Journal of International Economic
Integration 1(2), Autumn 1986, 194–208.

An Exchange Rate Determination by Portfolio Approach in Korea: Empirical Results

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I. Introduction

In the late 1960s, the standard model of the foreign exchange market had supply and demand as stable function of exports and imports. However, the period of floating rates that began in the early 1970s has revealed that exchange rates exhibit the volatility of financial market prices. The monetary approach to exchange rate determination had essentially one way causation from money to exchange rates, via purchasing power parity. The exchange rate, in the asset market view, is determined by financial market equilibrium conditions. Initial stock of assets determine temporary equilibrium values for endogenous such as exchange rates. It influences the trade balance and current account. The latter in turn is the rate of accumulation of national claims or liabilities to foreigners, and this feeds back into financial market equilibrium.

This study uses a Tobin's financial asset equilibrium framework to test the portfolio-balance model of exchange rate determination in Korea. In Branson, Halttunen and Masson (1979), three outside assets were recognized for each country: M1, cumulated current account, and net government debt. Their exchange rate equation excluded the two government debts. In Dornbush (1980), there was only one asset whose unexpected, movement had impact on exchange rate movement and it was the net stock of foreign assets held by residents. In this study, we limit our specification to the outside assets of the two countries (Korea-U.S.A.) under consideration. A small country like Korea is one whose bonds are not held by non-residents and which has no impact on the foreign interest rate. This mean that the accumulation of foreign financial assets is done through the

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I would like to thank Prof. Bruce Bolnick for helpful suggestions and comments. He does not bear any responsibility for the opinions expressed or for remaining errors.

provision of real goods and services to foreigners. The stock of foreign assets in private hands is the cumulated sum of current account minus intervention. Section II derives the exchange rate equation from the foreign asset demand. Section III reports the empirical results for the model and Section IV reports the simulation results of the model to test the stability conditions of exchange rate equations. Conclusion of this study is presented in Section V.

II. A Theoretical Basis of Exchange Rate Determination by Portfolio Approach.

In the spirit of the portfolio balance theory, using Tobin's financial framework to set up our theoretical framework, we make the following assumption; an agent regard government debt as net wealth and without any inside assets. The net behavior of the private portfolio management can be described by a demand function for each outside asset, and that the argument of each demand function is the vector of rates of return on the outside assets. To derive the exchange rate equation, we begin with the foreign asset demand equations;

$$F/W = \left[\frac{E(EI_{+1})}{EI}\right]^{a_1}\left[\frac{R^*}{R}\right]^{a_2} \quad \exp^{a_0} \tag{1}$$

$$\frac{B^*/EI}{W^*} = \left[\frac{E(EI_{+1})}{EI}\right]^{b_1}\left[\frac{R^*}{R}\right]^{b_2} \quad \exp^{b_0} \tag{2}$$

where

F	=	domestic holding of foreign financial assets denominated in domestic currency units.
B^*	=	foreign holdings of domestic financial assets denominated in domestic currency units.
W	=	domestic financial wealth
W^*	=	foreign financial wealth
EI	=	spot exchange rate domestic currency
E	=	denotes expectations
$E(EI_{+1})$	=	today's expected value of EI one period (quarter) ahead.
R	=	domestic curb interest rate
R^*	=	foreign interest rate.

Expected values of a_1 and a_2 are positive, b_1 and b_2 negative, a_0 and b_0 are constants. Equation (1) expresses the share of domestic holdings of foreign financial assets in domestic wealth as a function of the expected return on foreign financial assets relative to domestic financial assets. The expected return vairable includes the expected appreciation of the foreign currency and the ratio of foreign to domestic interest rates. Equation (2) determines liabilities to foreigners (domestic assets in terms of foreign currency held by foreigners) as a share of foeign wealth. Writing equations (1) and (2) in logarithmic form and rearranging, we have the following.

$$f = a_0 + a_1(E(ei_{+1}) - ei) + a_2(r^* - r) + w \qquad (1)'$$

$$b^* = b_0 - b_1(E(ei_{+1}) - ei) + b_2(r^* - r) + w^* + ei \qquad (2)'$$

where;

$f = \text{Log(F)}$
$b^* = \text{Log(B)}$
$r, r^* = \text{Log}(R), \text{Log}(R^*)$ respectively
$w, w^* = \text{Log}(W), \text{Log}(W^*)$ respectively
$ei, E(ei_{+1}) = \text{Log}(EI), \text{Log}(E(EI_{+1}))$ respectively

