Monetary and Exchange Rate Policy in Korea: Assessments and Policy Issues[1]

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1. Introduction

This paper considers some issues in the conduct of monetary and exchange rate policy since the financial crisis of 1997-8. My title is different than the one suggested by the Bank's research planning and coordination team, which was "Six Years of Free Floating in Korea." My alternative does not prejudge the question of how to characterize Korea's monetary and exchange rate policy since the crisis. National officials will say that the Bank of Korea has pursued inflation targeting and that the exchange rate has not been an intermediate target nor even contained much useful information for forecasting economic trends. The Bank of Korea has adopted much of the apparatus of inflation targeting, complete with a band for target inflation and a Monetary Policy Report to the National Assembly. The 2004 version, the most recent edition available at the time of writing, stipulates an annual target of 3 per cent plus or minus 1 per cent, along with a medium-term (longer than one year) inflation target of 2.5-3.5 per cent; it makes little mention of the exchange rate. Trends in the dollar/won exchange rate are

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mentioned in passing on p.8, but no implications are drawn for the conduct of monetary policy.[2] From this it would appear that the exchange rate plays little role in monetary policy in Korea.[3]

It would be surprising were this the case, for in an economy as open and sensitive to foreign trade and investment as Korea, movements in the exchange rate should contain valuable information useful for forecasting movements in inflation and the output gap, the two arguments of the standard objective function of a central bank that engages in flexible inflation targeting. Movements in the exchange rate determine movements in import prices, which are passed through into the prices of domestic substitutes and thereby affect the prospects for inflation. Movements in the exchange rate may also affect the short-to-medium-term evolution of the output gap, whether through changes in competitiveness (owing to incomplete passthrough) or balance-sheet effects (if a country's external assets and liabilities are dollarized). They may have implications for other valid concerns of the central bank, such as the stability of the financial system. Hence, even if the central bank does not attach utility to the exchange rate itself (even if the value of the currency is not itself an argument of the authorities' objective function), the exchange rate can still be an important intermediate target for monetary policy. This in fact is the unanimous conclusion of recent analytical work on the conduct of inflation targeting in open economies.[4]

[2] There is then a brief Chapter 5, entitled "Foreign Exchange Markets," again with a one-page review of trends in the dollar/won exchange rate in 2003, but no analysis of the implications for monetary policy. Equally revealingly, the first time the words "exchange rate" appear in Bank of Korea (2003) is some one hundred pages into this document, and then only in the context of a retrospective discussion of monetary and financial experience. The most revealing passage in this document is hidden on p.123, where it is written that "the Bank of Korea is obliged to change its monetary policy stance when the exchange rate is not in balance with the inflation target."

[3] The Bank of Korea's *Quarterly Bulletin* for the first quarter of 2004 (the latest available at the time of writing) does mention in the depreciation of the exchange rate in the context of import price inflation as early as p.l6, although it then does not refer further to the exchange rate in describing the formulation of monetary policy. See Bank of Korea (2004b).

[4] See Ball (1999), Eichengreen (2002) and Truman (2003).

In addition, there is the conclusion of authors like McKinnon and Schnabl (2003) that when exchange rate changes are measured at high frequencies the day-to-day volatility of the dollar exchange rates of the principal East Asian countries, including Korea, is not significantly greater than before the crisis. Other authors have reached different conclusions: Oh (2004a) similarly computes various measures of exchange rate volatility before and after the crisis (the percentage change in the absolute value of the end of day price between successive days, the difference between the highest and lowest price during the day as a percentage of the intra-daily average exchange rate) and finds more than a doubling of both measures between 1 March 1995-31 October 1997 and 1 April 1998-30 September 2003.[5] The same conclusion comes through even more strongly in Eichengreen (2003), when the standard deviation of the exchange rate is normalized by the standard deviation of reserves. Be this as it may, a number of authors have expressed surprise that the won exchange rate has not displayed more variability at high frequencies in the last six years.

Finally, McKinnon and Schnabl regress the exchange rate of the won against the exchange rates of the dollar, the yen and the deutschmark (where all exchange rate rates are measured vis-à-vis the Swiss franc and expressed as log differences). They find that the U.S. dollar has been the dominant currency in the authorities' implicit target basket both before and after the crisis and infer from this that the Bank of Korea continues to severely limit short-run fluctuations in the dollar rate.[6] Some Korean commentators will observe that the country was officially floating before the crisis as well, but the reality then was that the Korean authorities attached considerable importance to the dollar exchange rate. They actively managed the dollar

[5] Excluding the crisis period 1 November 1997-31 March 1998.
[6] There is some evidence of an increasing weight on the yen in the Korean basket, but the dollar still remains far-and-away dominant, according to their results. Oh (2004b) similarly finds that the won maintains its correlation with the dollar while displaying an increasing correlation with the yen.

rate to the point where some observers referred to an implicit dollar peg or band. Thus, pre-crisis experience is not obviously a challenge to McKinnon and Schnabl's conclusion that the Korean authorities continue to heavily manage the dollar rates – that even if fluctuations in the won-dollar exchange rate seem to be permitted in the medium run, the Bank of Korea adjusts policy to rather strictly limit the currency's fluctuation in the short run.

In this paper I ask what is the most accurate way of characterizing the conduct of monetary and exchange rate policy in Korea. Is the Bank of Korea accurately characterized as a flexible inflation targeter?[7] Does it use its monetary policy instrument – the overnight call rate – to target inflation and other variables potentially of concern (the output gap, the stability of the financial system) to while allowing the exchange rate to passively adjust to that interest rate setting, which is what would seem to be suggested by the Monetary Policy Report? Or does it attach independent importance to the exchange rate and modify its monetary policy stance when a putative setting for the overnight call right implies an uncomfortably large change in the exchange rate?

