

Conference Proceedings

**The Implications
of Globalization
of World Financial Markets**

THE BANK OF KOREA

The Risks of Unilateral Exchange Rate Pegs

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I. Introduction

The recent economic crisis in Asia has sent shock waves through the international financial system, and will likely have significant economic ramifications for several years. For academic economists, the Asian crisis is leading to a profound rethinking of the basic structure of the international financial system. Though it is perhaps easy to explain the crisis *ex-post*, economists who say they fully anticipated events are not being fully honest with themselves. This is not to say that economists were caught entirely by surprise. In my 1995 *Journal of Economic Perspectives* paper with Maurice Obstfeld on "The Mirage of Fixed Exchange Rates," we argued that "... it is folly to try to capture the lost innocence of fixed exchange rates. ... The exchange rate should be used as an indicator but virtually never as the central target for monetary policy." (p. 74). We concluded that "a broad range of empirical studies suggest that reducing domestic inflation and the instability it causes are better addressed through basic reform of domestic monetary systems."

In this paper, I will review the arguments we presented to make the case against having the goal of exchange rate stability play too large a role in monetary policy. As we shall see, few attempts to stabilize exchange rates have survived in the 1990s for more than a few years, with most pegs ending in costly speculative attacks. This problem applies not only to rigid fixed rate systems but even to systems with bands (which Obstfeld and I termed "fixed rates lite").

The mere fact that fixed rate regimes ultimately come to an end is not, of course, the real problem. One can argue that volatility is so great under floating, that a fixed rate system with periodic large corrections is still preferable, even if the corrections often 'overshoot' the necessary adjustment in the real exchange rate. The deeper problem with fixed rates is that they often serve as a lightning rod for broader debt and banking crises that greatly amplify the costs of adjustment. True, the link between exchange rate crises and debt crises is hardly immutable. The Latin American debt crises of the 1980s were not generally associated with collapsing fixed exchange rate regimes. The attacks on the European Monetary System in the early 1990s were not generally associated with severe sovereign debt crises (although

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several countries, most notably Sweden, suffered serious problems with their banking systems). Thus there is can be no presumption that the Asian debt crisis could have been avoided by having more flexible exchange rates, or that once exchange rates started to collapse, a broad-based financial crisis was inevitable. However, the Mexican collapse of late 1994 and the recent Asian debt crises have revealed some added dangers of fixed rates that have not, perhaps, been adequately emphasized until now.

The first part of this paper (after the introduction), will review the conventional rationales for placing a high priority on exchange rate stabilization in setting monetary policy, and will consider how thinking has sharply evolved in recent years. The second section of the paper shows why countries have such difficulties maintaining fixed exchange rates in the face of open capital markets, even in cases where foreign exchange resources seem to be more than sufficient to back up the currency supply. The third section offers a perspective on the recent history of fixed rates, showing how rare it is for a fixed rate system to survive more than a couple years, at least among the fifty to sixty largest economies of the world. The fourth section looks at variants of fixed rate systems — “fixed rates lite” — and argues that these ultimately share the same problems as narrow pegs. The fifth section looks at the problem of multiple equilibria, showing how and why exchange rate attacks can be self-fulfilling, and how they can simultaneously trigger debt crises. The next section looks at alternative monetary strategies, including inflation targeting and central bank independence. Finally, the paper briefly considers the issue of capital controls, arguing that improved prudential regulation is essential in a world of open capital markets. Capital controls, however, are not likely to be a long-term answer to asset market volatility.

II. The Rationale for Fixed Exchange Rates

Twenty years ago, most economists still viewed the choice between fixed and flexible exchange rates as a macroeconomic stabilization question, completely analogous to the choice between stabilizing the interest rate and stabilizing the money supply in a closed economy. If the predominant source of disturbances to the economy is shifts in the demand for money, then a fixed exchange rate system is desirable since it offsets such shocks automatically. If the predominant source of shocks is shifts in aggregate demand, then it becomes desirable to allow for some degree of exchange rate flexibility.¹⁾ There are even perfectly natural examples (e.g.,

1) Even recent editions of leading undergraduate international economics textbooks, such as Krugman and Obstfeld *International Economics*, or Frankel, Caves and Jones *International Economics*, stress the source of shocks as critical to the appropriate choice of exchange rate regime.

where aggregate demand shocks are very large relative to monetary shocks) where monetary policy should "lean with the wind", accentuating exchange rate movements rather than attenuating them.² The old stabilization view of exchange rate flexibility still offers many important insights, though practical implementation of its prescriptions is difficult for a number of reasons. First and foremost, in a world where major currency exchange rates are in flux, the meaning of exchange rate stabilization becomes clouded. Cross exchange rates between the dollar, the DM and the yen continue to exhibit enormous volatility on both a short-run and long-run basis. If a small country fixes its exchange rate against the dollar, it is sure to experience large exchange rate swings against the other major currencies. This problem was obviously important in precipitating the run on East Asian currencies. The sustained rise of the dollar against the yen meant that East Asian currencies sharply appreciated against the yen as well. Stabilization theory suggests that smaller countries should deal with major currency volatility by pegging to a basket of currencies. But the neat theoretical formulas one obtains for basket pegs are not always easy to implement in practice. Typically, stabilization considerations suggest that the optimal basket weights should shift over time, as the relative volatility of different shocks changes. If in practice, however, the monetary authorities were to constantly change basket weights, it would wreak havoc with market expectations.