Subtracting equation (2)′ from equation (1)′, we have an equation for the net private foreign asset position expressed in terms of the ratio of claims to liabilities.

$$f - b^* = a_0 - b_0 + (a_1 + b_1)\,(E(ei_{+1}) - ei) + (a_2 + b_2)\,(r^* - r) + w - w^* - ei \qquad (3)$$

Solving equation (3) for ei, we have:

$$ei = \frac{a_0 - b_0}{a_1 + b_1 + 1} + \frac{a_1 + b_1}{a_1 + b_1 + 1} E(ei_{+1}) + \frac{a_2 + b_2}{a_1 + b_1 + 1}(r - r^*) + \frac{1}{a_1 + b_{1+1}}(w - w^* + b^* - f) \qquad (4)$$

where; $a_1 + b_1 > 0$, $a_2 + b_2 > 0$

Equation (4) expresses the exchange rate as a function of the expected exchange rate, the interest differential, domestic and foreign private wealth and the ratio of liabilities to foreigners over claims on foreigners. Private wealths are defined as the cumulative sums of government budget deficits and current account balances. Equation (4) allows to empirically test the theoretical model of exchange rate determination. If domestic and foreign assets are assumed to be perfect substitutes, the substitution elasticities are infinite and equation (4) collapses to the interest parity condition:

$$ei = E(ei_{+1}) + r^* - r$$

where $E(ei_{+1})$ is equal to the forward rate.[1] In this case, portfolio balance conditions (change in current accounts, intervention and government budget deficit) do not affect the exchange rate except to the extent that they influence expectations. Therefore, the asset demand equations could not be estimated empirically.

In order to estimate equation (4), we must have specified the expected exchange rate which is an unobservable phenomenon. We have adopted an expectations which allows for a temporary deviations from purchasing power parity under the assumption that prices are sticky (Dornbush)[2] and due to shifts in the equilibrium real exchange rate. Here, we have formed that expectations about the future spot rate are formed on the basis of relative prices (long-run equilibrium levels, relative inflation ratio), acceleration of current account surpluses or deficits, and an extrapolative expectations behavior which allows for an overshooting in the exchange rates. This latter effect might be explained by the lack of relevant information by participants or by a more rational extrapolative expectation formation according to the 'vicious' or 'virtuous' circles theory.[3] The expected exchange rate function can be described by

$$E(ei_{+1}) = f(ei_{-1}, (P - P^*), \sum CA_{-1}, (\Delta NFA/MG)_{-1}) \tag{5}$$

where $E(ei_{+1})$ is the spot exchange rate expected as of period t for period $t + 1$, P is the domestic prices, P^* is the foreign prices, ΣCA_{-1} is the lagged cumulative current account, $\Delta NFA/MG$ is the foreign exchange reserves (NFA) scaled by the total imports (MG).

Extrapolation of the spot exchange rate at time $t - 1$ can explain oscillations in the expected spot exchange rate by producing overshooting of the expected spot rates.[4] Relative prices $(P - P^*)$ generate expectations of a future change in the exchange rate according to the purchasing power parity: an increase in domestic prices relative to those of foreign countries will result in a deterioration of the country; current account accumulation, which under a fixed rate system will increase the probability of a devaluation, and under a flexible rate system, will lead to a depreciation of the country's currency. Accelerations of current account surpluses or deficits create expectations of future change in the exchange rates. Although empirical work has not yet been formulated correctly for testing how well

[1] This condition depends on the absence of capital controls in addition to the perfect substitutability of assets, or the absence of a risk premium, which ensures the equivalence of the forward and expected future spot rates.

[2] There is the indisputable basic economic reality that adjustments to disturbances in goods and labor market take much longer than those in financial markets. This means that prices in those markets can be expected to bear the bunt of short run adjustment to unexpected economic development.

[3] A depreciating exchange rate does have a significant inflationary effect on the depreciated country by increasing domestic prices.