My answer to the first question is yes: a standard Taylor-type inflation targeting rule turns to be to a useful way of characterizing the Bank of Korea's policy. At the same time, movements in the exchange rate are too important for the objectives of central bank policy to effectively be disregarded, as they are in large, less open de facto inflation targeters like the United States. It is not surprising in this light that my analysis in fact suggests that when setting the overnight call rate the Bank of Korea responds to not just expected inflation and the output gap but also to movements in the won/dollar exchange rate. I thus prefer to think of its monetary

[7] The distinction between flexible inflation targeting and the alternative (strict inflation targeting) is that under the former the authorities attach weight not only to deviation in inflation from its target but also to short-run fluctuations in the output gap, over which they have limited control.

regime not as a free float backed by inflation targeting but as a managed float accompanied by modified inflation targeting.

Having provided a characterization of Korean monetary policy as open-economy inflation targeting with special attention to movements in the real exchange rate, I next consider some special topics that arise in the Korean context. I ask whether this controversy over the role that the exchange rate has actually played in the conduct of monetary policy suggests that Korean policy has been insufficiently transparent. In addition, previously authors (like McKinnon and Schnabl) having asked whether Korea has to follow the United States, Japan and Euroland when formulating its monetary and exchange rate policies, I inquire into the implications of the emergence of China. Finally, I ask how the development of the Korean economy and its financial markets should influence the conduct of monetary and exchange rate policies going forward.

2. Monetary Policy in Korea

The revision of the Bank of Korea Act that came into effect in April 1998 identifies price stability as the primary objective of monetary policy. It specifies that the central bank should set an annual inflation target and strive to achieve it. These arrangements superseded a system in which monetary indicators were the intermediate targets of policy (first M1, then the central bank's net domestic assets, then reserve money, then domestic credit of financial institutions, net domestic credit, again M1, M2, M2 plus certificates of deposit and balances held by investment trust companies, and finally M3 – it is hard to imagine a clearer illustration of the operation of Goodhart's law). The 1998 act then stipulated that the central bank should set an inflation target in consultation with the government and make that target public.

Initially, the target was framed in terms of the consumer price index; in 2000, after further study, this was changed to core inflation. For a time the Bank of Korea continued to set targets for M3 as well as inflation, on the grounds that "financial markets could have been thrown into confusion if the monetary targeting that had been utilized during the past 30 years were to be scrapped all at once."[8] From 2001, M3 was dropped as an intermediate target.[9] Policy decisions are delegated to an independent Monetary Policy Committee.[10] Consistent with modern theories of inflation targeting, the Bank of Korea began announcing its monetary policy decisions immediately, communicating its general intentions to the public, and submitting an annual report on monetary policy to the National Assembly.

The central bank's operating variable is the overnight call rate, the target for which can be raised or lowered on a monthly basis in response to fluctuations in expected inflation and other variables. The actual overnight rate fluctuates around the target call rate as a function of open market transactions in repos or monetary stabilization bonds (Figure 1). Other market rates move broadly in line with the overnight rate (Figure 2). The Bank of Korea's most recent report to the National Assembly suggests that it engages in flexible inflation targeting, in that it moderates the speed at which it adjusts the call rate in response to deviations between actual and target inflation with the condition of the real economy in mind. "Although the central bank's fundamental task is clearly that of ensuring price stability, that does not mean that it can ignore other policy goals. Even if future price increases are expected to be high, provided they remain

[8] Bank of Korea (2003), pp.17-18. In this respect its approach resembled the "two pillar" strategy of the early ECB. Thus, initially the Monetary Policy Committee decided on the basic direction of open market operations with reference to the movement of the monetary aggregates.
[9] M3 was subsequently used as an information variable only.
[10] Independence was buttressed by the revised Bank of Korea Act that came into effect in 1998, which made the Governor of the Bank rather than the Minister of Finance and Economics the chairman of the Monetary Policy Committee, limited to one the number of members that was appointed by the government, and removed provisions that might have been invoked by the government in order to force board members to resign.

within the target range, the central bank may not need to raise interest rates, basing its decision rather on the state of the financial markets or the real economy."[11]

One way of inferring how important inflation, the real economy and the exchange rate have been in the policy decisions of the Bank of Korea is to estimate an extended Taylor Rule.[12] Assume that the call rate partially adjusts to the target according to the function:

$$r_t=(1-\rho)r_t^* + -\rho r_{t-1} + \upsilon_t \qquad (1)$$

where r is the call rate, r* is the target for the call rate, and υ is a random shock that is assumed to be i.i.d.[13] The coefficient $\rho \in [0,1]$ captures the degree of interest rate smoothing practiced by the central bank.

Assume now that:

$$r_t^*=r_t^{lr} + \beta\,(E[\,\pi_{t+n} \mid \Omega_t] - \pi^*] + \gamma\, E[\text{output gap}_t \mid \Omega_t\,] + \zeta\, E\,[\,z_t \mid \Omega_t] \qquad (2)$$

where r_t^{lr} is the long-run equilibrium nominal interest rates, π_{t+n} is inflation between period t+n and period t, and z is another variable (or vector of variables) that may influence the reaction of the central bank (i.e. the depreciation of the exchange rate, as in Clarida et al. 1998).[14]

Combining (1) and (2) and rearranging:

$$r_t=(1-\rho)[\alpha + \beta\,\pi_{t+n} + \gamma\,\text{output gap}_t + \zeta\, z_t] + \rho r_{t-1} + \varepsilon_t \qquad (3)$$

where $\alpha = [\, r_t^{lr} - \beta\pi^*]$, and

$\varepsilon_t=-(1-\rho)[\,\beta\,(\pi_{t+n}-E[\pi_{t+n} \mid \Omega_t])+ \gamma\,(\text{output gap}_t-E[\text{output gap}_t \mid \Omega_t\,]) + (z_t- E\,[\,z_t \mid \Omega_t]) + \upsilon_t$.

