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Crawling Bands or Monitoring Bands: How to Manage Exchange Rates in a World of Capital Mobility

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Abstract

This paper discusses the choice of exchange-rate regime. It is argued that in general floating is undesirable, because of the extreme weakness of the economic mechanism that holds the exchange rate close to a level consistent with the fundamentals. Of the alternatives, fixed rates can occasionally make sense, where several conditions are all satisfied. But under current conditions of high capital mobility the more prudent choice will in most cases be a system of limited flexibility, in the form of a 'crawling band' (a wide band that is adjusted in small steps so as to keep it in line with the fundamentals, but is defended in the traditional ways) or possibly a 'monitoring band' (a wide band with similar properties, which is defended only when the rate goes outside the band).

Much of the economics profession continues to debate the question of exchange-rate policy as though the only alternatives are to fix the exchange rate or to let it float freely. A number of economists explicitly argue that either

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of those alternatives should be preferred to any intermediate regime. A third view is that all the interesting issues – and indeed virtually the only ones of any policy relevance – concern how to design and operate an intermediate regime. This paper is written by one who subscribes to the latter position.

The paper starts with a discussion of why floating exchange rates are undesirable. Having established the presumption that some alternative is usually to be preferred, the paper elaborates the rigorous conditions under which a fixed exchange rate makes sense, and then describes the two intermediate regimes that seem most attractive under present circumstances of high capital mobility, namely the 'crawling band' and the 'monitoring band' (a term and concept introduced by the Tarapore Committee in 1997).[1] This is followed by a discussion of the problems of operating a band, in which I argue that, while a crawling band is more likely to deliver the fundamental benefit of a band regime, a monitoring band has the attraction of being more robust.

I. The Case for Rejecting Floating

If the foreign-exchange market behaved as it is assumed to do in economics textbooks, with ubiquitous rational expectations as the driving force, it is indeed difficult to imagine why anyone would not want to allow the exchange rate to float (at least for countries that do not satisfy the conditions to be part of an optimum currency area). Since most economists like to assume that their models do indeed describe the real world, to some reasonable approximation, it is not difficult to understand the appeal of floating to the profession.

The case for rejecting floating is based on the evidence that asset markets in general, and the foreign-exchange markets in particular, are driven by herd behaviour rather than rational expectations. The best documented case is that of the dollar bubble of the mid-1980s. Note that labelling this a 'bubble' is not being wise after the event: Krugman 1985 and Marris 1985 both used economic analysis to demonstrate decisively *ex ante* that the dollar was

[1]The Tarapore Committee was set up by the Indian government in early 1997 and reported in May 1997. It was chaired by S. S. Tarapore, a former Deputy Governor of the Reserve Bank of India, and also consisted of Surjit Bhalla, M. G. Bhide, Kirit Parikh and A. V. Rajwade. The Committee recommended a three-year timetable for India to move to capital account convertibility, arguing that the establishment of fiscal discipline and a solvent, competitive and well-regulated banking system were necessary preconditions for capital account convertibility that could be established within the three-year time frame. It also recommended that India adopt what it termed a monitoring band, and it is this recommendation that is examined in this paper.

overvalued. Frankel and Froot 1986 and 1987 showed how the dollar bubble led portfolio managers to place overwhelming weight on 'technical' (i.e. chartist) forecasts, with 'fundamental' (i.e. economic) factors, as at least potentially determined by rational expectations, being essentially dismissed because of their repeated error over the preceding years in forecasting the reversal of the dollar's rise. This dismissal in turn supported the dollar's continuing levitation until the authorities realized that something had to be done to restore the dollar to a level consistent with the fundamentals. Some of us can still recall encountering rank disbelief on Wall Street prior to the Plaza Agreement when we explained that the dollar's overvaluation would have to be corrected sooner or later.

Subsequent events do not suggest that the dollar bubble was a one-off event, or that the markets have now learned the error of their ways. The yen's great roller-coaster has been the principal recent event among the industrial-country currencies: practically everyone knew that the yen was overvalued long before it reached 80 to the dollar, yet it continued to and through that mark. The overshooting of the East Asian currencies (including the yen) in the second half of 1987 was even greater: while one can understand the extreme weakness of the Indonesian rupiah as a result of capital flight driven by fears about the political succession, no similar explanation is available for the other currencies of the region. There was instead an obvious and extreme lack of the sort of stabilizing speculation that theory says one has to rely on to stabilize a floating exchange rate (McKinnon 1979).

The suspicion about the behaviour of the foreign-exchange market aroused by these anecdotes is confirmed by the empirical evidence on floating exchange rates. For a while this empirical evidence suggested that exchange rates show no tendency to revert to equilibrium, but tend rather to follow a random walk. It is still true that a random walk outperforms any of the structural models of exchange-rate determination for time horizons of less than a year, but there is now fairly conclusive evidence that a floating exchange rate will tend to revert slowly towards relative purchasing power parity (PPP), with half the adjustment being completed in something under five years (Rogoff 1996). However, there is also evidence to support the theoretical presumption that the equilibrium real exchange rate can change, rather than being a permanent constant as the PPP model assumes.[2] One can reconcile this with the empirical success of the long-run relative PPP model if random deviations from equilibrium tend to be large, relative to changes in the equilibrium real exchange rate.[3] Reflecting this near-random walk behaviour of a floating

[2]See the papers in Williamson 1994.

[3]The studies that have found evidence that exchange rates revert to relative PPP in the long run have not searched for changes in the equilibrium real exchange rate.

exchange rate, a change in the spot exchange rate is normally associated with an almost identical change in the forward rate (Svensson 1992, p. 132), signifying that there is a virtually complete lack of any market expectation that the exchange rate will revert towards an equilibrium level within any time horizon relevant to market participants.