[4] Since the financial prices have to compensate for the stickiness of goods and labor prices, their short run response is much larger than the long run one. in now popular terminology, these financial prices overshoot.

we can explain the expected future exchange rate in terms of expectations of future balance of payments flows, the empirical work of Branson, Halttun and Masson suggests that current account imblances have played an important role in driving exchange rates in recent years. Insofar as exchange rate changes have been predominantly unexpected, these empirical findings are consistent with the hypothesis that exchange rate have jumped expectedly in response to unexpected information about current accounts that in turn has led portfolio managers to revise their expectations about future balance of payments flow and future real terms of trade. This view is the important link between current and future exchange rates. Dornbush (1980)[5] develops a general model of exchange rates, incorporating the current account, which he describes as an extended version of the traditional Mundell-Flemming model. One of key extentions is to introduce expectations and the accompanying emphasis on 'news' as the determinant cause changes in exchange rates. The model assumes that an unanticipated current account surplus leads to an appreciation of the exchange rate, while an unanticipated deficit produces a depreciation of exchange rate. Since current account data is released with a lag of a quarter, the current account can be expected to affect the spot rate to the expectations with a one quarter lag.

Another role of current account is played by the wealth effect. A decline in the current account affects through portfolio rebalancing by reducing domestic wealth, raising foreign wealth and lowering the home country's private net foreign asset position. The wealth changes cause the exchange rate to appreciate through the impacts on asset demands. If the current account decline is matched by sterilized official intervention, so that the current account is financed by central banks, the private net foreign asset position remains unchanged. In this case the current account affects the exchange rate only through expectations. The foreign exchange reserves scaled by total imports account for the demand for official reserves of the monetary authorities. When a country is faced with a loss of reserves, the decline in reserves reduces its ability to maintain the current exchange rate and increase the probability of deprecation, generating expectations of a decline in its exchange rate.[6] Substituting equations (5) into equation (4), we have the following:

$$ei = \frac{a_0 + b_0}{a_1 + b_1 + 1} + \frac{a_1 + b_1}{a_1 + b_1 + 1}\left\{ei_{-1} + (p - p^*) + \Sigma CA_{-1} + (\Delta NFA/MG)_{-1}\right\}$$

$$+ \frac{a_2 + b_2}{a_1 + b_1 + 1}(r^* - r) + \frac{1}{a_1 + b_1 + 1}(w - w^* + b^* - f) \tag{6}$$

[5] Dornbush, R., "Exchange Rate Economics: Where do we stand?" *Brookings Papers on Economic Activity*, 1980:1 pp. 143-206.

[6] We would expect negative sign of cumulative current account, since an increase in the current account deficit would require a depreciation of the domestic currency to return the current account to equilibrium.

The log of the exchange rate varies positively with the interest differential, the ratio of domestic to foreign price levels, and the lagged exchange rate, negatively with the cumulative current account and positively with the ratios of domestic to foreign wealth and privated foreign claims to liabilities. When assets are less than perfectly substitutable, deviations form purchasing power parity (equation 6) can arise due to portfolio-balance considerations, i.e. changes in domestic and foreign wealth and the private net foreign asset positions. In this case, the current account affects the exchange rate through its impact on wealth variables and the net foreign asset position as we as through its impact on expectations.

On the other hand, we include the trade balance in order to capture the effect of import and export changes on exchange rates. When we choose the trade balance reflecting import and export supply as a determinant of exchange rates, the exchange rate depreciation or devaluation will improve the trade balance in a small open economy only with the satisfied Marshall-Lerner conditions $(1 + d_x + d_m > 0)$, where d_x and d_m are the price elasicities of supply and demand for exports and imports. This approach will integrate the traditional elasticities approach into our portfolio balance approaches of exchange rate determination. In order to focus on the causality from the trade balance to the exchange rate, we assume a specific form for the trade balance and proceed an expression linking the exchange rate with the current value of the trade balance, since we can not theoretically incorporate the direct trade balance terms and it empirically causes the multicollinearity problem with the current account variable. The rate of change in the stock of foreign currency equals to the ratio of the trade balance to the actual holdings of foreign currency. The exchange rate will be determined by this trade balance normalized by the current stock of foreign asset holdings within the portfolio-balance approach. Since the present level of the foriegn currency stock depends on the past trajectory of current account. Therefore, we normalized the current trade balance by the accumulated current account holdings. The final form of the exchange rate equation is following:

$$\begin{aligned}\mathrm{Log}(EI) &= a + b\,\mathrm{Log}(EI_{-1}) + c\,\mathrm{Log}(P/P^*) + d\,\mathrm{Log}(\Sigma CA_{-1}) \\ &\quad + e\Delta\mathrm{Log}(\Delta NFA/MG)_{-1} + f\,\mathrm{Log}(R/R^*) \\ &\quad + g\,\mathrm{Log}(W/W^*) + h\,\mathrm{Log}(B^*/F) + i\,\mathrm{Log}\,(TBN) \\ &\qquad b\,c\,e\,i > 0 \quad d\,f\,g\,h < 0\end{aligned} \tag{7}$$

where

$TBN =$ the current trade balance normalized by the accumulated current account holdings.