Let u_t be a vector of variables included in the central bank's information set at the time it sets the interest rate that are orthogonal to ε. In other words:

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[11] Bank of Korea (2003), p.33.
[12] Here I follow the approach of Clarida, Gali and Gertler (1998).
[13] I discuss and defend this assumption of interest-rate smoothing below.
[14] In this application we assume that the central bank cares about the current output gap but learns its value with a one-month lag, which seems realistic. It would, however, be possible to relax this assumption, as noted by Clarida et al. (1998).

$$E[\varepsilon_t \mid u_t]=0 \qquad (4)$$

Equation (4) provides the orthogonality conditions (the moments) that we exploit in order to estimate the unknown parameters via GMM. In particular, the inflation forecast for period t+12 is constructed using the values of instrumental variables available through time t. In practice, we use lags 1, 2 3, 4, 5, 6, 9, and 12 of the overnight call rate, the index of industrial production, the inflation rate and the lagged rate of real exchange rate depreciation as the elements of the central bank's information set.[15]

The sample period for this exercise is January 1998-May 2003. Although we have additional observations through May 2004, these are needed in order to calculate forward inflation.[16] Since a lagged dependent variable is included on the right hand side of equation (3), the estimates are adjusted for heteroskedasticity and autocorrelation.[17]

A key step in this exercise (for the Bank of Korea as for the econometrician) is to estimate the output gap. Here the time series for industrial production is transformed into an output gap series in two ways: a) using the two-sided linear Hodrick-Prescott filter; and b) assuming a linear trend.

The results in Table 1 fit actual movements in the call rate well.[18] The first two equations show that the call rate rises with inflation, although as aggressively as suggested by Taylor's rule (with a coefficient greater than one) only when the gap is constructed assuming a linear trend as

[15] Lags longer than 12 months added little in terms of forecast accuracy. Similarly, eliminating lags 7, 8, 10, and 11 sacrificed little and reduced the extent of multicolinearity in estimation. Note that the rate of real exchange rate depreciation in the current month is not included in the posited information set because it is not uncorrelated with the current interest rate shock ε_t, the exchange rate being a "jump variable" that can presumably move instantaneously in response to the shock.

[16] Given the 12 lags in the information set.

[17] The first step in the algorithm is to estimate the coefficients by OLS in order to compute an initial estimate of the parameters for use in computing the optimal weighting matrix. The second step uses the Davidson-Fletcher-Powell algorithm to find the line search in subsequent iterations.

[18] The goodness of fit is of course heavily driven by the lagged dependent variable. I return to this below. Note that the dependent variable in these estimates is the actual call rate as opposed to the call rate target (see Figure 1 for information on their relative movement).

in the original Taylor (1993) article. The call rate also rises as actual output rises relative to capacity (which is how the output gap is operationalized here). The lagged dependent variable is significant and large, consistent with the considerable degree of smoothing evident in the Bank of Korea's setting of the call rate. Note that the same large coefficient on the lagged dependent variable has been obtained previously in studies of other countries. Thus, for example, Clarida et al. (1998) obtain estimates in the interval 0.90-0.97 for the United States, 0.91-0.93 for the Bank of Japan, and 0.91 for the Bundesbank.[19] This suggests that the interest-rate smoothing behavior evident in the Korean data is not peculiar to that country, although a number of the explanations that have been offered previously in the literature for why central banks smooth interest rates – fear of disruption of financial markets (Goodfriend 1991), for example – seem especially relevant to the Korean case. It is worth noting that differences between the predicted and actual values of the call rate are particularly large following the beginning of the Daewoo problem, which is consistent with the notion that the Bank of Korea smoothes interest rates with a view toward financial stability.

Also note that despite the considerable explanatory power of the lagged dependent variable the coefficients on the inflation and output-gap variables are well determined (they have respectable t statistics). Although the presence of the lagged dependent variable explains the success of these equations in tracking trends in the call rate, the other variables still appear have a role in explaining fluctuations around that trend.

The key result for present purposes is that the rate of change in the real exchange rate in the immediate past month also appears to influence the setting of the policy instrument in

[19] In principle, the standard errors on these other independent variables should not be understated as a result of a combination of a lagged dependent variable and positive autocorrelation, since the results here adjust for autocorrelation.

practice.[20] Note that the real exchange rate is measured as the bilateral rate vis-à-vis the dollar, since it is the dollar rate to which the Bank of Korea refers in its publications.[21] When the real rate depreciates, there is a tendency for the Bank of Korea to raise the call rate, other things equal (Figures 3 and 4). Adding the rate of currency depreciation reduces the magnitude of the other coefficients slightly but does not otherwise change the results.[22] Because the first lag of (the percentage change in) the real exchange rate is also included in the information set used to forecast inflation, the interpretation of this coefficient is that the Bank of Korea cares about the movement of the real exchange rate above and beyond its use in forecasting future inflation.

Some of these results are sensitive to alternative ways of estimating the output gap. When no extra (z) variable is included, the coefficient on inflation is larger than the coefficient on the gap when the latter is constructed using a linear trend, but the inflation coefficient is smaller than the gap coefficient when the latter is calculated used the HP filter. It is not clear which approach to estimating the output gap is more reliable in this context. The linear-trend approach will be particularly sensitive to structural breaks in the data, which are likely to be evident in an economy like Korea that has been passing through rapid structural change since the crisis, while the sharp fall in output at the beginning of the sample period may tend to bias downward estimates of potential output obtained from the HP filter due to the end-point problem. Note, however, that the key result for present purposes – how the rate of change in the exchange rate affects the call rate – is not sensitive to how output is detrended.

A number of other sensitivity analyses lent support to the robustness of these results. The two that did not where when actual inflation was substituted for expected inflation, and when the

[20] Note that similar results have been obtained for other open economies, e.g. for a number of Latin American countries by Corbo (2000).
[21] See below.
[22] The one change is that the coefficient on forward inflation just misses being statistically significant at the 90 per cent confidence level.

sample was limited to the second half of the post-crisis period. Substituting backward-looking behavior for forward-looking behavior produces a negative coefficient on the excess of actual output over capacity output, contrary to what one would expect (see Table 2). The difference in the two sets of estimates is thus consistent with the assumption that the Bank of Korea looks forward when contemplating the evolution of inflation and makes reasonably efficient use of the available information. Table 2 also provides support to the observation that estimates of monetary policy reaction functions framed in terms of backward-looking price movements can be seriously misleading.