A further practical problem with the stabilization approach is that its implementation requires that the monetary authorities have useful measures of the relative variances of different types of shocks buffeting the economy. These relative variances play a key role in the formulas for the optimal feedback rule. For example, when monetary shocks predominate, then monetary policy should react strongly to exchange rate movements. Unfortunately, as a practical matter, the relative variances of different types of shocks are extremely difficult to measure except perhaps over very long time intervals. Information drawn from long-period averages are of fairly little use if, as seems likely, relative variances change sharply over time. Oil price volatility, for example, was high during the 1970s and the early 1980s, but was less so over the past decade; they could become more volatile again in the future. Finally, the stabilization approach implicitly assumes a stable relationship between exchange rates and economic fundamentals such as incomes, interest rates, and money supplies. Empirical evidence, however, strongly suggests that any short- to medium term relationship between real-world exchange rates and the variables emphasized in stabilization models is very tenuous at best.³

Despite all these qualifications, it must still be said that the stabilization approach offers valuable insights into dealing with particular, well-identified, one-time distur-

2) See Obstfeld and Rogoff (1996), p. 657, p. 3 and Obstfeld, Rogoff, and Gopinath (1997), p. 102-105.

3) See Meese and Rogoff (1983a,b) and Frankel and Rose (1995).

bances. Stabilizing the nominal exchange rate, for example, in response to a dramatic deterioration in a country's terms of trade, can have serious adverse effects on output and employment if there are rigidities in nominal nontraded goods prices.

In recent years, the mechanism of fixed exchange rates has been in far wider use as a device for establishing anti-inflation credibility than as device for using monetary policy to stabilize output. This has especially been the case for countries trying to achieve a sharp reduction in moderate to high inflation rates. Italy, Spain and other European countries have succeeded in reducing their moderate rates of inflation by pegging to the DM. Countries such as Mexico, Indonesia, Russia and Poland, succeeded in bringing inflation down from very high levels by pegging to the dollar. The logic of a currency peg is simple. If the monetary authorities can tie down the nominal price of highly traded goods, then other prices must eventually come into line, given that money is neutral in the long run. Currency pegs have a certain immediate transparency that is at least superficially appealing. Private agents can far more easily verify that the monetary authorities are sticking to a currency peg than, say, a monetary target. Perhaps due to this transparency, several countries have succeeded in adopting currency pegs in circumstances of virtual macroeconomic chaos, making it (seem to be) a useful early step on the road to economic reform.

III. Problems with Sustaining Fixed Rates

There are, unfortunately, some clear drawbacks to the strategy of exchange-rate based stabilization. The most serious problem is that countries using an exchange-rate peg as an anti-inflation device typically experience sustained sharp increases in the real exchange rate, often for a period of several years. That is, even though the authorities may stick to the exchange rate peg, inflation tends to come down only gradually over several years. The initial rise in the real exchange rate is a standard by-product of unanticipated monetary contraction. Over the medium term, however, the real exchange rate appreciation is often sustained by other factors. This is especially the case if capital inflows help finance an increase in traded goods consumption and in investment. In that case, the price of nontraded goods will also be bid up, leading to a rise in CPI inflation and an appreciation of the real exchange rate. This process is sharply reversed, of course, during a debt crisis when capital suddenly flees the country. If prices are rigid downwards, then, during the downturn, there can be very sharp drops in output and steep rises in unemployment. Despite these drawbacks, some proponents of exchange-rate based stabilization plans argue that, nevertheless, exchange rate pegs are preferable to other mechanisms for wringing high and unstable inflation out of the economy.

Perhaps the most serious problem with an exchange rate peg, however, is that it only provides a firm anchor for inflation expectations if agents expect the peg to stay in place for a sustained period. It is not enough to maintain the peg today. Both home and foreign agents must be convinced that the peg can be maintained well into the future. The problem is easily illustrated using a simple monetary model of the exchange rate:

$$m_t - e_t = \eta [i_t - i_t^*]$$

$$E_t(e_{t+1} - e_t) = i_t - i_t^*$$

where m_t is the log of the domestic money supply, e_t is the log of the exchange rate, i is the home nominal interest rate, i^* is the foreign nominal interest rate, and $E_t(e_{t+1} - e_t)$ is the expected rate of change of the log of the exchange rate. If the peg is a fully credible fixed rate (with no bands), then $E_t(e_{t+1} - e_t) = 0$, and $i_t = i_t^*$.

If, however, if the current rate is pegged but investors believe the exchange rate will be allowed to depreciate in the immediate future, then $E_t(e_{t+1} - e_t) > 0$, and $i_t > i_t^*$.