In attempt to model the systematic part of the monetary authorities' behavior, we assumed that the intervention function might exhibit a tendency to smooth changes in the exchange rate, they will buy dollars when the currency is appreciating and sell dollars in the opposite case. They are assumed to have the additional objective of preventing large swings in their reserve stocks. Assuming that central banks intervene to restore reserves to some desired level, their purchases and sales of foreign exchange can be described by the following equation.

$$\Delta NFA = f\{\Delta EI^{+}, (\Delta NFA/^{+}MG)_{-1}, (NFA^{*} - NFA_{-1})\} \tag{8}$$

Where the expected signs of the partial derivatives as indicated above the explanatory variables. ΔNFA stands for the change in official foreign exchange rates. The ratio between the stock of foriegn reserves (NFA) and imports (MG) lagged one period shows the desired demand for a stock of reserves by central bank. NFA^{*} represents desired stock of foreign exchange rate. The lagged stock adjustment variables represents some adjustment path to equilibrium. Under floating exchange rates, with intervention set to zero, ΔNFA could be replaced by zero in the balance of payments equilibrium condition. Under a managed floating system, equations can be estimated for the intervention behavior of the monetary authorities. The simplest form of reaction function consistent with leaning against the wind would relate net intervention to the change in the exchange rate over the sample period. The change in net foreign assets as a proxy for the intervention is more closely related to the change in the exchange rate, but its effect in moderating appreciation or depreciation of exchange rate is less than the effect of all other influences on the exchange rate. The final form of intervention function used is following:

$$\begin{aligned} \Delta \mathrm{Log}(NFA) = a + b\Delta \mathrm{Log}(EI) &+ c\ \mathrm{Log}(\Delta NFA/MG)_{-1} \\ &+ d\ \mathrm{Log}(NFA)_{-1} \\ b\ c\ d &> 0 \end{aligned} \tag{9}$$

III. Empirical Results

These equations of (7) and (9) were estimated over the floating rate period in Korea from 1980, 1st. quarter to 1984, 4th. quarter, using quarterly data. The beginning of the period was chosen because it marks the starting point of a managed floating rate system in Korea. Foreign country's variables include only the U.S.. Table 1 through 2 displays the results for the exchange rate equations and intervention functions. The overall good-

TABLE 1 Exchange Rate Functions

Variables	CORC(1)	NL3SLS(2)	NL3SLS(3)
C	4.272**	2.269**	4.450**
	(6.728)	(2.26)	(47.566)
*R/R**	−0.096**	−0.055	−0.095**
	(−5.506)	(1.726)	(−5.349)
*P/P**	−0.838**	0.471	0.2765**
	(−3.685)	(1.531)	(2.595)
*W/W**	−0.097**	−0.148	0.3099
	(−5.311)	(−0.841)	(1.468)
$\Delta(NFA/MG)_{-1}$	0.002	−0.032	−0.041*
	(0.169)	(−1.835)	(−2.307)
EI_{-1}	0.349**	−0.042	−0.008
	(3.008)	(−0.176)	(−0.422)
B/F*	0.016**	−0.143*	−0.014
	(5.27)	(−2.15)	(−0.691)
ΣCA_{-1}	0.0169**	−0.043	−0.110**
	(5.211)	(1.158)	(−7.29)
TBN	0.014**	0.280**	
	(3.822)	(2.87)	
M1/USM1			0.1785**
			(9.966)
adj R^2	0.99	0.99	
x^2		28.16(8)*	31.97(8)*
D–W	2.54	1.9921	3.228

Adj. R^2 is the adjusted R^2. x^2 is the chi-square statistics. The t-statistics are contained in parenthesis. D–W is the Durbin-Watson statistics. CORC stands for the Cochrane-Orcutt Correction method. NL3SLS stands for the nonlinear three stage least square method. * is significant at the 5 percent level. ** is significant at the 1 percent level.

ness of fit for this equations appears to be very good. The chi-square statistics estimated by the nonlinear three least square method (NL3SLS) is significant at the 5 percent significant level. However, the Durbin-Watson test rejects the hypothesis of serial independence in the residuals. This equation was reestimated using the Cochrane-Orcutt correction method (CORC).