Second, limiting the sample to the second half of the post-crisis period produces less precise estimates. This is not surprising, in that this leaves relatively few monthly observations and even fewer changes in the call rate, and given the fact that many of the changes in the call rate are concentrated toward the beginning of the period.

The bottom line is that in practice the Bank of Korea does not disregard fluctuations in the won exchange rate when operationalizing monetary policy. The rhetoric of inflation targeting and lack of reference to the exchange rate in its reports on monetary policy notwithstanding, it seems to take exchange rate fluctuations seriously when setting its operating target. This appears to be true even when the behavior of the exchange rate is included in the information set used to forecast inflation. This seems to indicate that exchange rate fluctuations matter not just for expected inflation but also for other variables of concern to the central bank, such as the relative condition of the traded and nontraded goods sectors, the stability of the

financial system, and the overall development of the Korean economy, which has traditionally been linked to the level of the exchange rate through the mechanism of export-led growth.[23]

The conclusion I draw is that the exchange rate matters for the conduct of monetary policy in Korea, rhetoric of free floating or not. It matters not merely in that it is useful for forecasting inflation, but in its own right, insofar as it is directly linked to the evolution of other variables also of concern to the central bank.

3. What this Implies About the Transparency of Korean Monetary Policy

The fact that the Bank of Korea says little about the exchange rate and its influence on policy decisions in its annual report to the National Assembly and in its monthly statements on monetary policy, issued following policy decisions, raises questions about whether central bank policy in Korea is as transparent in theory as it is in practice. If the central bank says one thing but does another (or, in the case of the exchange rate, it says nothing but does something), current practices may neither be an efficient way of communicating with the markets nor be an effective mechanism for holding the independent monetary authorities accountable for their decisions.

This is less of a problem for the annual report on monetary policy than for the monthly statements of the Monetary Policy Committee. Insofar as the annual report to the National Assembly is intended as a mechanism of accountability, it makes sense that this should focus on the ultimate goals of policy – an acceptable average level of inflation and an acceptable tradeoff between inflation variability and short-term movements in the output gap – and that it should devote limited attention to the exchange rate per se. The Bank of Korea should be held

[23] Or perhaps the Bank of Korea cares about the opinions of the Ministry of Finance and Economy, which in turn has strong views about the level of the exchange rate that is appropriate for the growth of exports and the stability of the financial sector, and which is officially responsible for determining Korean exchange rate policy.

accountable for its success in achieving its ultimate goals and crafting a socially-acceptable balance between them. The National Assembly should have something to say, and it may want to do something as well, if it sees the central bank too single mindedly attempting to minimize the variance of inflation while placing too little weight on short-term movements in the output gap, or equally if it sees the central bank as doing the converse. Movements in the exchange rate are not obviously of first-order importance for the balance between these variables (as distinct from affecting each of them). It is hard to imagine members of the National Assembly, or other observers, saying "Because we think you should be placing more weight on the output gap as opposed to minimizing the variance of inflation, we think you should be placing more weight on the exchange rate in your decisions," for it is far from clear whether the exchange rate affects the prospects for inflation or the output gap more strongly. Indeed, the precise answer may depend on circumstances. From this point of view, that the Bank's annual report to the National Assembly focuses on inflation, financial stability and the real economy rather, while saying little about the exchange rate per se, does not seem inappropriate.[24]

The monthly statements of the Monetary Policy Committee are another matter. These are a mechanism for communicating the intentions of the monetary authorities to the public and the market on a month-to-month basis. They are part of the basis on which the public and the market take their consumption and investment decisions. Typically, these statements make no mention of the exchange rate. If in fact the central bank is responding to movements in the

[24] Faust and Henderson (2004) suggest a different problem with documents like the Bank of Korea's report to the National Assembly. In practice these focus almost entirely on the central bank's success in achieving an acceptable average rate of inflation, and do not analyze the policy tradeoff between greater inflation variance on the one hand and smaller variance of the output gap on the other. Like the Bank of Korea, they describe the optimization process in terms of a target for one variable (inflation) and adjusting the time horizon (moving from the short-run target to a medium-term target) to take into account the other (movements in the output gap). As Faust and Hednerson (p.15) put it, "this description fundamentally obfuscates" a trade-off that essentially involves using one instrument (monetary policy) to get close to a weighted average of two targets (the mean of inflation and the balance between the variability of inflation and the variability of the gap).

exchange rate but it is not acknowledging this fact, private consumption and investment decisions may be taken erroneously, or at least they will be unnecessarily affected by uncertainty.[25] Best-practice open-economy inflation targeting suggests that MPC's monthly statements should contain more discussion of the exchange rate if this in fact is part of the basis for the committee's rate-setting decisions. This is especially important for a country with a highly competitive media, like Korea, where there is an incentive for journalists to engage in hyperbole in order to sell papers. In this case it will then be particularly important for the central bank to provide market participants with the relevant information directly, rather than leaving it to the press to characterize the role of the exchange rate in monetary policy formulation.

4. Which Exchange Rate?

Traditionally, these questions of how events in other countries affect Korean growth and inflation have been formulated in terms of the U.S., European and Japanese markets. When those markets are buoyant, the output gap narrows in Korea and inflationary pressure intensifies. There is then an argument for tightening monetary policy and letting the exchange rate strengthen. The new development on this scene is, of course, China. Where China accounted for less than one per cent of South Korea's exports as recently as 1990, it now accounts for roughly

[25] Poole (2001, p.4) puts it too strongly when he asserts that there is no finding in the macroeconomic literature providing "a theoretical case, or empirical support, for the view that confusion or uncertainty in the private sector about the direction of monetary policy serves to better achieve policy objectives." In fact, there is a fairly substantial theoretical literature (surveyed by Geraats 2002) analyzing circumstances in which less transparency and/or more uncertainty about central bank policy may be welfare improving. Most of these special cases are elaborations of the theory of the second best, where an additional distortion (adding noise to the public signal about the intentions of monetary policy makers) is welfare enhancing because there exist other distortions working in the opposite direction. Most of these examples are, in my view, rather special cases with little practical relevance for policy. The most compelling such example assumes strategic interaction among private agents and that the public signal about future economic developments is noisier than the private signal. In this situation, providing a bit more public information through an increase in transparency causes private agents, concerned to coordinate their actions, to place more weight on the noisy public signal, resulting in a deterioration rather than an improvement in resource allocation. In practice, studies like Memertzis and Hughes Hallett (2003) provide little empirical support for these perverse cases.

a fifth. (See Table 3.) This implies that the Bank of Korea should monitor developments in China as intensively as it monitors developments in the United States and other advanced industrial countries. This is an argument for the Bank of Korea moving away from its "dollar focus" in its policy statements and its call-rate policy. In particular, as Chinese economic growth decelerates in response to the monetary tightening implemented there in response to fears of overheating, there may similarly be an incentive for the Bank of Korea to loosen and allow the won to depreciate as necessary.