Essentially, a speculative attack begins when domestic interest rates rise sharply because investors doubt the long-term viability of a peg. Provided the monetary authorities have sufficient assets to repurchase the monetary base, the exchange can still be pegged in the face of speculation, but only at the price of allowing a rise in the interest rate. Unfortunately, a sustained rise in short-term interest rates can have catastrophic consequences for domestic banks, which borrow short and lend long. It can also sharply dampen aggregate demand and investment activity. Thus, even though the monetary authorities may have the resources to repurchase the monetary base, they may be unable to stare down speculators in the face of sustained pressure. The spectacular case of Sweden in 1992, when a key indicator short-term rate was allowed to exceed 500% (and broader market measure of short-term rates exceeded 50%), illustrates how even a determined monetary authority may have to allow an exchange rate collapse if pressure is sustained. In contrast, the Hong Kong monetary authorities were able to fend off a speculative attack in October 1997 by raising interest rates for a relatively short period of time. Brazil also succeeded in fending off a speculative attack early this year by sharply raising interest rates.

The fine line between a successful currency defense and a costly collapse shows the profound strategic problem facing a monetary authority whose currency is subject to speculative attack. If the authorities do not adjust the money supply in response to the peg, then the currency collapses immediately. If the monetary authorities wish to respond aggressively, they must typically be willing to use large quantities of foreign exchange reserves to soak up excess domestic liquidity. If the attack fails, the cost of

the defense is modest since, once expectations stabilize and demand for domestic currency is restored, foreign exchange reserves can be replenished at the same price they were originally sold for (ignoring transactions costs). On the other hand, if the defense fails, then the monetary authority incurs a potentially catastrophic capital loss. The Bank of England is rumored to have lost in excess of \$7 billion during the September 1992 speculative attack on the pound; the Bank of Thailand suffered losses of a similar order of magnitude in the 1997 attack on the Baht. With the benefit of hindsight, one can easily say that in both cases, the central banks should have backed off immediately and allowed the exchange rate to depreciate without squandering precious resources on a futile defense of an untenable rate. But in practice, the central bank does not know for sure the extent and depth of a speculative attack, and whether it will be overwhelming or not. If the central bank were to always abandon the rate even in the face of a small attack, a fixed rate could not be sustained for any length of time. Similarly, if private agents knew exactly at what point the central bank would surrender, it would be difficult indeed for the monetary authorities to withstand attacks indefinitely.

Proponents of currency boards have argued that these eliminate any possibility of speculative attack since the currency is fully backed. But this is quite naive. In fact, as Obstfeld and Rogoff (1995) show, the vast majority of the countries whose currencies were subject to speculative attacks during the 1990s had sufficient resources to repurchase their entire monetary base. Thus, even though these countries did not have rigid currency boards, no level of speculation could have defeated a determined defense of the currency. The exchange rate fixes collapsed because ultimately the monetary authorities had other objectives besides the exchange rate fix. The popular misconception that large international capital flows can overwhelm any monetary authority is patently incorrect. However, the monetary authorities typically do care about the health of the banking system (often under their hat as lender of last resort), and more generally about the health of the economy. Thus, if speculation is sustained, high interest rates may still cause the monetary authorities to back down and let the currency float, thereby making expectations self-fulfilling.

IV. The Longevity of Fixed Rates in Practice

Maintaining a pegged exchange rate for a limited period of up to a couple years is an achievement that many countries have been able to accomplish during the floating era. However, maintaining a fixed exchange rate over a longer period, of say five to ten years, has proven remarkably difficult. Over the course of the 1990s, speculative attacks have brought down one fixed exchange rate after another. Indeed,

if one uses the Bretton Woods criteria — which required that exchange rates be fixed within \pm one percent bands — only a very small handful of major economies with open capital markets have held an exchange rate fixed for more than five years, against any currency or basket of currencies. The evidence is presented in table 1, which updates a similar table from Obstfeld and Rogoff (1995). In comparison with the earlier table, there is one significant addition. Argentina has maintained a fixed rate against the US dollar since June 1991 if one uses one percent bands, and since April 1991 if one uses two percent bands. Thailand, whose resiliency we questioned, appeared in the 1995 table but, of course, does not appear today. The reader may be surprised that more countries from the EMS, countries such as France, do not appear on the table. Admittedly, this is partly an artifact of the arbitrary five-year cutoff point, since France's peg to the DM misses by only a few months. The EMS system is quite exceptional, of course, since its stability has been underpinned by the steady progression towards a single currency in Europe. This type of fixed rate system, if and when it is achieved, should prove far more stable and durable than the conventional types of fixed rates covered in table 1.

Clearly, sustained fixed exchange rate regimes are the exception rather than the rule. This presents the fundamental conundrum of any effort at exchange rate stabilization in the modern era. A country may be able to fix its exchange rate temporarily, but eventually it is likely to collapse. How can the monetary authorities engineer the economy so that there is a soft landing after the collapse, without undermining the fixed rate entirely?