Equations are specified in logarithmic terms as a matter of convenience, because the formulation in logarithm enables us to obtain the constant elasticities. We experimented with separate coefficients on the domestic and foreign wealth and net foreign asset terms, in both logarithmic and linear from. Coefficients on the relative price variable was wrong sign with a significance only in the CORC (1) results, but insignificant in most estimation cases. Given the purchasing power parity assumptions, theses coefficients were constrained to 1.0, so that a 1 percent change in the price ratio induces a 1 percent change in the exchange rate, certeris paribus. However, in our exchange rate equation this constraint were rejected since the elasticities of relative price variable was 0.28 in the nonlinear

TABLE 2 Intervention Function

Variables	CORC	NL3SLS
Constants	9.934	0.03044
	(1.698)	(0.8537)
ΔEI	-1.400	1.0033**
	(0.929)	(78.1589)
$\Delta(NFA/MG)_{-1}$	-0.359	0.27222
	(0.9399)	(1.358)
NFA_{-1}	-0.3592	0.31137**
	(-0.7377)	(3.61649)
adj R^2	0.94	
x^2		47.37(4)**
$D-W$	1.53	2.3680

Adj. R^2 is the adjusted R^2. The t-statistics are contained in parenthesis. X^2 is the chi-square statistics. $D-W$ is the Durbin-Watson statistics. CORC stands for the Cochrane-Orcutt Correction method. NL3SLS stands for the nonlinear three stage least square method. * is significant at the 5 percent level. ** is significant at the 1 percent level.

three stage least square estimation, but -0.83 in the Cochrane-Orcutt results. In fact, the coefficient is less than unity. It implies that the purchasing power parity is not held in the short run. The interest rate differential coefficients had the expected sign and were significant at the 99 percent confidence level in CORC(1) estimation. For bilateral rates, a one-point shift in the real interest rate differential in favor of the home currency is associated with the range from a 0.09 and 0.05 percent appreciation. The interest term coefficient suggests that a 1 percent change in the differential, allows for induced forward market movement, will lead to stock adjustment. Within the portfolio balance term, the wealth variable and the net foreign asset term, yield significant coefficients with the expected sign. The proxy variables of the expectation terms, which is the lagged foreign exchange rate reserves scaled by total imports, the lagged exchange rate, and the current account variables have the correct sign. The coefficient on the current account is in the appropriate range, and is significantly different from zero in CORC (1). This suggests that lagged cumulative current account deficits play a significant of "news" in affecting exchange rates. An unanticipated increase in the current account deficit leads to a depreciation. The coefficients do have the correct sign and significance. Our estimated coefficient of the cumulative current account suggest that a 1 billion won increase in the current account cause the won to depreciate by about 0.01 percent. The normalized trade balance variable to capture the effects of trade balance on the spot exchange rate within the portfolio balance approach is correct sign, and significant in the estimation. It implies that the direct trade balance phenomena do play a crucial role in the exchange rate determination.

In our empirical specification of an exchange rate equation, the main focus is on the impact of shift in the bilateral wealth on the Korean exchange rates. The wealth variable has the expected negative coefficients and is significant at the 5 percent significance level in the CORC(1) estimation. The negative coefficients on the wealth variable would be consistent with the predictions of the portfolio balance model. The wealth variables appear with the correct signs, being significant at the usual level. On the other hand, the net foreign asset stock variable should have a negative coefficient. Our result confirm this hypothesized sign. The NL3SLS(3) estimates in the Table 1 are set out in order to investigate how the combined portfolio and monetary approach in the exchange rate determination affect the exchange rate by including the relative money stock. The relative money stock variable between Korea and U.S. have the expected positive sign and is significant at the 1 percent level. The coefficient suggests that a result in the expansion of the Korean money supply will depreciate the Korean currency.