But Chinese trade in general and Chinese trade with Korea in particular differ from the trade of other countries in the magnitude of the country's imports of parts and components used as inputs into its exports of manufactures to third markets. China is an export platform for countries like Korea, assembling consumer electronics and other goods for sale in the U.S., Europe and Japan, using Korean machinery, parts and expertise. Thus, a deceleration in Chinese growth (like that which we are apparently witnessing at the moment) has two offsetting effects on Korea. On the one hand, it slows the growth of China's demand for Korean exports of components and capital goods. On the other hand, it slows the growth of China's exports of manufactures to third markets, creating additional space there for Korea's own exports. It is not clear in the abstract which effect dominates. If the second effect dominates, then a soft or hard landing in China might in fact *intensify* inflationary pressure and *narrow* the output gap in Korea, providing grounds for tightening monetary policy and allowing the won to appreciate, rather than the other way around.

In Eichengreen, Rhee and Tong (2004), my coauthors and I estimate the impact of Chinese growth on China's demand for imports from its Asian neighbors, together with the impact of China's growth on that country's exports to third markets, and the propensity for

Chinese exports to crowd out the exports of other Asian countries to those same third markets.[26] We use trade data disaggregated into exports of capital goods, intermediates, and consumer goods. A summary of the results is in Table 4. These show that the Chinese and Korean economies tend to move together. Thus, when China slows down, Korea slows down as well, due mainly to the impact on Korean exports of capital goods to the Chinese mainland. This suggests that the Bank of Korea should react to movements in the Chinese yuan in much the same manner that it reacts to movements in the dollar, the yen and the euro.

Note, however, that while the same result obtains for Japan and Singapore, the two other advanced economies in the region that are also heavy exporters of capital goods to China, it does not obtain for middle-income Asian countries such as, inter alia, Malaysia and Thailand (and it certainly does not obtain for low-income Asian countries). This is a reminder that the same formula for monetary and exchange rate policy that is appropriate for Korea is not appropriate for all Asian economies.

5. The Role of the Exchange Rate and Economic and Financial Development

At the most basic level, the choice of exchange rate regime – equivalently, the weight placed on changes in the exchange rate in the central bank's reaction function – should be a function of a country's economic development strategy. Korea has long been committed to a strategy of export-led growth, in which it keeps the exchange rate of the won stable at competitive levels. The traded-goods sector has traditionally been seen as a locus of learning by doing and productivity spillovers. Thus, keeping the exchange rate from appreciating in order to stimulate capacity expansion and investment in this sector, while at the same time keeping

[26] The key methodological insight in this exercise is the recognition that Chinese exports are endogenous, and the use of the standard arguments of the gravity model, such as the distance from China to each extra-Asian export market, as an instrument for this variable.

interest rates low and utilizing government influence over the financial system to channel resources for capital formation in its direction, was the Korean strategy for stimulating productivity and economic growth. The positive results of this strategy create understandable worries that greater exchange rate flexibility might jeopardize the success of Korea's growth model. This explains, in the conventional view, why the Ministry of Finance and Economy has opposed an overly strong exchange rate and the Bank of Korea has accumulated such massive dollar reserves.

The rebuttal to this view is that the model of export-led growth has outlived its usefulness. To be sure, exports of manufactures still matter for Korea, as they do for the United States and every other advanced economy. But they are no longer disproportionately the locus of learning effects and productivity spillovers. Recent studies of the U.S. (e.g. Gordon 2002) have documented that the sector with far and away the fastest growing productivity growth rates is retailing: companies like Walmart have succeeded in using information and communications technologies to rationalize inventory control and otherwise streamline their operations in ways that have resulted in massive increases in productivity. While U.S. companies have also sought to export this technology, this is basically productivity advance led by the nontraded goods sector. A set of economic policies that encourages companies to concentrate on the production of exportable manufactures at the expense of nontradables production may pass up the most attractive opportunities for boosting productivity.

To the extent that growth in the 21st century will depend on a country's ability to train – and retain – knowledge workers, the argument for policies that encourage a better balance between traded- and nontraded-goods production becomes stronger still. Education is the obvious activity to be fostered in order to train knowledge workers, and education is a classic

nontraded good (although those of us who teach at the University of California, observing the composition of our student body, may question whether such services are really nontraded). Retaining knowledge workers – and, even better, attracting them from abroad – requires investing in housing and urban amenities, which are similarly nontraded goods. All this suggests that a growth model tailored to the imperatives of the 21st century requires a better balance of investment in sectors supplying traded and nontraded goods.

Finally, a strategy of keeping the exchange rate from appreciating and keeping interest rates low in order to channel additional resources into the production of exports – or more generally into the production of those goods in which the scope for productivity improvement is greatest – works less well in a deregulated financial environment. Recent experience shows that countries that have imported low U.S. interest rates as a result of keeping their currencies stable against the dollar have seen resources flow not into increases in industrial capacity but into speculative investments in commercial and residential real estate. In a substantially deregulated financial environment, the government has little ability to prevent this. Construction booms can lead to an inferior allocation of resources with very long-lived effects (Field 1992). A concentration of speculative construction loans on bank balance sheets can pose a threat to financial stability. Even China, where the banking system remains substantially under the control of the authorities, displayed these symptoms in 2003, when the combination of a pegged exchange rate and substantial capital inflows led to signs of property-market overheating. Because China's banks still take instructions from the authorities, the latter can address the problem simply by directing the banks to stop lending.[27] For countries with more completely

[27] Although there is still some scope for capital to flow into the property market through nonbank channels, as described in Eichengreen (2004).

deregulated financial systems and open capital accounts, the only solution to this problem is a more flexible exchange rate.