Fixed Rates Lite and Fixed Rates Stout: Target Zone Exchange Rate Systems and Currency Boards

Some advocates of fixed exchange rate systems accept the limitation of standard Bretton Woods type fixed rates, but argue that there are other variations of fixed rates that can work. At one extreme are advocates of "target zone" exchange rates with wide bands such as the EMS employed during the years following the crises of the early 1990s. Wide bands, so the argument goes, help cushion the effects of speculative movements, and offer the monetary authorities a measure of monetary independence that would be impossible under more rigid systems with very narrow bands. Unfortunately, this argument is highly suspect. Very wide bands (the EMS bands were \pm 15%) postpone the day of a speculative attack. But if they are too broad, the stabilizing effect of the bands is negligible. At the time, if the exchange rate were to ever drift to the edge of the band, the same credibility problems arise as under more rigid fixed rate systems. The monetary authorities can, of course, realign the bands before the exchange rate hits any kind of region where an attack might become likely. But if agents come to expect that the bands will be always moved, then the difference between a soft target zone and unfettered exchange rate flexibility

[Table 1] Countries that have Maintained Fixed Exchange Rates for Five Years or More (May 1998)^a

Group 1a: Major Economies with Open Capital Markets

Country	Fixed against	Fixed Since ($\pm 2\%$ bands)	Fixed since ($\pm 1\%$ bands)
Argentina	U.S. dollar	April 1991	June 1991
Austria	German mark	September 1979	January 1990
Hong Kong	U.S. dollar	October 1983	October 1983
Luxembourg	Belgian franc	1945	1945
The Netherlands	German mark	March 1983	August 1992

Group 1b: Developing Countries and Oil Kingdoms with Limited Capital Mobility

Country	Fixed against	Fixed Since ($\pm 2\%$ bands)	Fixed since ($\pm 1\%$ bands)
Egypt	U.S. dollar	May 1991	October 1992
El Salvador	U.S. dollar	August 1992	September 1992
Estonia	Deutsche Mark	June 1992	
Jordan	U.S. dollar	October 1992	June 1995
Saudi Arabia	U.S. dollar	March 1985	June 1986

Group 2: Small Economies Pegging to or Using the U.S. dollar

Country	Fixed against	Fixed Since ($\pm 2\%$ bands)	Fixed since ($\pm 1\%$ bands)
Antigua & Barbuda	U.S. dollar	May 1976	May 1976
Bahamas	U.S. dollar	1949	1949
Bahrain	U.S. dollar	January 1978	July 1979
Barbados	U.S. dollar	July 1975	July 1975
Belize	U.S. dollar	January 1977	January 1977
Djibouti	U.S. dollar	February 1973	February 1973
Dominica	U.S. dollar	May 1976	May 1976
Grenada	U.S. dollar	May 1976	May 1976
Marshall Islandsb	U.S. dollar	1986	1986
Micronesiab	U.S. dollar	1986	1986
Omanb	U.S. dollar	January 1986	January 1986
Panamab	U.S. dollar	1934	1934
Qatar	U.S. dollar	May 1979	November 1979

Country	Fixed against	Fixed Since ($\pm 2\%$ bands)	Fixed since ($\pm 1\%$ bands)
St. Kitts & Nevis	U.S. dollar	May 1976	May 1976
St. Lucia	U.S. dollar	May 1976	May 1976
St. Vincent & Grenadines	U.S. dollar	May 1976	May 1976
United Arab Emirates	U.S. dollar	June 1979	January 1980

Group 3: Small Economies Pegging to or Using Nondollar Currencies

Country	Fixed against	Fixed Since ($\pm 2\%$ bands)	Fixed since ($\pm 1\%$ bands)
Bhutan	Indian rupee	1948	1948
Brunei	Singapore dollar	1967	1967
Kiribati ^a	Australian dollar	1979	1979
Lesotho ^c	South African rand	1966	1966
Liechtenstein ^a	Swiss franc	1921	1921
Monaco ^b	French franc	1865	1865
Namibia	Australian dollars	1968	1968
Nauru ^a	Australian dollar	1968	1968
San Marino ^a	Italian lira	1897	1897
Swaziland ^c	South African rand	1968	1968
Tuvalu ^a	Australian dollar	1979	1979
Vatican City ^a	Italian lira	1930	1930

Notes: a. The periods of exchange-rate fixity given in the table are longest continuous periods uninterrupted as of June 1995. The table excludes countries that have not continuously fixed a foreign exchange rate for their currency over the period from July 1990 to June 1995. Also excluded are Myanmar and Seychelles, which peg their currencies within bands to the Special Drawing Right (since 1977 and 1981, respectively), and Liberia, Syria, Yemen and Iraq, which peg to the U.S. dollar. All of these countries have closed capital markets. The table omits a large number of semiautonomous states, colonies or territories, such as Anguilla, Bermuda, the Cayman Islands, the Falkland Islands, the Pitcairn Islands and Puerto Rico.

b. There is no domestic paper currency. Instead, the economy uses a foreign currency, and this is "dollarized" rather than having a true fixed exchange rate. Andorra, which is omitted from the table, uses the French franc and Spanish peseta. Its lack of a local currency seems to go back as far as 1278, when Andorra ceded the right to domestic coinage in a treaty between the Bishop of Urgel and the Count of Foix. Our list also excludes a number of other dependencies such as the Faroe Islands (Danish krone since 1940), the Falkland Islands (pound sterling since 1899), etc.

c. Lesotho, Namibia, Swaziland and South Africa are all part of the Common Monetary Area. Lesotho, Namibia and Swaziland used the rand while they were part of South Africa. Following their independence dates (1979, 1990 and 1986, respectively) all switched to their own currencies, which are pegged at par with the rand. The South African homelands also use the rand.

becomes only a matter of semantics.