The intervention function to be regressed assume that the authorities 'Lean against the wind', i.e. they resist variations in the exchange rate and try to counter erratic fluctuations. Intervention responds automatically to the rate at which the exchange rate change. It is assumed that central banks try to preserve a certain desired stock of foreign reserves, i.e. the intervention is constrained by the level of foreign exchange reserves. The results of the intervention equation seems to correspond to Bank of Korea's behavior over the sample period. It includes the change in the nominal exchange rate as an explanatory variable, consistent with the hypothesis that the authorities attempt to smooth short-run fluctuations. Such behavior does show up in our estimation of the NL3SLS, because the parameter estimate of the change of exchange variable was significantly different from zero. This suggest that an unanticipated depreciation of 1.0 percentage point leads to an intervention of 1.003 percent of foreign net claims on the Korea. Because of the large swings in the reserve variations in the 1980s in Korea, the coefficient of the lagged ratio between the stock of foreign reserves and imports in the intervention function is insignificant. On the other hand, it is consistent with a rational response of the Bank of Korea: i.e., to intervene only to maintain orderly markets, but otherwise to allow the exchange rate to float. Purchase of foreign currency will cause the exchange rate to experience a transitory depreciation from its underlying trend, since the orderly markets strategy implies zero expected intervention in the future periods.

IV. Simulation Results

In this section, we use the estimates of the parameters of the model presented in the previous section to simulate responses of the exchange rate to a variety of shocks. Results shown refer to simulation of only our exchange rate model. These simulations differ from simulations of rational expectations model as for example in Lipton and Sachs,[7] in that we specify a realistic process followed by exogenous variables, rather than implicitly assuming a random walk. Given our estimates, unanticipated shocks have some persistence. Some of the shocks, however, eventually fade away. By describing the effects of innovations in the process governing the exogenous variables, we perform an exercise similar to impulse responses in vector autoregressive models. To evaluate the performance and to compare the exchange model, it is natural to compare the tracking ability within the sample period by simulating dynamically. The dynamic simulation results track the exchange rate reasonably well with a root mean square error of 1.419 percent.

A) Effect on exchange rates of one point increase in the U.S. interest rates.

The issue of how much of the recent high real interest rates can be explained both in the United States and elsewhere, has been addressed in two recent papers. Blanchard and Summers[8] consider a number of explanations for high real interest rates and that fiscal deficits may be a cause. They argue that even though the U.S. deficit shows an increase of 3.9 percent points of GNP over the period 1978–1985, fiscal contraction in other countries implies an increase of only 0.8 percent points for the six largest OECD countries. Adjusting deficits for inflation and for cyclical position, and allowing for anticipated future deficits, leads them to conclude.

> "We find no evidence that fiscal policy in OECD as whole is responsible, through its effect on saving for high real interest rates. Fiscal policy is not the only factor that may shift saving. Another potential candidate is a shift in saving behavior of the oil exporting countries."

Another recent paper of Sachs[9] examines the consequences of the U.S. policy mix of

[7] See, Lipton, D. and J. Sachs, "Accumulation and Growth in a Two-Country Model: A Simulation Approach," *N.B.E.R. W.P* No. 572, October, 1980

[8] Blanchard, O.J. and Summers, L.H., "Perspectives on High World Real Interest Rates," *Brookings Papers on Economic Activity*, 2:1984, pp. 273–324

[9] See, Sachs, J. and W. Mckibben, "Macroeconomic Policies in the OECD and LDC External Adjustment," *N.B.E.R* W.P. 1534, 1985.

fiscal expansion and monetary contraction in particular its effect on U.S. dollar. Simulations of a small, world macroeconomic model tends to support the view that the U.S. monetary/fiscal policy mix goes a long way toward explaining development in financial and exchange market in the last few years. His finding is that the fiscal expansion causes the exchange rate to appreciate by 3.8 percent points. The U.S. short term real interest rates rise relative to abroad. One reason for the difference in the conclusion of these two papers is disagreement concerning the extent of shifts in the stance of fiscal policy. We will not attempt to shed any light on the particular issue. We will follow the results of Sachs.

A first simulation exercise shows the response of the exchange rate model to an interest shock. Table 3 shows results for the exchange rate model when the U.S. interest rates increase by a one point during the first period. Results suggest that a one point increase in the U.S. interest rates causes the exchange rate to depreciate by 0.27 percent in the first period, because what is left is absorbed by the increase in reserves of the intervention in the foreign exchange market by the central bank.

B) Effect on exchange rates of a 100 million dollar increase in the current account balance.

