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G3 Exchange Rate Relationships:
A Recap of the Record and a Review of Proposals for Change

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I. Introduction

As the world recovers from what President Clinton has called "the worst international financial crisis of the last fifty years" there is renewed interest in rethinking and redesigning the global financial architecture. Trillions of dollars flow each day through the world's foreign exchange and securities markets, making capital and the opportunity to diversify risk available around the world to borrowers and issuers deemed worthy of access. Although such access to the international financial markets has expanded enormously in both scale and scope over the last decade, the contagions following the December 1994 Mexican crisis and the June 1997 Thai crisis have made painfully clear how fragile such access can be even for previously sound credits in growing, stable, well-managed economies.

Any effort to rethink, let alone redesign, the global financial architecture gives rise to many issues. Recent papers on this subject have explored the regulation, supervision, and risk assessment of financial institutions engaged in international borrowing and lending (Calomiris 1998); the role and function of the global capital market under the existing architecture (Obstfeld 1998); the case for capital controls (Bhagwati 1998); the case for currency unions (Dornbusch 1998); the case for target zones (Williamson 1998); the causes and consequences of currency crises (Krugman 1997; Feldstein 1999); and the role of the IMF in sorting all this out (Eichengreen 1999).

This paper examines exchange rate relationships among the Group of Three (G3) countries. The G3 has traditionally referred to Germany, Japan and the United States but, since the euro was adopted as common currency in January 1999, G3 now refers to the new "Euroland" plus Japan and the United States. The paper recaps developments since the collapse of Bretton Woods and analyzes recent proposals for changing the (ad hoc) way the G3 currently conducts exchange rate policy. The goal is to understand these proposals in the context of the monetary policies and intervention arrangements that are likely to be pursued by the G3 central banks in the absence of any formal arrangements among their governments to limit exchange rate volatility.

Most countries outside the G3 invoice a large fraction of their international commerce in a G3 currency; an even greater portion of their international borrowing is similarly denominated. These countries have in effect chosen to peg their exchange rates to the dollar (or yen, or euro) either to stabilize inflation or to facilitate their integration into the global capital market. However, the results have had important implications for trade flows, capital flows, portfolio composition, and, as recent research (Krugman 1997) demonstrates, vulnerability to speculative attack.[1] The recent turmoil in international financial markets may influence how the small open economies adapt to the vicissitudes of the global capital market. Following the experience of Argentina and Hong Kong, the smaller economies may turn away from flexible exchange rates and choose to give up monetary autonomy altogether, by linking their money supplies and interest rates to a G3 currency via a currency board or even complete "dollarization."[2]

The plan of the paper is as follows. Section II begins with a concise review of key aspects of the G3 countries' experience with managed, floating exchange rates since 1973. It documents important features of the post-Bretton Woods experience with managed floating, discusses the recent empirical research on the relationship between exchange rates and fundamentals, examines some popular definitions of and evidence for currency misalignments, and reviews post-Plaza Accord[3] efforts to use intervention as a tool for dampening exchange rate volatility. It then considers some of the criticisms of the post-Bretton Woods exchange rate experience leveled by, among others, Krugman and Miller (1993), Volcker (1995), McKinnon (1997) and Williamson (1998). These and other papers argue that exchange

rate volatility appears to be excessive, that deviations of exchange rates from equilibrium values are persistent, that the costs of volatility and misalignment are not insignificant, and that benign neglect is an inappropriate policy response to (and may in fact be one of the causes of) the observed wide fluctuations in G3 exchange rates.

Section III details the key features of three proposals recently put forward by Paul Volcker (1995), John Williamson (1998), and Ronald McKinnon (1997). They propose that the G3 countries adopt some form of target zone system among themselves to keep exchange rates inside a wide band surrounding an estimate of their equilibrium levels. Section IV outlines several potential challenges that could well undermine the durability of any of the proposed wide band target zone arrangements, and Section V provides some concluding remarks.

