phi\lambda\delta\Delta^{-1}}\right)(\ell(0) - \bar{\ell}(0))$$

This implies $c(0)-\bar{c}(0)=0.8508(\ell(0)-\bar{\ell}(0))$. Suppose that the central bank reduces the rate of monetary growth π by a 1 percent. Then when the speed of adjustment β is 2, the immediate loss of international competitiveness reaches to 1.70 percent since $c'(0)=0.8508\,\ell'(0)$ and $\ell'(0)=-d\bar{\ell}=\lambda d\pi$ by equation (12). This is because the nominal exchange rate initially jumps towards its new lower equilibrium path which is -1.0 percent. Here the interest rate and nominal exchange rate are still higher than their ultimate equilibrium level corresponding to the reduction in the rate of monetary growth.

This excess of the interest rate above its long−run level induces the capital inflow and causes the initial appreciation of the nominal exchange rate. Since the price level is predetermined variable, the jump appreciation of the nominal exchange rate results in a sudden appreciation of real exchange rate. Table 1 shows the equilibrium trajectories for the real cash balance $\ell(t)$ and real exchange rate c(t), corresponding to the three different speeds of adjustment which are arbitrarily chosen to gain some perspective on the quantitative nature of our analysis.

As can be seen from Table 1, an important result drawn from these numerical experiments is that as the degree of openness of capital markets becomes larger, the magnitude of initial loss of competitiveness in response to reduction in monetary growth becomes greater. That is, when the speed of adjustment becomes relatively high with $\beta=5$, the real exchange rate immediately appreciates by 2.07 percent, which reflects 0.37 percentage point higher in terms of absolute value, compared with the case of $\beta=2$. In addition, in the extreme case of perfect capital mobility, $\beta\rightarrow\infty$, the real exchange rate appreciates on impact by 2.37 percent, which is turned out the same results as Buiter and Miller(1981) has calculated.

The reason for these results induced from the numerical experiments is due to the magnitude of degree of capital mobility and expectations structures, and hence the asset markets and goods markets have different adjustment processes. In addition, in contrast to the stylized model for the interest rate parity condition to always hold, the rate of nominal exchange rate in our model setting is determined not only by interest rate differential but also by the real exchange rate. Notice that equlibrium real exchange rate can be also derived from equation (7) by using the solution values of interest rate and rate of change in exchange rate given in Table 2.

On the other hand, Table 2 also shows the impact effects of a one percent reduction in monetary growth on the other state variables. In any case of three different values for β, fall in the output and decline rate of change in price level can be found.

As pointed out previously, the numerical examples based on the parameter values chosen by Buiter and Miller, the value of $\lambda\phi-k$ in Δ of equation (10) is incidentally zero, so that the model has the saddlepoint stability unambiguosly. However, the stability and impact effects are much sensitive to the value of interest rate semi-elasticity of the demand for money λ as well as the size of degree of capital mobility β. Thus, in order to further examine the proposition of international competitiveness loss in response to reduction in monetary growth, we now assume $\lambda=5$ and $\gamma=1$ instead of $\lambda=2$ and $\gamma=0.5$ used until now. The other parameter values are, however, assumed to be unchanged. In this case we still have $|A|<0$, and $\dot{\ell}=0$ locus is negatively sloped but $\dot{c}=0$ locus is positively sloped. Thus our model still possess the saddlepoint property[8]. In addition, the proposition derived above is also supported. That is, as the capital mobility becomes greater, the size of loss of competiveness becomes larger in response to reduction in monetary growth. For example, when the growth rate of money supply reduces by a 1 percent, the real exchange rate declines by 3.39 percent if $\beta=2$. But if we choose $\beta=5$, the real exchange rate immediately appreciates by 4.28 percent, and then when perfect capital mobility is assumed, the initial loss of international competitiveness increases by 5 percent.