A second simulation exercise shows the response of the exchange rate model to current account shocks. Table 3 shows results for the exchange rate model when the Korea current account increases by a 100 million dollar. Changes in the current account by 100 million dollar causes the exchange rate to depreciate. The effect on the exchange rate exhibit an erratic pattern and seems to imply that the initial current account deficits has a 0.75 percent depreciate on the exchange rate in the first period. The exchange rate is by far more volitle than the U.S. interest rate increase shocks.

TABLE 3 Simulated Impacts of Interest and Current Account Shocks

	response to the 1% increase in U.S. interest	response to 1 billion dollar increase in the current account
1st qtr.	0.270	0.750
2nd qtr.	0.230	0.440
3th qtr.	0.220	0.570
4th qtr.	0.200	0.390
5th qtr.	0.210	0.400
6th qtr.	0.180	0.390
7th qtr.	0.150	0.380
8th qtr.	0.140	0.360
9th qtr.	0.126	0.340
10th qtr.	0.110	0.240

V. Conclusion

This paper has specified and estimated a model of exchange determination within a small country portfolio approach. In this study, a portfolio model of exchange rate determination was applied to Korea under a managed floating exchange rate system. In the simulations, we have the data to inform us as to the stochastic process followed by exogenous variables. Such a model can shed light on important structural parameters like the relevance of overshooting. This ability is some extent independent of whether the model forecasts well.

Our empirical analysis is successful. Estimates of the parameters of the model do indicate the empirical significance of wealth variable, the fundamental feature of our model, is considerable. The basic results is that the current account balance affect the exchange rate significantly within the portfolio framework. Simulations of the model, using the parameter estimates obtained from CORC estimation, and the estimates of autoregressive process for the exogenous variables, show that the data yields predictions of the effects of disturbances that match the predictions of the theory. However, this study has defect that there is no channel for third-party influence on the exchange rate between the two countries, and there is several specification problems, which do not include identifying rational expectations, quantifying the effects of capital controls in Korea.

VI. Description of the Data

The private net foreign assets positions (liabilities/claims, or B^*/F) is defined by cumulative current account and official intervention of central bank. Therefore, the stock of net foreign assets in private hands is defined by the cumulated sum of current account minus intervention.[10] The domestic financial wealth is constructed by the sum of domestic monetary base plus domestic bonds that earn the interest rate and are not internationally traded plus foreign issued assets. Domestic bonds is equal to the cumulative budget deficit of the government. The foreign wealth is constructed by the same method such as the

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[10] A similar set-up of this kind of approach can be found in the following literatures. Kouri, "Balance of Payments and the Foreign Exchange rate Markets: A Dynamic Partial Equilibrium Model" *N.B.E.R* W.P. No. 644, 1981.

Branson, Halttun, Masson, "Exchange Rates in the Short Run: the Dollar-Deutschemark Rate," *European Economic Review*, vol. 10. 1977, pp. 303–324. They argue that, within the portfolio balance framework, since foreign issued assets is traded, the foreign issued assets can be accumulated only running a current account surplus over time. But, in Korea case, the foreign issued assets can be decumulated by running the current account deficit over time, since Korea experiences the current account deficit during the past decades.

domestic wealth. Since foreign holdings of domestic assets (B^*) can be accumulated only by running a current account deficit over time in Korea, we calculate the cumulated current account on benchmark figure. [sources: for Korea, Bank of Kora, Monthly Bulletin, January, 1980. for the U.S., Survey of Current Business, January, 1980.] The initial value of domestic and foreign financial wealth (W, W^*) are estimated from the end of 1979 stocks of monetary bases, as published in the Bank of Korea, *Monthly Bulletin*, *Flow of Funds in Korea* for Korea, and *The Flow of Funds Accounts in U.S.A.* for U.S.A..

EI	foreign exchange rate, won/us dollar, Bank of Korea (B.O.K.), Monthly Bulletin.
R	Curb market interest rates, Bank of Korea.
R^*	U.S. prime loan rates, U.S. Dept. of Commerce, Survey of current business, monthly.
NFA	Official reserves, stock end of period. B.O.K.
P	Wholesale price index, B.O.K.
P^*	U.S. wholesales price index, IMF, *International Financial Statistics*.
$\sum CA$	Accumulated current account balances, B.O.K, Monthly Bulletin
$M1$	Korea's monetary stock, B.O.K., Monthly Bulletin
$USM1$	The United States' monetary stock, *International Financial Statistics*

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