Frankel and Rose (1994, p. 35) argue that matters may be even worse than this. They acknowledge that Frankel and Froot 1987 'found that investors tended to react to current appreciations by expecting future depreciations, consistent with either regressive expectations, adaptive expectations, or distributed-lag expectations, at time horizons of one year, six months, or three months'. This suggested that expectations appeared to be stabilizing. However, they go on to argue:

> Subsequent studies… indicated that investors at shorter horizons of one week to one month tend to extrapolate recent trends… Expectations at these short horizons appear to be destabilizing. Since most trading in the foreign exchange market is known to consist of taking and unwinding positions at horizons measured in hours rather than months or years, these findings have potentially serious implications.

The stylized fact, however, is that a change in the spot rate is normally matched by an equal change in the forward rate under floating. This implies that the net impact of all expectations, in the long- as well as the short-term, is typically neutral rather than destabilizing.

Many economists have been puzzled by the evidence that the market can disregard long-run fundamentals, for it raises the problem first posed by Friedman (1953) of how profits can be made from speculation that tends to destabilize the market. The most intellectually satisfying answer to this question is that offered by Krugman and Miller 1993, who postulate that, in addition to traders who wish to settle their current account transactions, the market contains speculators who behave like chartists, in following the market and stop-loss traders who invest abroad and choose to cover their foreign-exchange exposure against abnormally large losses. The way they do this is to place stop-loss orders at a rate that limits the maximum loss they may make. This involves their selling the foreign currency in which they have made their investment when it is extremely weak, and buying their home currency when it is strong, which creates the possibility for speculators who have collectively driven a currency down to an unrealistically low value to buy that currency from the stop-loss traders at a particularly cheap rate. In effect, the stop-loss traders buy insurance, and the speculators provide the insurance and take the profits.

Matters are very different in the presence of an exchange-rate band. While bands do not normally have full credibility, and while they sometimes lack any credibility at all, the evidence shows conclusively that, when a rate moves within a band, the forward rate normally changes by less than the spot rate, indicating that the market expects that the spot rate will tend to revert back toward the centre of the band (Svensson 1992, 132–33). In other words, except where a band has become clearly unrealistic, it performs the function of crystallizing market expectations of where the equilibrium rate lies, and thus makes expectations stabilizing at the time into horizons relevant for influencing market behaviour. This is the fundamental reason for preferring a band system rather than allowing the exchange rate to float.

It is sometimes asserted (e.g. by a referee of this paper) that the claim that a band can crystallize market expectations was refuted in Obstfeld's well-known paper on international currency experience in 1995. This is what Obstfeld said on the topic:

> One drawback of target zones is that they may not exert a stabilizing effect unless markets are confident that their edges will be defended successfully. The difficulties in defending rigidly fixed exchange rates, however, apply fully to the edges of target zones, as was illustrated in March 1995 by the Spanish peseta's crash out of a band much wider than most proponents of target zones advocate. If markets can figure out the fragility of the edges and perform the requisite backward induction, a target zone loses much of its stabilizing power. It may even become destabilizing.

Now it is not true that full credibility is necessary for a target zone to exert a stabilizing effect: it is well established that partial credibility means that the stabilizing impact of the target zone is attenuated, but that it still exists.[4] The fact cited above, that a movement of the spot rate within a band is normally accompanied by a smaller movement in the forward rate, while there is no such tendency with a floating rate, is conclusive proof that a band typically works as it is meant to in stabilizing market expectations. To counter this well-documented fact Obstfeld offers us one anecdote, about the Spanish peseta in March 1995. I confess that I have never understood why the Spanish authorities did not make more effort to defend the peseta at that time, any more than I can understand why the Indonesian authorities did not make an effort to defend the rupiah in August 1997 comparable to that made by the Brazilians when faced by a similar attack three months later. But even if the Spanish authorities indeed had no alternative, in the way that Obstfeld implies, it is a

[4]Krugman 1991; see also the discussion in Williamson 1996a, pp. 8–9.

sad reflection on the profession's standards of evidence if one anecdote is deemed to outweigh a well-documented finding such as that which I have cited above.[5]

II. Crawling Bands and Monitoring Bands

Given that floating should be regarded as a last resort, to be employed only by a country that cannot see its way to adopting an alternative less subject to what empirical evidence shows to be market whims, what are the other possibilities?

The traditional alternative is a fixed exchange rate. One proposition does seem to be widely accepted nowadays: that if one is going to fix the exchange rate, then one should do it properly, by adopting a currency board that will make it (almost) certain that the chosen rate can be defended against market pressure, rather than utilize a half-baked adjustable peg in which the rate is fixed until market pressure knocks the rate off its peg. But the conditions for a fixed exchange rate to be an optimal policy, which have been extensively studied in the optimal currency area literature, are demanding. The conditions under which I would personally recommend a fixed exchange rate are even more demanding, requiring that a country satisfy all four of the following conditions (Williamson 1991):

1. The economy is small and open, so that it satisfies the conditions for being absorbed in a larger currency area according to the traditional literature on optimum currency areas.
2. The bulk of its trade is undertaken with the trading partner(s) to whose currency (or whose mutually pegged currencies) it plans to peg.
3. The country wishes to pursue a macroeconomic policy that will result in an inflation rate consistent with that in the country (or countries) to whose currency (or currencies) it plans to peg.
4. The country is prepared to adopt institutional arrangements that will assure continued credibility of the fixed-rate commitment (which usually implies a currency board).