The other reason besides their long-standing commitment to export-led growth why Korean policy makers may be reluctant to move to greater exchange rate flexibility is the worry that exchange rate stability is important for financial development – and for the development of bond markets in particular. The currency risk associated with volatile exchange rates may deter both local and foreign investors from holding long-term, domestic-currency-denominated debt securities. Hence there may be a conflict between allowing greater exchange rate variability and encouraging local bond markets, something that Korean policy makers see as integral to building a more robust and better developed financial sector.

Eichengreen and Luengnaruemitchai (2004) report some evidence that countries with more volatile exchange rates do in fact have smaller bond markets, holding constant a number of other potential determinants of bond market development. However, this result is driven by a few cases where exchange rates are highly volatile and unpredictable. In the range of more modest exchange-rate volatility relevant to Korea, there is little evidence that greater exchange rate variability is a significant impediment to bond market development. Part of the explanation may lie in the development of derivatives markets and structured instruments with which it is possible to hedge exchange rate risk (see e.g. Fernandez and Klassen 2004).

6. Conclusion

Korea's experience with inflation targeting since implementation of the revised central bank act in 1998 and the shift away from targeting monetary aggregates after 2000 has been

broadly satisfactory. The authorities have succeeded in maintaining a relatively stable and moderate rate of inflation. The technical problems warned of by skeptics of the application of inflation targeting to Korea and other Asian countries (viz. lack of timely data, difficulty of forecasting inflation) have not interfered with the operation of this regime.[28] Nor have inadequate financial depth and development seriously disrupted its operation. There is some evidence (for example, in the large deviation between the policy interest rates predicted by the Taylor rule and those actually maintained by the Bank of Korea around the time of the Daewoo crisis) that financial fragility has figured in the conduct of inflation targeting in Korea. I return to this point momentarily. But, be this as it may, the authorities' concern for financial stability has not conflicted in alarming ways with their pursuit of the key objective of inflation targeting, namely, a low and relatively stable inflation rate, any more than, say, in the case of the Federal Reserve and Long-Term Capital Management in 1998.

What has been the role of the exchange rate in this regime? The balance of evidence suggests that the won is now fluctuating more freely than under the old (pre-crisis) regime. By and large these fluctuations have stabilizing from a macroeconomic point of view: the won has strengthened in periods when the expansion of the Korean economy was accelerating and weakened when the expansion appeared to be losing steam. While the exchange rate does not receive much attention in the Bank of Korea's Monetary Policy Report to the National Assembly or its monthly press releases following decisions of the Monetary Policy Committee, there is still the sense that the authorities are vigilant about its fluctuation – that they continue to care about how movements in the exchange rate affect their ultimate policy goals, and that they adjust policy accordingly. Movements in the real exchange rate will naturally matter in a small open economy, where they have important implications for the future course of inflation. But my

[28] For an ex ante review of these potential problems see Ho and Wong (2001).

findings suggest that the Bank of Korea does not only care about the real exchange rate because the latter contains information relevant for its inflation forecast. In addition, it responds to movements in the real exchange rate for other reasons as well, reasons like the balance of investment in traded and nontraded goods sectors, or the implications for financial stability.

My analysis is consistent with the notion that this is a sensible monetary regime for the country. The exchange rate is not a suitable anchor for monetary policy in an economy as large, diversified and financially open as Korea. Inflation targeting provides a sounder basis for the formulation and conduct of monetary policy in such a country. At the same time, a central bank like Korea's cannot regard fluctuations in the exchange rate with an attitude of benign neglect. Movements in the exchange rate matter too much for future inflation, for the evolution of the output gap, for the stability of the financial system, and for the development of the economy generally. Inflation targeting in an open economy like Korea does not imply disregard of the exchange rate. Indeed, the opposite is true. Moreover, the central bank of a country like Korea whose real and financial sectors are sensitive to movements in the real exchange rate is unlikely to limit its attention to the exchange rate to its implications for the future evolution of inflation.

My recommendations are thus not for radical changes in Korean monetary policy, but for more clarity on the role of the exchange rate in its formulation and conduct. If the members of the Monetary Policy Committee are in fact attentive to exchange rate movements when adjusting the call rate, which is what is suggested by the evidence presented here, and especially if they care about such movements for reasons not limited to the utility of that variable for forecasting future inflation, then they should acknowledge this in their monthly press releases communicating the rationale for their decisions to the public and the markets. Avoiding the issue sows confusion among consumers and investors, which is not helpful for policy. More

specifically, discussing the exchange rate purely in terms of its information content for future inflation is not transparent and consistent when the central bank apparently cares about the exchange rate for other reasons as well. And framing discussions of exchange rate trends purely in terms of dollar/won fluctuations is not illuminating at a time when Korea's trade is geographically diversified and other exchange rates matter increasingly for the conduct of monetary policy. Finally, the most important new event affecting the prospects for Korean inflation and growth, China's emergence, still figures not at all in the publications and statements of Korean monetary policy makers. More attention to developments in China and more discussion of how these shape the formulation of policy will be essential to the effective communication of policy intentions going forward -- especially since the implications for Korea are far from straightforward.