II. G3 Exchange Rates

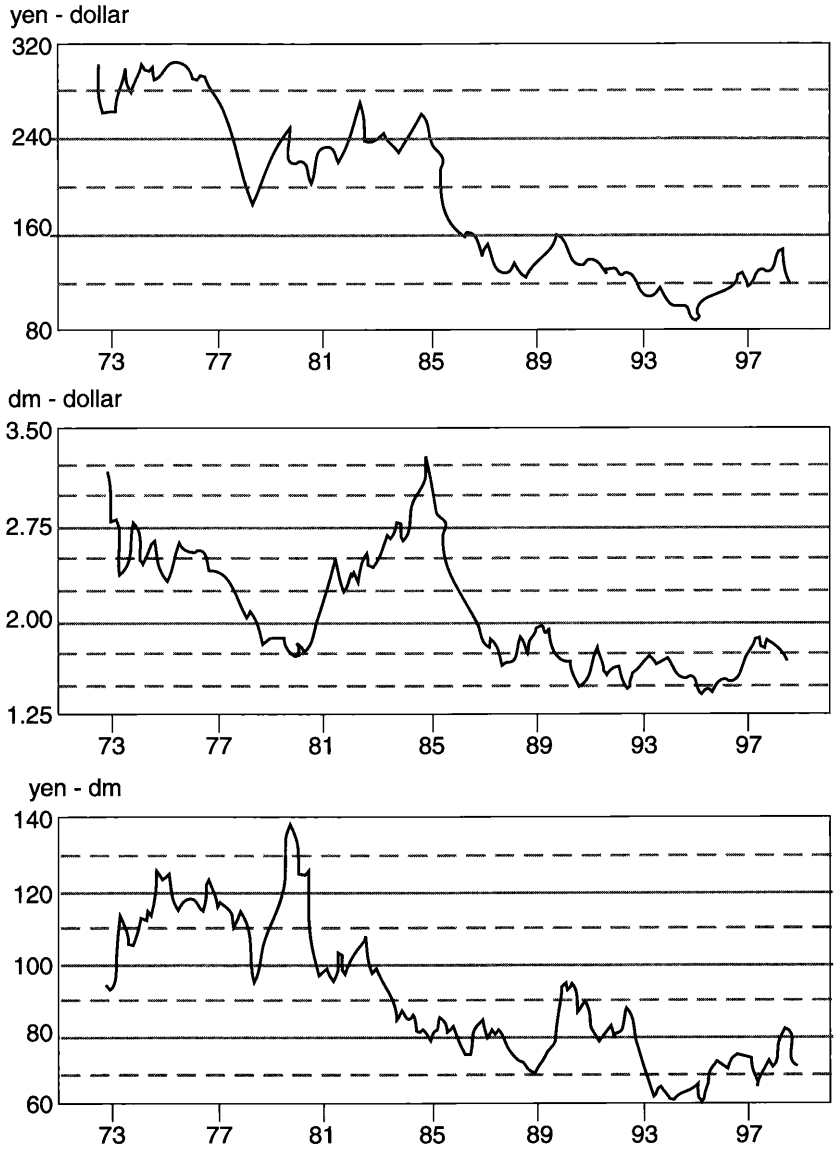
The Status Quo

Figure 1 plots the history of bilateral monthly dollar, yen, and deutschemark (dm) exchange rates since the collapse of Bretton Woods and the advent of (managed) floating in 1973. Figure 2 plots the post-Louvre Accord[4] history of these exchange rates as well as the history of the (synthetic) euro, along with estimates of the purchasing power parity (PPP) levels of these exchange rates. It can be seen that, on average over periods of several years, a simple PPP relationship (with P/P* denoting the ratio of home to foreign price levels),