[5]Incidentally, Obstfeld also betrays his lack of understanding of the literature on limited exchange-rate flexibility in arguing that the difficulty of defending a rigidly fixed exchange rate applies fully to the edge of a target zone. To sell a currency that may depreciate when its exchange rate is rigidly fixed is to buy into a one-way option, as one can be quite sure that the currency under attack will not be revalued even if the speculative attack is successfully fended off. In contrast, a currency with a wide band may well appreciate within the band if the attack fails, implying that joining in such an attack involves an element of risk. This makes defence of the band easier.

When these conditions are not all satisfied, it will be sensible to opt for a system of limited flexibility. The systems that go under this heading include the crawling peg, the wide band, their fusion into target zones[6] (alias 'crawling bands'), and the latest addition, the 'monitoring band'. I propose to describe the two leading alternatives under present conditions of high capital mobility, the crawling band and the monitoring band, in detail.

A 'crawling band' involves a central bank undertaking a public obligation to maintain its country's exchange rate within a wide, publicly announced, band, around a parity that is periodically adjusted in relatively small steps in a way intended to keep the band in line with the fundamentals.[7] The band width has typically been envisaged as something like ±10% around parity, although Chile has recently employed a band of as much as 15% on either side of parity (similar to that adopted by the European ERM after the 1993 crisis). The principal cause of changes in the parity – the 'crawl' – is typically the inflation differential, to ensure that high domestic inflation does not lead to a progressive erosion in international competitiveness (although this compensation may be less than complete where a country is trying to reduce inflation and is prepared to see some loss of competitiveness in the cause of using the exchange rate as a nominal anchor). But countries may also crawl in order to facilitate current account adjustment, allowing a real appreciation following a positive shock (such as an upward revision in the estimate of medium-run capital inflows or the price of an important commodity export) or seeking a real depreciation following a negative shock. The purpose of making parity changes in relatively small steps is to avoid creating situations where the market is able to profit through correct anticipation of an impending parity change.

A crawling band is defended with the same tools that are used to honour any other exchange-rate commitment. The first line of defence involves intervention, which is obligatory when the exchange rate hits the edge of the band. Whether or not the intervention is sterilized depends on the judgment of the central bank, which has to decide whether the change in the monetary stance inherent in non-sterilization runs counter to the needs of the domestic

[6]The term 'target zone' was first used by Robert Roosa, and subsequently by other authors including myself, to mean a system which combined both flexibility in the parity and a wide band. But it was then pre-empted by Paul Krugman to mean simply a system with a wide band. Rather than have the same name applied to two different regimes, we have adopted Jacob Frenkel's term 'crawling band' to signify the regime that combines both features.

[7]Note that some countries that have employed a wide band, such as Mexico in the years leading up to the 1994 crisis, did not satisfy this latter condition. That is, Mexico tried to use its exchange rate as a nominal anchor, rather than making it an important policy objective to keep the exchange rate competitive. This resulted in the overvaluation that was the root cause of the crisis.

economy. For example, a country with an undesired inflow has to decide whether to sterilize this by selling bonds on the open market so as to keep the money supply constant. Even if it decides to sterilize in the first instance, it may be driven to a subsequent change in monetary policy if the exchange-market pressures persist. Other tools that may be used to help defend an exchange-rate target include capital controls, a market-friendly version of which is the obligatory reserve requirements against short-term foreign loans required in Chile and Colombia. To the extent that the market finds the commitment to defend an exchange-rate target convincing, it will itself help to defend the band even before the authorities intervene (Krugman 1991, Miller and Weller 1991).

There is now significant experience with the operation of crawling bands. I have examined how the regime operated in the first three countries to implement it, namely Chile, Colombia and Israel (Williamson 1996a), where I concluded that it had been quite successful in supporting macroeconomic policy, even in the face of strong capital inflows, where a floating rate would undoubtedly have resulted in a serious loss of international competitiveness. All three countries were successful in reducing inflation, in achieving growth, in maintaining their balance-of-payments position and in limiting speculative crises. Since then several other countries have also used the regime, notably Ecuador, Indonesia and Russia (see Table 1). But, while Russia appears to have had a favourable experience with the regime, it was, as noted above, abandoned in Indonesia in difficult circumstances in August 1997.

Indonesia's traumatic experience is worth recounting. The rupiah had been crawling for some time, with the crawl being used to neutralize the trade

Table 1: Known Cases of a Crawling-band Exchange-rate Regime[1]

	Period	Band Width[2]	Anchor Currency
Chile	1989–present	±15%	Basket
Colombia	1991–present	±7%	US$
Israel	1991–present	±7%	Basket
Indonesia	1997	±6%	Basket (*de facto* US$)
Ecuador	1995–present	±5.5%	US$
Russia	1996–present	±15%	US$

Notes: [1]A crawling band is defined as existing when a) the width of the band is at least ± or –5%, and b) the band is adjusted in small steps with a view to keeping it in line with the fundamentals (a requirement that excludes, *inter alia*, the ERM and Mexico).

[2]Maximum width over period under the crawling band regime. The entry for Ecuador is as of July 1997.