Many of the trends reviewed in this paper suggest that the Bank of Korea should now place less weight on the exchange rate, the dollar exchange rate in particular, in the formulation of policy, on the grounds that movements in that rate are becoming less closely tied to the ultimate objectives of monetary policy. As Korea exits the stage of export-led growth for innovation- and knowledge-intensive economic growth, it needs a better balance of investment in traded- and non-traded goods sectors. Keeping the exchange rate from appreciating will no longer be the obvious tonic for growth. As the yuan begins to move more freely against the dollar, as will happen sooner or later, no one exchange rate will any longer be an appropriate focus for export competitiveness. As domestic financial markets develop and prudential supervision and regulation continue to be strengthened, corporate finances will no longer be as sensitive to exchange rate movements, enabling the authorities to allow the currency to fluctuate more without threatening financial stability. By how much the exchange rate should then move

will depend on circumstances; it will depend on the specific constellation of domestic and foreign shocks to which the Korean economy is subjected. We should not automatically expect to see wider exchange rate movements in 2004-2010 than in 1998-2004. But the considerations raised here do suggest that the Bank of Korea should place less weight on those movements than it has in the last six years.

References

Ball, Lawrence (1999), "Policy Rules for Open Economies," in John Taylor (ed.), *Monetary Policy Rules,* Chicago: University of Chicago Press, pp.127-156.

Bank of Korea (2003), *Monetary Policy in Korea,* Seoul: Bank of Korea.

Bank of Korea (2004a), *Monetary Policy Report*, Seoul: Bank of Korea.

Bank of Korea (2004b), *Quarterly Bulletin* (March), Seoul: Bank of Korea.

Clarida, Richard, Jordi Gali and Mark Gertler (1998), "Monetary Policy Rules in Practice: Some International Evidence," *European Economic Review*, pp.1033-1068.

Corbo, Vittorio (2000), "Monetary Policy in Latin America in the 1990s," Working paper no. 78, Santiago: Banco Central de Chile (August).

Demertzis, Maria and Andrew Hughes Hallett (2003), "Central Bank Transparency in Theory and Practice," DNB Staff Report no. 105, Amsterdam: De Nederlandsche Bank.

Eichengreen, Barry (2002), "International Monetary Options for the 21st Century," *Annals of the American Academy of Political and Social Science* 579, pp.11-25.

Eichengreen, Barry (2003), "What to Do with the Chiang Mai Initiative," *Asian Economic Papers* 2, pp.1-52.

Eichengreen, Barry (2004), "Chinese Currency Controversies," *Asian Economic Papers* (forthcoming).

Eichengreen, Barry and Pipat Luengnaruemitchai (2004), "Why Doesn't Asia Have Bigger Bond Markets?" unpublished manuscript, University of California, Berkeley.

Eichengreen, Barry, Yeongseop Rhee and Hui Tong (2004), "The Impact of China on the Exports of Other Asian Countries," unpublished manuscript, University of California at Berkeley and Sookmyung University.

Faust, Jon and Dale W. Henderson (2004), "Is Inflation Targeting Best-Practice Monetary Policy?" International Finance Discussion Paper no. 807, Washington, D.C.: Board of Governors of the Federal Reserve System (May).

Fernandez, David and Simon Klassen (2004), "Choice of Currency by East Asian Borrowers," unpublished manuscript, J.P. Morgan.

Field, Alexander J. (1992), "Uncontrolled Land Development and the Duration of the Depression in the United States," *Journal of Economic History* 52, pp.785-805.

Geraats, Petra M. (2002), "Central Bank Transparency," unpublished manuscript, University of Cambridge (March).

Goodfriend, Marvin (1991), "Interest Rates and the Conduct of Monetary Policy," *Carnegie Rochester Conference Series on Public Policy* 34, pp.7-30.

Gordon, Robert J. (2002), "Technology and Economic Performance in the American Economy," NBER Working Paper no.8771 (February).

Ho, Daryl and Simon Wong (2001), "Inflation Targeting in Asia," Research Paper, Economic Research Division, Hong Kong Monetary Authority (October).

Hoffmaister, Alexander (2001), "Inflation Targeting in Korea: An Empirical Exploration," *IMF Staff Papers* 48, pp.317-343.

McKinnon, Ronald and Gunther Schnabl (2003), "A Return to Exchange Rate Stability in East Asia: Mitigating Conflicted Virtue," unpublished manuscript, Stanford University (October).

Oh, Junggun (2004a), "Effects of Free Floating on the Foreign Exchange Market: The Korean Experience," paper presented to the Claremont Exchange Rate Workshop, Claremont Graduate School, Claremont California, 1-2 April.

Oh, Junggun (2004b), "Exchange Rate Disparities and Needs of Policy Cooperation in East Asia," paper presented at the WEAI conference, Vancouver, Canada, 30 June-3 July.

Poole, William (2001), "Central Bank Transparency: Why and How?" www.stlousfed.org (30 November).

Taylor, John (1993), "Discretion versus Rules in Practice," *Carnegie Rochester Conference Series in Public Policy* 39, pp.195-214.

Truman, Edwin M. (2003), *Inflation Targeting in the World Economy,* Washington, D.C.: Institute for International Economics.

Table 1
GMM Estimates: Forward-Looking Inflation
(adjusted standard errors in parentheses)

Equation	Alpha (constant)	Beta (Inflation)	Gamma (Gap)	Rho (LDV)	Zeta (Real depr.)	Gap computed by
1	1.086	0.772	1.103	0.956	--	Hodrick-Prescott
	0.881	0.288	0.139	0.004		
2	-0.716	1.384	0.412	0.944	--	Linear trend
	0.696	0.223	0.038	0.004		
3	2.493	0.370	0.129	0.937	0.123	Hodrick-Prescott
	0.672	0.228	0.099	0.005	0.010	
4	-0.073	1.169	0.409	0.933	0.054	Linear trend
	0.713	0.237	0.029	0.005	0.009	

Note: The rate of real exchange rate depreciation is lagged one month. The instruments are a constant and lags 1, 2, 3, 4, 5, 6, 9 and 12 of the overnight call rate, industrial production index, real exchange rate depreciation and inflation.

Source: see text.