At the other extreme are currency boards, which offer rates that are more rigidly fixed than under standard "fixed" rates. Under a currency board, at least in its purest form, the monetary authority should always have sufficient foreign currency to fully back the fixed rate. A currency board also places sharp limitations on central bank lending to private banks, so that the central bank is precluded from using the printing press to back up any lender of last resort role that it may have. Proponents argue that currency boards are so credible that speculative attacks are rare and easily beaten back. As we have already seen, a country whose peg is highly credible has a much easier time enforcing it than a country which must endure sustained high interest rates to ward of speculators. Our list of successful five-year fixers in table 1 includes Hong Kong and Argentina, two poster countries for the currency board approach. Whether these currency boards will prove a lasting feature of the international monetary system, however, remains to be seen. Argentina's currency will come under very strong speculative pressure when Brazil's currency eventually collapses. Hong Kong's ability to back its currency relies on China's willingness to put stability of the Hong Kong dollar above other uses of its foreign exchange reserves. The day may come when Peking ultimately attaches higher priorities - such as stabilizing the yuan - to its foreign currency reserves. Currency boards - "fixed rates stout" do not make a fixed exchange rate immutable.

V. The Connection Between Speculative Attacks on Fixed Exchange Rates and Debt Crises

Economists can reliably predict that most fixed exchange rates systems will not last for more than a few years at most. But while standard theory suggests a number of variables which might be important in deciding when an exchange rate starts to become susceptible to attack, predicting the exact timing of the collapse is quite difficult. As table 2 illustrates, many East Asian countries were running sustained

[Table 2]

Current Accounts

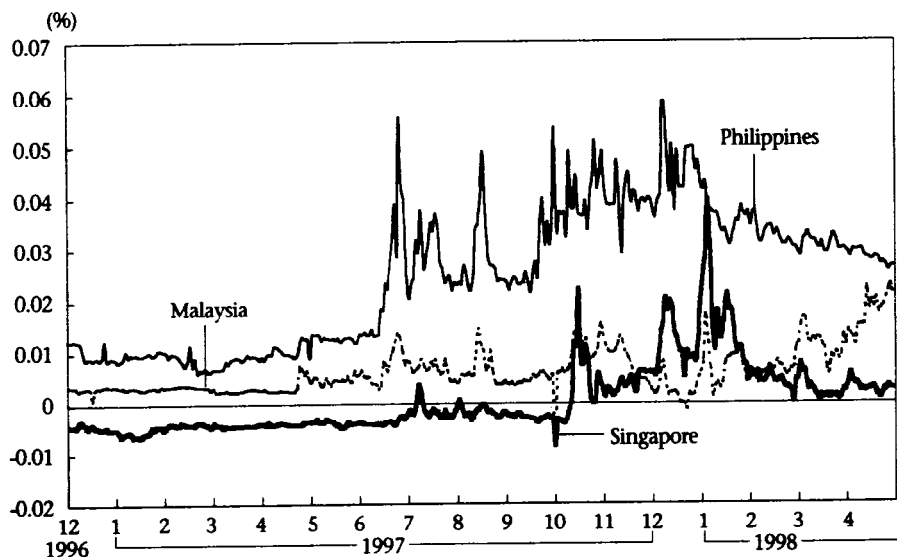
(% of GDP)

	1990	1991	1992	1993	1994	1995	1996
Korea	-1.24	-3.16	-1.70	-0.16	-1.45	-1.91	-4.89
Indonesia	-4.40	-4.40	-2.46	-0.82	-1.54	-4.25	-3.41
Malaysia	-2.27	-9.08	-4.06	-10.11	-11.51	-13.45	-5.99
Philippines	-6.30	-2.46	-3.17	-6.69	-3.74	-5.06	-5.86
Thailand	-8.74	-8.61	-6.28	-6.50	-7.16	-9.00	-9.18