Sources: Williamson 1996a; EIU Country Profiles Ecuador 1996–97, Indonesia 1997–98, Russian Federation 1997–98; IMF Exchange Arrangements and Exchange Restrictions 1997.

effect of Indonesia's relatively high rate of inflation. The central bank began cautiously to widen the exchange-rate band in the mid-1990s, and by mid-1997, the band had reached a width of ±4%. On 2 July 1997, Thailand was forced by speculative pressures to allow the baht to float, when it promptly depreciated by around 15%. The rupiah initially remained at the strong edge of its band, and on 11 July the central bank announced that it was widening the band to ±6%, in what the author took to be a well-judged precautionary move in line with Indonesia's reputation for exemplary macroeconomic management. Just over a month later, however, Indonesia was hit by the contagion effect, and the exchange rate went from the strong edge of the band to the weak edge, and indeed slightly beyond it, all in one day. The next day (14 August) the rupiah was floated. It continued to depreciate in the following weeks and months, sometimes by as much as 10% in a day with virtually no apparent intervention, and was driven further downwards by desperate attempts by Indonesian borrowers to buy dollars to cover their external debt obligations. Because many Indonesian corporations had heavy short-term, foreign exchange-denominated borrowings, the depreciation of the rupiah after the move to floating had a catastrophic impact on their solvency. In due course the corporate dollar buying was reinforced by capital flight as ethnic Chinese began to fear a re-run of the troubles of 1966. The currency collapse was the proximate cause of what happened in Indonesia in the following months; had the band been successfully defended, there is no reason to suppose that Indonesia would not have been able to ride out the crisis as Malaysia and the Philippines did, despite its crony capitalism and the weaknesses of its banking and political systems, of which we are now so painfully aware.

Two aspects of this sad story are relevant to the debate about the choice of an exchange-rate regime. One is that a crawling band was abandoned when it was subjected to strong market pressures. The other is that the depreciation that followed the move to floating was a disaster for the Indonesian economy. Anyone who still believes that floating provides a robust defence against catastrophe (a view with which I must admit to having had some sympathy prior to the Indonesian events described here) needs to think again. It is perhaps unlikely that a country that has once adjusted to a floating regime would find itself vulnerable to depreciation in the way that Indonesia did: one can surely assume that people do not accept massive unhedged foreign-exchange exposure once they have learned that exchange rates are forever gyrating in ways that are essentially random. But, at the very least, an extra degree of circumspection is called for before advising a country that is already in trouble to shift to a floating regime.

Nevertheless, the fact that Indonesia encountered catastrophe as a direct consequence of abandoning the crawling band is not an unambiguous

recommendation for the latter, given that its abandonment was due to *force majeure*. Countries with crawling bands have previously had to accept limited depreciations or appreciations, or a widening of the band, in response to strong market pressure, and one may wonder whether the Indonesian authorities did not give in too easily when they abandoned the band so quickly. The Indonesians were holding over $20 billion in foreign-exchange reserves at the end of July, of which they used only $0.9 billion in August. But even if one could show that a more spirited defence of the existing band, or of a slightly depreciated or further widened band, could have succeeded, one still has to acknowledge the danger that a crawling band will not always be robust against strong market pressures.

Before concluding that this forces us back into acquiescing in a floating exchange rate, let us consider the alternative regime mentioned in the title of this paper, which the Tarapore Committee named a 'monitoring band'. The Committee explained its proposal in the following terms:

> 3.28. On the specific aspect of exchange rate policy, the Committee recommends that the RBI [Reserve Bank of India] should have a Monitoring Exchange Rate Band of ±5.0% around the neutral Real Effective Exchange Rate (REER). The RBI should ordinarily intervene as and when the REER is outside the band. The RBI should ordinarily not intervene when the REER is within the band. The RBI could, however, use its judgment to intervene even within the band to obviate speculative forces and unwarranted volatility. The Committee further recommends that the RBI should undertake a periodic review of the neutral REER which could be changed as warranted by the fundamentals.
>
> 3.29. The Committee stresses that credibility of the exchange rate policy would be vital in the context of CAC [capital account convertibility] and to this extent there must be transparency in exchange rate policy: (i) the neutral REER, i.e. the base period, should be announced, (ii) the REER Monitoring Band should be declared, (iii) the REER should be published on a weekly basis with the same time lag as the publication of the reserves, and (iv) changes in the neutral REER should be made public.

The key difference between a crawling band and a monitoring band is that the latter does not involve an obligation to defend the edge of the band. The obligation is instead to avoid intervening within the band (except in a tactical way, to prevent unwarranted volatility). There is a presumption that the authorities will normally intervene to discourage the rate from straying far from the band, but they have a whole extra degree of flexibility in deciding the tactics they will employ to achieve this. In particular, if they decide that market pressures are overwhelming, they can choose to allow

the rate to take the strain, even if this involves the rate going outside the band.[8]

People sometimes ask whether a monitoring band would amount to anything different to a floating regime. If the authorities choose not to defend the band, is that not floating? In practice, having a monitoring band may make a difference even if the authorities choose not to intervene, as long as the market knows that the authorities can employ policy weapons which they might wield at some future date in seeking to push the rate back within the band, and they know where the band is. This knowledge should make the market fearful of pushing the rate so far as to set up the conditions for a bear squeeze (or a 'bull squeeze'). Another possible reason is that the market may believe that the authorities have chosen a correct estimate of the long-run equilibrium rate in their positioning of the band, and this again may discourage the market from pushing the rate as far as it would otherwise go.

III. Problems of Managing a Band Regime

It is one thing to want to operate a band; it is another actually to make it work. Let us consider first the policy issues involved in operating the more familiar of the two systems, a crawling band.

One first has to decide in terms of what unit to define the band and its parity (i.e. its centre, or what the Tarapore Committee called the neutral exchange rate). The most common choice has been to use a major international currency, typically the US dollar, or less commonly the Deutschmark (and formerly the pound sterling), for this purpose. This has the advantage of simplicity, but it can also have a severe disadvantage for a country with a diversified trading pattern. Among the crawling band countries, Colombia trades overwhelmingly with the dollar area, and so it pegs to the dollar. But Chile and Israel have more diversified patterns of trade, and both peg to baskets.