Table 1. Dynamic Effects of 1% Slowdown in Monetary Growth (Assumption: $\lambda=2$, $k=1$, $\phi=\gamma=\delta=0.5$, $i^*=\tau=0$) Unit: %

Variable	Time Period							
	0	1	2	3	4	6	8	∞
				With $\beta=2$				
ℓ (t)	−2.00	−1.43	−1.02	−0.73	−0.52	−0.26	−0.13	0.00
c (t)	−1.70	−1.21	−0.87	−0.62	−0.44	−0.22	−0.11	0.00
				With $\beta=5$				
ℓ (t)	−2.00	−1.36	−0.93	−0.63	−0.43	−0.20	−0.09	0.00
c (t)	−2.07	−1.41	−0.96	−0.65	−0.45	−0.21	−0.10	0.00
				With $\beta\rightarrow\infty$				
ℓ (t)	−2.00	−1.31	−0.86	−0.56	−0.37	−0.16	−0.07	0.00
c (t)	−2.37	−1.56	−1.02	−0.67	−0.44	−0.19	−0.08	0.00

8) In this case of $\beta=2$, $|A|=-0.1071$, and eigenvalues (v_1, v_2) are given by (−0.3853, 0.2781).

Table 2. Impact Effects of 1% Slowdown in Monetary Growth on the Other State Variables

		$\beta = 2$	$\beta = 5$	$\beta \rightarrow \infty$
i(t)	%	0.32	0.23	0.16
y(t)	%	−1.35	−1.53	−1.69
$\dot{p}$(t)	%	−0.68	−0.77	−0.84
$\dot{e}$(t)	%	−0.10	0.03	0.16
Eigen values (v_1,v_2)		−0.3377 0.4627	−0.3835 0.3585	−0.4215 0.2965

Finally, let us examine the impact effects of interest equalization tax on capital inflows to reduce loss of real competitiveness resulted from monetary disinflation with the values of parameter assigned by Buiter and Miller. From equation (12), we again calculate $\bar{\ell}(0)=-2\pi-1.6(i^*+\tau)$. Assuming $di^*=0$, $d\pi=-1.0$ percent, and $d\tau=1.0$ percent, we get $\ell(0)-\bar{\ell}(0)=\ell'(0)=-0.4$ percent. Accordingly $c(0)-\bar{c}(0)=c'(0)=-0.34$ percent when $\beta=2$. This implies that the loss of competitiveness reduces by 1.36 percentage point, compared with the case of $\tau=0$ and $\beta=2$.

Moreover, as we know from Table 3, the magnitude of loss of competitiveness becomes smaller as β becomes larger, and then as $\beta \rightarrow \infty$, the effects of reduction in monetary growh rate are completely offset by imposing the same rate of interest equalization tax on capital inflows.

Table 3. Dynamic Effects of 1% Increase in Interest Equalization Tax Rate associated with 1% slowdown in Monetary Growth Unit: %

Variable	Time Period							
	0	1	2	3	4	6	8	∞
				With $\beta=2$				
ℓ (t)	−0.40	−0.29	−0.20	−0.15	−0.10	−0.05	−0.03	0.00
c (t)	−0.34	−0.24	−0.17	−0.12	−0.09	−0.04	−0.02	0.00
				With $\beta=5$				
ℓ (t)	−0.18	−0.12	−0.08	−0.06	−0.04	−0.02	−0.01	0.00
c (t)	−0.19	−0.13	−0.09	−0.06	−0.04	−0.02	−0.01	0.00

5. CONCLUDING REMARKS

The model and analysis of this paper has been focused on the dynamic effects of change in monetary policy on real exchange rates in an imperfect capital mobility setting. It has examined the size of the initial loss of international competitiveness in terms of qualitative and quantitative analyses with different speeds of adjustment in asset markets. It has also shown that the size of the loss of competitiveness in response to the slowdown in monetary growth is larger as the speed of adjustment becomes greater.

Finally, a dynamic exercise has been conducted to see whether the loss of competitiveness can be offset by imposition of tax on capital inflows. The parameterized numerical exercise has shown that an increase in rate of interest equalization tax can be an effective policy instrument to reduce the rate of appreciation of real exchange rates, and that the magnitude of effectiveness becomes larger as the speed of adjustment in asset markets becomes greater. However, these could be the robustness of the conclusions since the effects of monetary policy must take into account the actual structure of the economy. In this paper, we have first used the values of parameters chosen by Buiter and Miller to compare our results with theirs, and then some of these values are replaced by more plausible ones. However, we cannot still claim that these results are directly applicable to the Korean economy because the structural models including price equation are so simply defined. The extensions of the basic framework or applications to the Korean economy remain just a next step for further research.

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