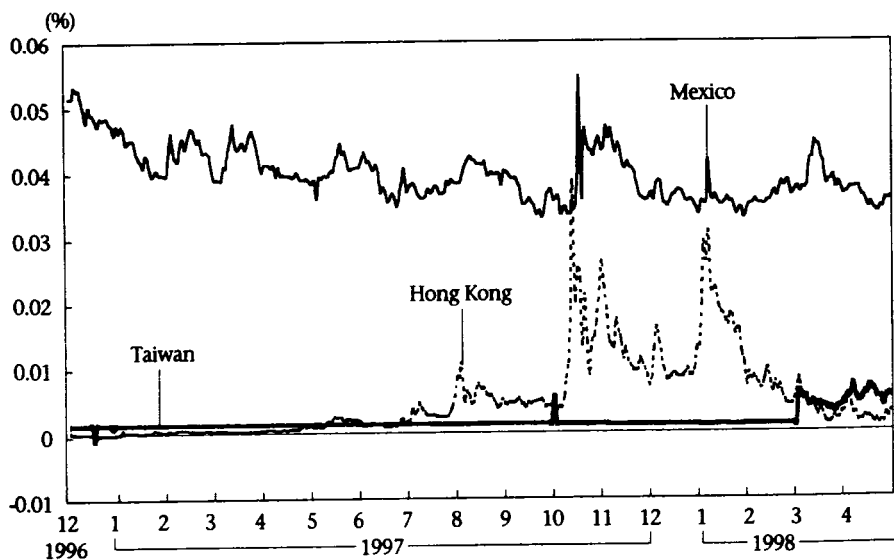
Source: International Financial Statistics

[Figure 1]

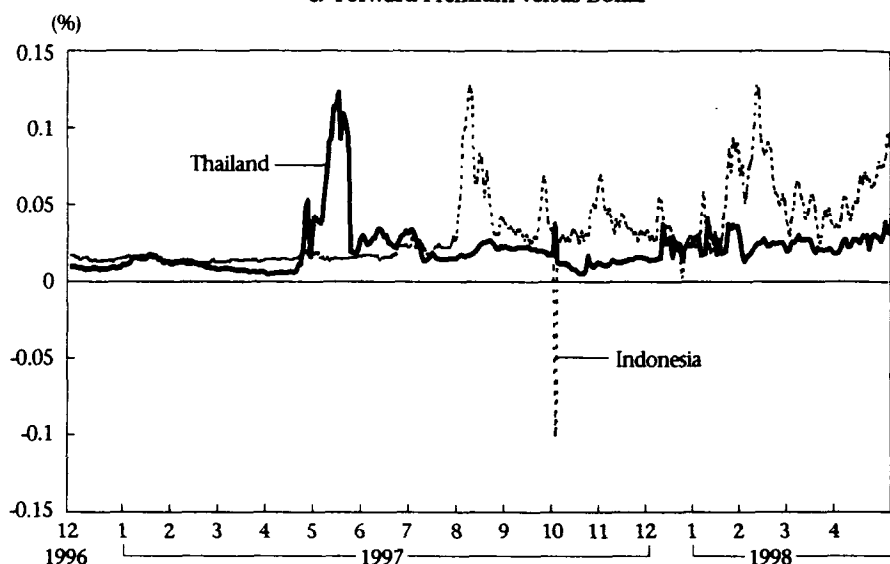
a. Forward Premium versus Dollar



b. Forward Premium versus Dollar



c. Forward Premium versus Dollar



current account deficits prior to the crises. But while investors might have been plausibly concerned that the East Asian countries would not be willing to bear excessively large debt burdens, the timing of the reversal of these flows would not have been easy to predict, especially given the record of strong growth in the region. Indeed, as figures 1a- 1c illustrate, whereas three-month forward exchange rate premia appeared to reflect some small anticipation of devaluation during the first part of 1997, the premia were under 2% and generally under 1% (in contrast, say, to the much larger premia for Mexico over the same period, given in figure 1b). The failure of investors to substantially anticipate an attack until the month of the crisis is not unusual; it is rare to see truly large (five percent or more) forward premia six months prior to a speculative attack. (See the evidence Svensson and Rose (1995) and the evidence cited in Obstfeld and Rogoff (1996).)

The fact that speculative attacks are not presaged long in advance by interest differentials is something of a puzzle. True, in non-stochastic "first-generation" speculative attack models [e.g., Krugman (1979)], the home interest rate remains equal to world interest rate right up to the moment of attack. Only after the attack does the interest rate rise to its new, higher, steady level. But in a stochastic version of the same model, this would not be the case. As reserves trend downwards, the probability increases that a large shock will force a shift to floating rates increases. Thus one would expect that the typical speculative attack would be preceded by a period of rising interest rate differentials. The interest differentials in figures 1 do

show a run-up as the theory predicts but, superficially, at least, one would expect the run-up to occur longer in advance than appears to be the case in the data.

One possible explanation for this phenomenon is that the true process governing speculative attacks does indeed depend on fundamentals, but in a way that is highly non-linear. Many researchers have concluded, however, that a more likely explanation is that speculative attacks are most typically a "bubble" phenomenon of the type that appears to drive many other asset prices. "Second-generation" speculative attack models [e.g., Obstfeld (1994) or Obstfeld and Rogoff (1996, ch. 9)], imply that speculative attacks can be a self-fulfilling prophecy. Thus, it is perfectly possible to have a situation in which a fixed exchange rate can be sustainable, provided investors believe it will be sustained. But if for some extraneous reason investors believe that the authorities will not stick to the peg, then an attack will be successful. The high interest rates caused by the loss of confidence in the currency will induce the monetary authorities to abandon the peg, much as we discussed in section III above. According to these multiple equilibrium models, speculative attacks do not occur completely out of the blue. If the fundamentals are sufficiently strong, attacks are impossible. If the fundamentals become sufficiently weak, then again the multiplicity disappears, but now the only equilibrium is one in which the attack occurs immediately. There can, however, be an intermediate range of values for fundamentals so that an attack is a probabilistic phenomenon.