The countries of East Asia also have highly diversified trade patterns, with Japan being an important import source and export competitor as well as an export market, and Europe also being a major trading partner. Despite this, all

[8]Those interested in the intellectual history of proposals for limited exchange-rate flexibility may care to note two antecedents of the monitoring band. The first is the 'reference rate proposal' of Ethier and Bloomfield 1975, which essentially proposed a monitoring band of zero width around an announced reference rate that would constrain intervention – a central bank could intervene only to push the exchange rate toward its reference rate, but it was not obliged to intervene if it did not wish to do so. The second is the 'soft margins' that accompanied my original proposal for 'target zones' (Williamson 1985), which would have allowed the authorities to let the rate move outside the target zone if they deemed market pressures too strong to resist without unacceptable cost to other objectives of economic policy.

these countries were more or less pegged to the US dollar in the mid-1990s. When the dollar collapsed in 1995, this meant that their effective exchange rates depreciated and they became hyper-competitive on world markets, sparking an export boom despite the Chinese devaluation of the preceding year. But when the dollar recovered in mid-1995 and continued to strengthen thereafter, they suddenly found that their competitive position was eroding, export growth slowed accordingly, and within two years their seemingly impregnable economies had gone into crisis. Given the underlying weaknesses in their banking systems that were exposed by the crisis, and the extent to which they had built up short-term international debts, one cannot be sure that these countries would not have run into crisis even if they had adopted the more rational policy of pegging to a basket of currencies that would have roughly stabilized their effective exchange rates (as suggested by Williamson 1996b).[9] But it seems clear that the actual policy of *de facto* pegging to the dollar was a contributory cause of the East Asian meltdown of 1997.

The second issue is to determine the value of the parity. Most countries face this issue in the form of deciding whether they should devalue or revalue a parity inherited from the past. Just occasionally, as with Indonesia in 1998, when it toyed with the idea of establishing a currency board, a country may confront the more difficult issue of deciding where to try to stabilize a currency that has been floating. One of the several compelling arguments against the currency-board idea being applied in the Indonesian context was the impossibility of being sure that any rate which was not so undervalued as to threaten macro stability would not provoke capital flight. More usually, the question as to whether or not to devalue/revalue requires choosing between the case for a strong exchange rate to help restrain inflation and a weak exchange rate as a mechanism for boosting competitiveness. Additionally, minds are often influenced by the state of the market: it may be that there is now too little willingness to defend a rate that comes under market pressure, even if objective analysis suggests that the parity makes more sense than the rate toward which the market is pushing. It is, of course, crucial to the viability of any band system that changes in the band should be made in small steps rather than large jumps (i.e. that the band should crawl), for otherwise speculators can expect to reap large rewards from correct anticipation of impending parity changes, which makes the market subject to frequent large speculative surges of the character witnessed in the dying days of the Bretton Woods system or of the narrow-band ERM.

[9] I also suggested that the basket to which they pegged should be a common one, so as to avoid arbitrary and unwanted movements in their mutual competitiveness as a result of variations in the exchange rates between third currencies.

What sort of 'objective analysis' is available to help form a judgment as to what exchange rate makes sense? One approach is to appeal to PPP, but the disadvantage of this is that it ignores the fact that real shocks can change the equilibrium real exchange rate. My own approach has been to pose the question: what is the (real effective) exchange rate that would be consistent with macroeconomic balance in the medium term? This I termed the 'fundamental equilibrium exchange rate', or FEER (Williamson 1985). A number of economists have now invested significant intellectual resources in attempting to estimate FEERs.[10] No one pretends that this question can be answered with any precision, but most of those who have worked in the area seem to feel that our answers are meaningful within a range of ±10% or so.[11]

That range is important in trying to answer the third question that arises in designing a crawling band system, namely how wide to make the band. The band needs to be quite wide for at least three reasons. The first is because estimates of the FEER are imprecise, and it would be silly to go to great expense to prevent an exchange rate moving toward equilibrium, as could happen if one were trying to defend a narrow band, and the estimate of equilibrium were not quite correct. The second is to give scope for cyclical variations in monetary policy: if the home country is in a recession when the rest of the world is in a boom, then it will want to lower its interest rate relative to that in the rest of the world in order to stimulate recovery. A band of ±10% gives scope *ceteris paribus* for the home country to keep the short-term interest rate 5% below the international interest rate for two years, without arousing pressures for the rate to go beyond the weak edge of the band, assuming that the market expects the rate to return to parity at the end of that period. The third reason for a wide band is to contain speculative pressures: the wider the band, the greater the possibility of a rebound in the rate, and hence the greater the possible cost of an unsuccessful speculative attack, and the lower the possibility that the speculators will catch the authorities in the no-win situation of having to try to defend a disequilibrium exchange rate.

The question may be posed as to whether the band widths needed for each of these three reasons have to be added together, or whether there are

[10]See, for example, the essays collected in Williamson 1994, or those in Montiel and Hinkle forthcoming, or Wren-Lewis and Driver 1998.