Table 2
GMM Estimates: Backward-Looking Inflation
(adjusted standard errors in parentheses)

Equation	Alpha (Constant)	Beta (Inflation)	Gamma (Gap)	Rho (LDP)	Zeta (Real depr.)	Gap computed by
1	-0.523	1.259	1.555	0.947	--	Hodrick-Prescott
	0.555	0.138	0.175	0.005		
2	1.820	0.505	0.574	0.925	--	Linear trend
	0.295	0.071	0.055	0.004		
3	4.347	-0.318	1.034	0.939	0.133	Hodrick-Prescott
	0.442	0.137	0.115	0.004	0.018	
4	4.613	-0.453	0.422	0.910	0.128	Linear trend
	0.242	0.079	0.042	0.004	0.012	

Note: The rate of real exchange rate depreciation is lagged one month. The instruments are a constant and lags 1, 2, 3, 4, 5, 6, 9 and 12 of the overnight call rate, industrial production index, real exchange rate depreciation and inflation.

Source: see text.

Table 3. The Percentage of Exports to China in Total Exports

	1990	1997	2002
Japan	2.47	6.38	11.69
Bangladesh	1.26	1.04	0.51
Cambodia	0.39	7.48	1.28
Sri Lanka	0.08	0.21	0.24
India	0.47	2.19	4.25
Indonesia	3.14	4.74	6.96
Korea	0.39	11.73	16.42
Malaysia	2.49	2.65	8.01
Pakistan	1.54	4.54	5.51
Philippines	0.94	1.11	6.90
Singapore	1.96	4.60	7.28
Thailand	1.62	3.25	7.46
Vietnam	0.06	3.80	6.61

Source: Eichengreen, Rhee and Tong (2004).

Table 4. Net Impact on Neighbors' Exports of China's Income Growth

	Capital Goods	Consumer Goods	Inter-mediates	Total
Japan	0.18	-0.24	0.05	0.03
Bangladesh	0.00	-0.32	0.05	-0.28
Cambodia	0.01	-0.32	0.09	-0.24
Sri Lanka	0.03	-0.32	0.00	-0.25
India	0.02	-0.30	0.06	-0.12
Indonesia	0.14	-0.30	0.08	-0.04
Korea	0.23	-0.19	0.12	0.06
Malaysia	0.11	-0.30	0.04	-0.01
Pakistan	0.06	-0.25	0.07	-0.21
Philippine	0.11	-0.30	0.05	-0.01
Singapore	0.11	-0.28	0.00	0.03
Thailand	0.11	-0.29	0.08	-0.07
Vietnam	0.04	-0.30	0.14	-0.14

Source: Eichengreen, Rhee and Tong (2004).

Figure 1
Observed and Target Call Rate and Annual CPI Inflation

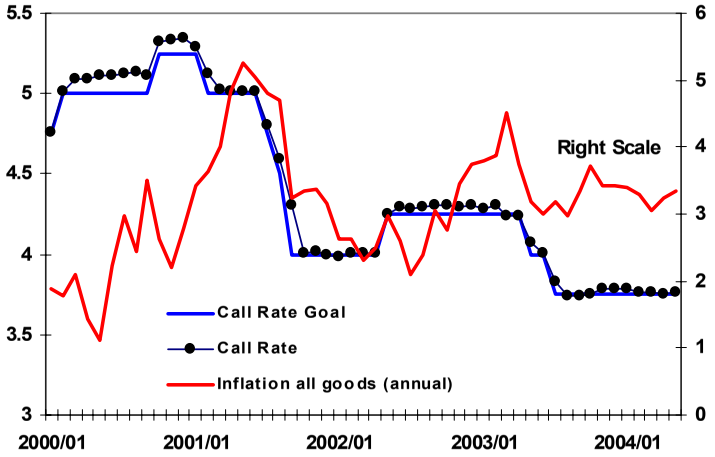

Figure 2
Call Rate, Treasury Bond 3 years, Corporate Bond (3 years) and Monetary Stabilization Bond Yields

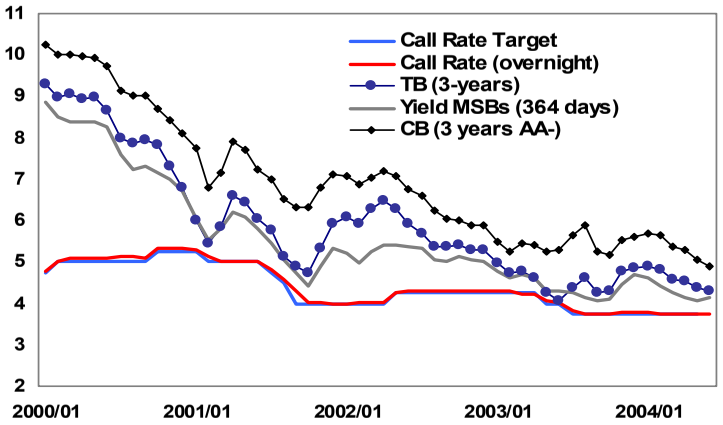

Figure 3
Observed Inflation and Annual Exchange Rate Depreciation

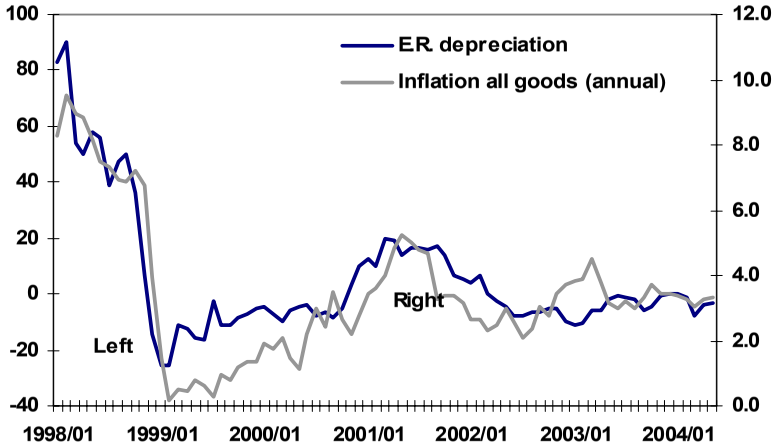

Figure 4
Inflation Target (%) and Annual Exchange Rate Depreciation