Are second-generation models more consistent with the forward rate data in figures 1 than are first-generation models? Perhaps, but only to a modest extent. A model that predicts that an attack can happen anywhere, anytime, regardless of fundamentals, might explain why interest differentials are so small. But second-generation models are not this nihilistic. They predict that countries with weaker fundamentals are more at risk, much the same as first-generation models do. The only difference is that "sunspots" form an additional random element. So the fact that second-generation models give somewhat weaker predictions than first-generation models - and therefore do not patently contradict the data - should only be of limited comfort.

Attacks on a country's foreign debt can also be subject to speculative attacks, independent of the exchange rate regime. This is especially the case if a country's government issues a large quantity of short-term maturity, foreign-currency denominated debt. Since a government's assets (chiefly the present value of future tax payments) are typically quite illiquid, a government with high short-term debt has the same kind of maturity mis-match as in the classic Diamond-Dybvig (1983) bank run model. Absent a lender of last resort, self-fulfilling debt crises are possible. Though it is not easy in practice to distinguish between debt runs due to adverse fundamentals (such as a sharp rise in world real interest rates) and debt runs that are

"panics", it seems likely that the flight from Mexican debt in 1994 had an important "panic" element to it.

Are speculative attacks on exchange rates and debt runs at all linked? If both types of attacks are essentially self-fulfilling prophecies, then certainly they can be linked by expectations. The same extraneous "sunspot" event that triggers a speculative attack on the exchange rate can trigger a speculative attack in which investors refuse to roll over a country's short-term maturity debt. This connection is one interpretation of the 1994 Mexican crisis, in which debt problems and an exchange rate run occurred on top of each other. But there are also, other, more fundamental links. A country may lose so much in foreign exchange reserves when unsuccessfully defending against a challenge to its fixed rate, that its debt position becomes weaker. Thailand, which lost vast reserves in the forward exchange market in 1997, is an example of this kind of connection. There can also be a link through domestic banks. If domestic banks have large unhedged foreign exchange liabilities, then a sharp fall in the exchange rate can lead to large losses which fall, in turn, on the government. If so, then the government's own debt rating may become severely compromised. There seems little question that in the case of the 1997 Asian crises, countries with stronger prudential regulation of their financial systems (e.g., Australia) were much more successful in avoiding the worst costs of the problem.

Finally, we note that if crises are essentially "panics," then they may easily spread if investors link countries within a region in forming expectations. If linked expectations were the primary cause of contagion, then the case for having an international lender of last resort would be strengthened.

Can we conclude then that a fixed rate regime is definitely a lightning rod for speculative debt attacks? Do countries with fixed rate regimes run a significantly greater risk of a broader capital market panic than countries with a floating rate? The answer is probably yes. As we have stated, a country adopting a fixed exchange rate definitely risks setting off a broader debt run in several ways. A large loss of reserves may trigger a sovereign debt panic. If a fixed exchange rate system lulls banks into take on too much foreign-currency denominated debt, and if the regulatory authorities do not recognize the dangers, then a fixed rate also amplifies the probability of a speculative attack. Finally, the fall of a fixed rate is certainly a more dramatic event than when a floating exchange rate depreciates by the same amount. The drama of the collapse of a fixed rate focuses investors' attention, and makes it more likely that speculation against a country's currency will have a broader spillover. Though economists can hardly be confident of this link, absent confidence over the "right" model of speculative exchange rate attacks, the concern is clearly a very serious one.

VI. Alternatives for Monetary Policy in an Open Economy

The theory and evidence on fixed exchange rates suggests that most countries would be wise to forgo the instant gratification of exchange-rate based stabilization policy in favor of other mechanisms to promote low inflation. Establishing an independent central bank, and putting in place a leadership strongly committed to low inflation, both through preferences and incentives [as I recommend in my (1985) paper] would seem like a better approach, at least outside situations of extreme economic and political chaos. Although establishing a strong independent central bank may take longer than instituting an exchange rate fix, it is a much more stable and effective approach over the longer term. An exchange rate fix may have an immediate effect on traded goods prices, but its effects on nontraded goods prices and on wages will be very slow if it lacks credibility. Consequently, the output costs of an exchange rate fix may ultimately be much higher. And these costs are greatly amplified by the potential for speculative attacks. Even in countries that risk exchange rate pegs, establishing a strong independent central bank with a strong aversion to inflation is an important way to keep down inflationary expectations.

One may argue that recommending central bank independence may be folly in countries where the political culture makes the concept of institutional independence relatively meaningless. But the fact is that over the past ten to twelve years, dozens of countries with vastly differing political systems and cultures have been successful in setting up an independent central bank, indicating that institution is more robust than it might seem.