[11]The most difficult issue that arises in estimating FEERs is interpreting what should be meant by the external dimension of macroeconomic equilibrium. The question is what sort of current account balance to identify with equilibrium: clearly this must be a balance that will be sustainable in the medium run, but that is normally too weak a criterion to yield a unique figure. One may select the value that is consistent with the government's medium-term fiscal intentions, or the value of the trend capital in(out)flow, or one may use some criterion of optimality: normally these approaches give much the same answer, but none of them seems completely satisfactory under all circumstances. The issue remains a contentious one.

economies of scale that allow a given width of band to serve more than one function. In any event, as none of the reasons for wanting a wide band yields a quantitative estimate of the desirable band width, one can simply look at what countries have actually done to get a feel for what makes sense. Countries that have operated crawling bands have traditionally used widths in the range of anything up to ±10%, while in recent years both the ERM (following the crisis of August 1993) and Chile have gone as wide as ±15%. Critics have often derided such a wide band as no different to floating, but in fact the swings in floating currencies have often been much larger than this. Moreover, the ERM currencies have mostly stayed quite close to the centre of the band. Hence, while for years I specified the desirable band width as ±10%, I now feel that the balance of evidence suggests something rather wider than this, perhaps as much as ±15%.

Full specification of a crawling band requires the identification of one other parameter: the rate at which the band will crawl. In the most articulated crawling band systems, such as those in Chile, Colombia and Israel, this is pre-announced for as much as a year into the future, and the band then crawls each day in accordance with the formula. Countries that employ crawling bands usually do so mainly because they are experiencing higher inflation than their trading partners, and, since they doubt whether they could use a fixed exchange rate as a nominal anchor that would promptly stop inflation, they announce a crawling depreciation calculated to neutralize the trade effects of their expected or actual inflation. If they use expected inflation for this purpose (as in Israel), this is normally a somewhat lower inflation rate than that of the previous year, thus providing a mechanism for co-ordinating expectations of a gradual deceleration of the inflation rate. If they use actual inflation (as in Chile), then the nominal crawl is announced for only a month in advance, on the basis of the previous month's inflation (less an allowance for inflation in the country's trading partners). Chile also makes an allowance for productivity bias – the tendency for the prices of tradable goods to rise relatively slowly in fast-growing countries experiencing catch-up growth. A best-practice formula for the rate of crawl is:

> Crawling depreciation *equals* target domestic inflation *minus* expected foreign inflation *minus* estimated productivity bias.

Countries may also need to alter their bands in order to facilitate balance-of-payments adjustment, if they discover that their previous payments expectations were unrealistic or if they are subjected to real shocks. The sorts of shocks that would cause a need for real depreciation (in conjunction, of course, with an expenditure-reducing policy such as fiscal tightening) are a permanent worsening in the terms of trade, a permanent reduction in capital inflows,

an increase in the size of the external debt (relative to GDP) that has to be serviced or a permanent real depreciation of important competitors in export markets. Import liberalization would also call for real depreciation, but without any need for an associated fiscal tightening. The opposite real shocks would cause a need for real appreciation. Such real exchange-rate changes can be introduced by an appropriate modification in the rate of crawl for a limited period of time, or they can be effected by a one-time parity change. Provided that the needed parity change is not large relative to the width of the band, so that the market will not have a motive for seeking to guess whether the authorities are planning to make such a change, the balance of advantage would normally seem to lie with making a one-time change (Williamson 1996a, 112–13).

The objective of choosing a band according to the above principles is to avoid a situation in which the equilibrium exchange rate lies outside the band, which would be prone to motivate speculators to launch a speculative attack in the knowledge that resistance will be too costly to sustain. But even if the equilibrium rate lies within the band, the random nature of much exchange-market activity implies that it may prove necessary from time to time to defend the band against market pressure. The commitment implied by announcing a conventional band (as opposed to a monitoring band) is to intervene at the margins to prevent the rate going outside the band. Most countries that operate wide bands also make a practice of intervening within the margins, typically to discourage the rate from approaching the edge of the band. The logic of this is the fear that any shock to confidence when the rate is already close to the edge of the band could easily provoke a speculative run.[12]

Intervention alone is unlikely adequately to defend a band against strong market pressure. The next line of defence is usually to change monetary policy, tightening it when the problem is too weak a currency. (The two steps may be combined, by making intervention that is unsterilized.) Another monetary instrument that may prove a useful supplement to sterilized intervention may be a change in the reserve requirements which commercial banks are required to observe. This can be particularly useful where a country is suffering from excessive capital inflows, and especially when it has recently liberalized its financial system, because under those circumstances there is a strong risk of a lending boom that lays the seeds of a subsequent banking crisis (Hausmann and Gavin 1995). An increase in reserve requirements limits the banks' ability to expand credit on the basis of a given capital inflow and reduces the profitability of their borrowing from abroad, thus simultaneously curbing the capital inflow and reducing the impact of a given inflow on

[12]The Krugman target-zone model predicts that the exchange rate will spend most of its time close to the edge of the band. This prediction has been decisively rejected by empirical evidence. The practice of intra-marginal intervention may explain why the model fails.

demand. However, it is important not to raise reserve requirements so far as to prompt excessive disintermediation, as the banking system is generally a more efficient intermediary than the alternatives.

Most economists recommend a tightening of fiscal policy as a way of reacting to an excessive pressure of capital inflows, on the argument that this dampens demand and thus permits lower interest rates, which in turn discourage the inflow. Some object that the improved fiscal policy may instead act as a magnet and magnify the inflow, although my own assessment is that a further effect of this type is unlikely once a country has placed itself indisputably among the ranks of the solvent. Others argue that it is paradoxical to react to a foreign desire to make more resources available to the country by cutting the demand generated by the public sector. (One can understand the average politician reacting with incredulity when told that it is his duty to raise taxes or cut expenditures because foreigners want to lend his country so much!) Hence it would be a mistake to regard fiscal policy as a panacea, although it may be able to play a useful supporting role.

These techniques may suffice to handle relatively short surges in capital inflows or outflows, but their power is limited when the root cause of the problem is a permanent capital flow markedly larger than the government believes it to be prudent to accept, either because of a fear of Dutch disease or because of the danger of an excessive build-up of foreign debt. This is the really difficult case to handle, and the one that best justifies an attempt to limit the magnitude of capital inflows by some type of capital controls. The most successful of such controls in recent years seem to have been the obligation to hold unremunerated reserves against foreign loans at the central bank, a technique that has been exploited by both Chile and Colombia. But even in this case, there is a debate as to whether the controls have done much to limit the size of the total inflow (though they have certainly extended the maturity of the foreign debt, which is worth doing in itself, as has been graphically illustrated by the flight of short-term foreign loans during the East Asian crisis).

It is far-fetched to suppose, as has sometimes been argued, that these rather marginal capital controls are the main reason for the success of the crawling band. Countries with far more Draconian capital controls than these were regularly forced to change or abandon their exchange-rate pegs under the adjustable peg system. What these reserve requirements do seem capable of doing is to limit the build-up of short-term foreign debt that can make a country vulnerable to a foreign-exchange crisis even without much exchange-rate misalignment, as seen in East Asia in 1997. But to imagine that they could fend off a crisis when a misalignment has developed is pie in the sky. It is even more difficult to imagine that a Tobin tax (which is a two-way tax of a few basis points on foreign-exchange transactions, in contrast to the implicit one-way tax of as much as 300 basis points on the stock of short-term foreign

inflows employed in Chile and Colombia) would make an epsilon's worth of difference in stemming a speculative run in which the potential gains are perceived as hundreds or thousands of basis points.

While a combination of all the policy instruments listed above seems to provide a reasonably effective way of maintaining exchange rates within a band under most circumstances, provided of course that the band is not misaligned with respect to the fundamentals, none of the individual policy weapons is overwhelmingly effective, and experience has shown that there are conditions under which they may not be able to hold the line. In most cases, the reaction of a government that finds that it cannot defend the band has been to undertake a realignment or to widen the margins. Provided that such incidents are isolated and the changes are fairly small, so that the gains of the speculators are of limited size, this does not appear to destroy the viability of the system: in effect, the market is allowed a contributory role in helping to determine the position of the band, but the government still plays the strategic role – that is so lacking in a system of floating – in thinking about where the exchange rate needs to be in the long term if macro equilibrium is to be served.

But we now have the evidence of Indonesia (and earlier of Spain) that exogenous shocks can be greater than the authorities feel comfortable handling with such marginal adjustments. Defending the band was perceived to involve too costly a conflict with other policy objectives. And it is possible to think of other contexts in which the same would be true: for example, a recent study by Wren-Lewis and Driver 1998 estimates that the yen/dollar FEER is under 100 yen to the dollar, as against a current market exchange rate of over 130 yen to the dollar. Even after allowing for the likely effect of an announced band in discouraging large movements away from parity, one can hardly be sanguine that the market exchange rate could be pushed within a band around such a parity without prohibitive costs, in terms of either stifling the possibilities of Japanese recovery or igniting inflation in the United States. Clearly no one wishes to pay a price like that for achieving an exchange rate in line with the long-run fundamentals.

A monitoring band, or a crawling band with soft margins, represents an attempt to continue having some impact on the exchange rate without obliging the authorities to give it priority over other objectives. It is worth asking whether such a regime might have been capable of heading off the crisis that hit Indonesia in August 1997. The central bank would have allowed the rate to go outside the band under extreme market pressure, but it would have announced that it planned to take every opportunity to push the rate back within the band as and when circumstances permitted. When it announced that it was going to the IMF, the intention would have been to replenish the ammunition that it could use in seeking to push the rate back within the band. The key question is whether such an announcement would have avoided the

scramble for foreign exchange to establish cover for uncovered debts that was the proximate cause of the plunge of the rupiah.

Even if one regards that as doubtful, it might be possible to supplement a band that was blessed as appropriate by the IMF with measures on the debt front that would make such an announcement credible. Specifically, there is now a great deal of concern about the moral hazard that tempts international banks to extend short-term loans without giving too much thought as to whether the debtors will be able to service their obligations under adverse circumstances, secure in the knowledge that an IMF bailout will enable them to recover their loans if the worst comes to the worst. One possible approach to this problem would be for the IMF to have the right to approve a temporary suspension (or a permanent restructuring) of short-term debt-service payments by a country that was at (or beyond) the weak edge of a wide band that was agreed by the IMF to be appropriate to the country's situation, and was being defended by the authorities with an approved degree of vigour.

The idea of a monitoring band is to make such soft margins the rule rather than the exception. Intervention would normally not take place at all within the band, except perhaps for smoothing purposes and to curb short-term volatility. Only when the rate breached the limits of the band would the central bank start to intervene, and the other sorts of measures discussed above start to be deployed, with a view to limiting further deviations. The advantage of this is that it would avoid drawing a sharp line in the sand, whose breach gives a signal to the market that policy has failed and that all bets are now off. The rush to buy foreign-exchange cover that precipitated the Indonesian collapse might have been averted had there been a market expectation that further depreciation would encounter steadily growing resistance, instead of a sudden realization that the band had gone and that unlimited depreciation was now a possibility.

Most of the earlier analysis about how to manage a crawling band remains valid for a monitoring band as well. Specifically, one would have to go through exactly the same analysis in choosing a unit to which to peg, in choosing the value of the parity, and in deciding how to crawl. The two differences concern the width of the band and the question of how to defend it. So far as the width is concerned, it would surely be appropriate to select a narrower band, as the obligation is only to start intervening in a systematic way once the margin has been crossed. A figure of ±5%, as suggested by the Tarapore Committee, seems perfectly reasonable.