The issue of optimal central bank design is a topic for another paper. How much of the central bank's anti-inflation credibility should derive from the reputation of its leadership, and how much should derive from checks, balances and incentives that the government places on it? One should be skeptical about naive engineer-like models that treat inflation targets as a panacea, independent of uncertainty about the preferences of the central bank.⁴ But overall, this approach seems far more promising than the more mechanical one of adopting a pegged exchange rate system.

VII. Capital Controls

The scourge of speculative attacks in the 1990s has led many to conclude that countries should rethink the benefits of free trade in securities, and consider putting

4) See the discussion of incentive contracts for central bankers in Obstfeld and Rogoff (1996), chapter 9.

on various types of capital controls. These voices have been strengthened by academic analyses, influenced by Lucas (1988), suggesting that the benefits to capital market integration may not be all that large in welfare terms, anyway. Whereas as a careful analysis of this topic is certainly beyond the scope of this paper, the issue has such a large effect on the implementation of monetary policy that it still requires some discussion. I first take up the academic literature.⁵⁾

In a highly influential paper, Lucas (1988) argued that the costs of output volatility must be relatively small in welfare terms compared to the benefits of very small increases in an economy's growth rate. Aggregate consumption volatility for most OECD economies is relatively small. If, as Lucas posits, agents can costlessly diversify idiosyncratic individual income volatility, then the marginal benefits to eradicating the aggregate consumption volatility that remains must be very small. Cole and Obstfeld (1990) showed that in an international context, the welfare benefits to trade in a rich menu of securities is not necessarily all that large if countries can already trade in riskless bonds. Whereas one can find ways to amplify the benefits of international capital market integration (e.g., through growth effects as in Obstfeld (1994)), overall the theoretical literature seems to suggest that the benefits are not that large, especially compared with the apparent risks.

The literature on the welfare benefits of capital market integration should not be interpreted as fortifying the case for controls on short-term capital flows. The reason is that the literature largely compares a world in which there is perfect trade in bonds with a world in which there is perfect trade in all securities. If one calculates the costs of total capital market autarky - including autarky from borrowing and lending - then the costs can be an order of magnitude greater than if trading in bonds is allowed. And it is precisely trade in bonds, especially short-term bonds, which seems to engender the greatest prospects for speculative attacks. Capital controls that dampen all bond lending could thus have great costs. Most plans to institute capital controls generally aim at only cutting off short-term maturities, as in the case of Chile. But long experience has shown that without high liquidity at the short end of the market, the ability of the economy to intermediate long-term loans is greatly reduced. The United States short-term interest market is the deepest and most liquid in the world, and its existence has allowed an incredible array of innovations to facilitate longer-term lending. In sum, one must be skeptical of reading the academic literature as saying that the welfare costs of controls on short-term lending are necessarily quite small.

Of course, there is the broader question of whether capital controls can work in practice. The existence of such controls leaves enormous scope for corruption, lack of

5) Obstfeld and Rogoff (1996), chapter 5, surveys and exposit the literature on the welfare benefits of international capital market integration.

transparency and inefficiency. In today's ever more sophisticated markets, it is not at all clear that controls would work for any length of time, even if they have worked in the past. For these reasons, one must be very cautious in recommending capital controls as a panacea. The issue clearly merits further analysis and investigation,

VIII. Conclusions

The lessons of the Asian financial crises are still being absorbed. Certainly, while many predicted an eventual, if gradual, slowdown in Asian growth, the vast majority of policymakers, investors, and academics failed to anticipate the depth, voracity and breadth of the crisis. But it cannot be said that academic economists failed to warn policymakers about the dangers of trying to peg currencies closely to the dollar, or any other major currency for that matter. In today's world of highly mobile capital, unilateral exchange rate pegs almost invariably go up in flames at some point. If the central bank is fortunate not to suffer huge capital losses in a losing cause, if it is not forced to bail out too many private banks which failed to hedge foreign currency liabilities, and if the loss of confidence does not trigger a debt crisis, the collapse of a fixed exchange rate (or the sharp depreciation in an exchange rate which had been tightly managed if not literally fixed) will not necessarily end in calamity. But these are big "ifs". It is not easy for a central bank to know when to back down in defense of its currency, since it cannot simply fold every time speculators test the peg. Fixed exchange rates can easily lull both banks and regulators to neglect the dangers of large unhedged foreign exchange liabilities. And the collapse of an exchange rate which had long been kept highly stable can easily lead to a broader collapse in confidence in a country's bonds and foreign debts. Any attempts to peg exchange rates, from Bretton Woods type narrow bands, to 15% bands of the EMS "fixed rate lite" system of the mid-90s, to currency boards, risks setting up a lightning rod for a broader attack. There are many other important lessons to learn from the Asian financial crisis, not least of which is the importance of prudential financial market regulation, and the dangers to the international financial system of not having a well-designed lender of last resort. But all of these problems are exacerbated by a regime of pegged rates. Unfortunately, a number of countries still rely on various forms of unilateral exchange rate pegs, and so the world has surely not witnessed the last of the problems such pegs can cause.

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