The key question that needs to be asked is whether a monitoring band would have the same positive role, in focusing market expectations on where the equilibrium rate lies, as a crawling band has been shown to have. Since we have no experience of the operation of a monitoring band, it is impossible to give an empirically based answer to that question. All one can say is that it seems a reasonable presumption.

IV. Conclusions

In the above I have laid out the case for employing a band system to manage the exchange rate, in preference to floating. This case rests both on the extremely weak links between the market exchange rate and the 'fundamentals' of economic theory under a regime of floating, and on the presumption that a government that thinks about those links can expect to do better than the market does. This is not to deny that there have been many historical instances when misguided government policies of sticking to a fixed exchange rate, that has been outdated because of relative inflation or real shocks, have led to misalignments of the same order of magnitude as those that have occurred under floating exchange rates. The point is rather that, with the high degree of capital mobility that prevails in the world, markets can nowadays be relied upon to discipline similar foolishness. The authorities think about where the rate needs to be from the standpoint of the macro fundamentals, and the market is then guided by that judgment as long as it finds it plausible, while remaining free to challenge it when it concludes that the authorities have got it wrong. But even then the market knows that what it needs to think about is whether the authorities have misjudged the fundamentals, and not what other market operators are going to be thinking in the next ten minutes. A system of crawling bands relies on constructive interactions between the market and the authorities; it does not pretend that all the wisdom lies with one or the other.

This paper has only briefly touched on the reasons for preferring a system of crawling (or monitoring) bands to a fixed exchange rate. I regard this as preferable for most large countries, because it gives them an extra degree of freedom in policy-making, which is especially valuable when confronted by a need for balance-of-payments adjustment as a result of an asymmetrical shock. But there are also cases, especially relevant for many small countries, where a fixed exchange rate may be a better option, as analysed in the literature on optimal currency areas. The main thing we have learned in recent years is that if a country intends to pursue a fixed exchange-rate policy, it ought to do it properly by employing a currency board. So the debate on exchange-rate policy ought not to concern fixed versus floating rates, but rather currency boards versus crawling bands.

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References

Frankel, Jeffrey, and Kenneth Froot (1986), 'Understanding the US Dollar in the Eighties: The Expectations of Fundamentalists and Chartists', *Economic Record*, 24–38.

——— (1987), 'Short-Term and Long-Term Expectations of the Yen/Dollar Exchange Rate: Evidence from Survey Data', *Journal of the Japanese and International Economies*, 1, 249–74.

Frankel, Jeffrey, and Andrew K. Rose (1994), 'A Survey of Empirical Research on Nominal Exchange Rates', NBER Working Papers No. 4865.

Friedman, Milton (1953), 'The Case for Flexible Exchange Rates', in *Essays in Positive Economics*. Chicago: University of Chicago Press.

Hausmann, Ricardo, and Michael Gavin (1995), 'The Roots of Banking Crises: The Macroeconomic Context', paper presented to the conference on Banking Crises in Latin America organized by the IDB and the Group of 30, October 6–7, Washington.

Krugman, Paul (1985), 'Is the Strong Dollar Sustainable?', in *The U.S. Dollar – Recent Developments, Outlook and Policy Options,* 103–33. Kansas City: Federal Reserve Bank.

——— (1991), 'Target Zones and Exchange Rate Dynamics', *Quarterly Journal of Economics*, 106, 3, August, 669–82.

Krugman, Paul, and Marcus Miller (1993), 'Why Have A Target Zone?', NBER Discussion Paper No. 718.

Marris, Stephen (1985), *Deficits and the Dollar: The World Economy at Risk*. Washington: Institute for International Economics.

McKinnon, Ronald I. (1979), *Money in International Exchange*. New York: Oxford University Press.

Miller, Marcus, and Paul Weller (1991), 'Exchange Rate Bands with Price Inertia', *Economic Journal*, November.

Montiel, Peter, and Lawrence Hinkle, eds (forthcoming), *Estimating Equilibrium Exchange Rates in Developing Countries*. Washington: World Bank.

Obstfeld, Maurice (1995), 'International Currency Experience: New Lessons and Lessons Relearned', *Brookings Papers on Economic Activity*, 1.

Rogoff, Kenneth (1996), 'The Purchasing Power Parity Puzzle', *Journal of Economic Literature*, 34 (June), 647–68.

Svensson, Lars E. O. (1992), 'An Interpretation of Recent Research on Exchange Rate Target Zones', *Journal of Economic Perspectives*, 6, 4 (Fall), 119–44.

Tarapore Committee (1997), *Report of the Committee on Capital Account Convertibility*. Mumbai: Reserve Bank of India.

Williamson, John (1985), *The Exchange Rate System*. Washington: Institute for International Economics.

——— (1991), 'Advice on the Choice of an Exchange Rate Policy', in E. M. Claassen, ed., *Exchange Rate Policies in Developing and Post-Socialist Countries*. San Francisco: ICS Press for the International Center for Economic Growth.

——— (1994), *Estimating Equilibrium Exchange Rates*. Washington: Institute for International Economics.

——— (1996a), *The Crawling Band as an Exchange Rate Regime: Lessons from Chile, Colombia, and Israel*. Washington: Institute for International Economics.

——— (1996b), 'The Case for a Common Basket Peg', in *Exchange Rate Policies In Emerging Asian Countries (*forthcoming). Conference held in Seoul on 14–15 November 1996.

Wren-Lewis, Simon, and Rebecca L. Driver (1998), *Real Exchange Rates for the Year 2000*. Washington: Institute for International Economics.