$$E = P/P^*$$

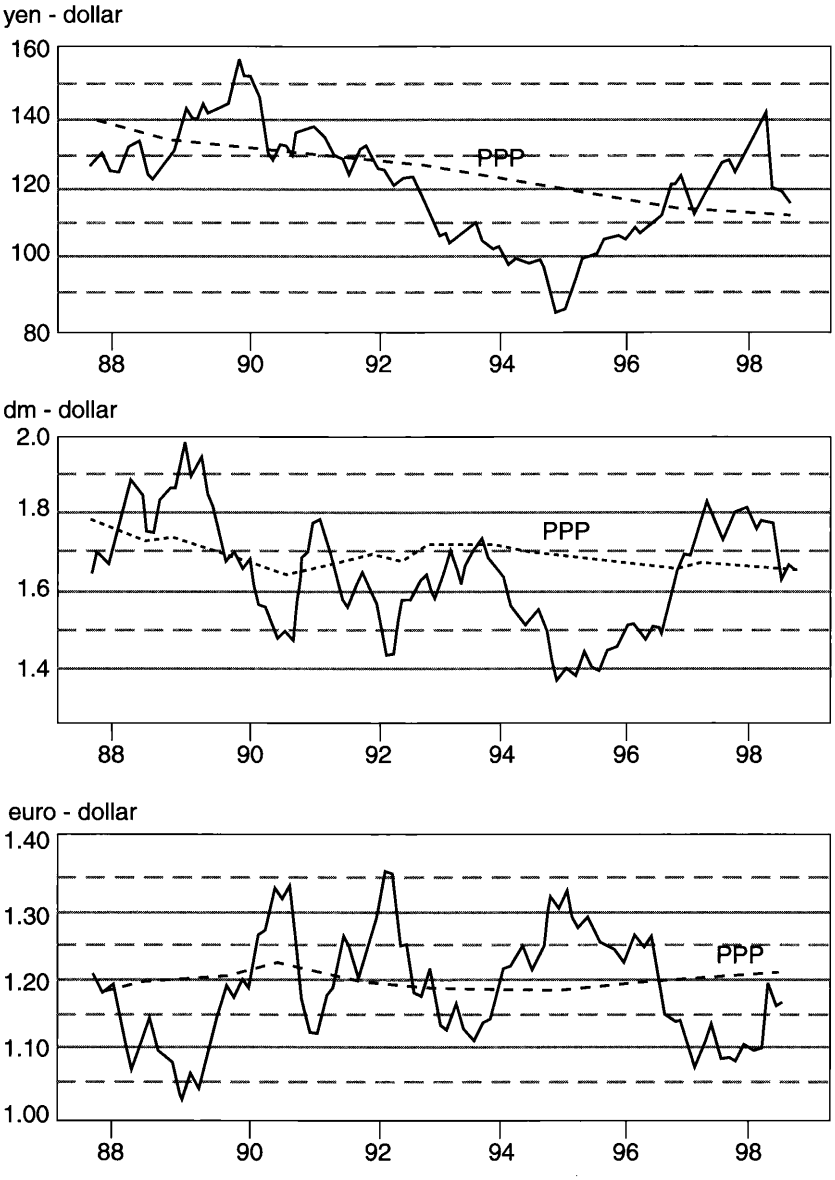
appears to provide an anchor for these exchange rates (Frankel and Rose 1996). However, not only have deviations from PPP been large, they have also been persistent and volatile. The short-run volatility of G3 real exchange rates is one of the most robust (and to many observers disturbing) characteristics of the post Bretton Woods floating exchange rate experience. It reflects, at least in part, the fact that nominal exchange rates are forward looking asset prices that adjust continuously to clear the global capital market whereas money goods prices adjust only gradually to clear the international goods markets (Dornbusch 1976; Mussa 1982).

Figure 1. G3 Exchange Rates Since 1973



Source: OECD Main Economic Indicators (various issues)

Figure 2. G3 Exchange Rates Since 1988



Source: OECD Main Economic Indicators (various issues)

PPP is a useful construct for placing medium-run currency movements in context, but it is neither necessary nor sufficient for a currency to be properly aligned. Shifts in the supply of or demand for national outputs will in general require an adjustment in the terms-of-trade and/or the relative price of nontraded goods, and these relative price adjustments will in general necessitate a departure from PPP (Obstfeld and Rogoff 1997). Moreover, any required adjustment in the terms-of-trade or relative price of nontraded goods in response to a real disturbance to relative prices will in general require an adjustment in the nominal exchange rate (Obstfeld 1985). Clarida and Gali (1994) estimated a structural empirical model of the dm-dollar and the yen-dollar exchange rates on data from the 1970s through the early 1990s. They decomposed observed quarterly changes in bilateral real exchange rates into three sources: exchange rate changes driven by shocks to money supply and demand ("asset market" shocks), exchange rate changes driven by shocks to the demand for national outputs ("demand" shocks), and exchange rate changes driven by shocks to the supply of national outputs ("productivity" shocks). They concluded that a substantial fraction of the short-run variance of real as well as nominal exchange rate changes is due to asset market shocks.[5]

The Clarida-Gali model also provides a natural measure of when and to what extent the dm-dollar and yen-dollar were over- or undervalued relative to their estimated equilibrium levels during the 1970s, 1980s, and early 1990s. According to Clarida and Gali (1994), estimated over- and undervaluations of these key exchange rates have often been large and persistent. The Clarida-Gali (and for that matter any other) time series approach to estimating the long-run equilibrium real exchange rate cannot formally distinguish between two competing interpretations of the deviations of the exchange rate from the long-run equilibrium. According to the interpretation emphasized by Clarida and Gali (1994), these deviations do not represent exchange rate misalignments but instead reflect the interplay of sticky goods prices with nominal and real shocks that have transitory as well as permanent components. Another interpretation of such a decomposition is that the large and persistent departures from long-run equilibrium do represent misalignments.

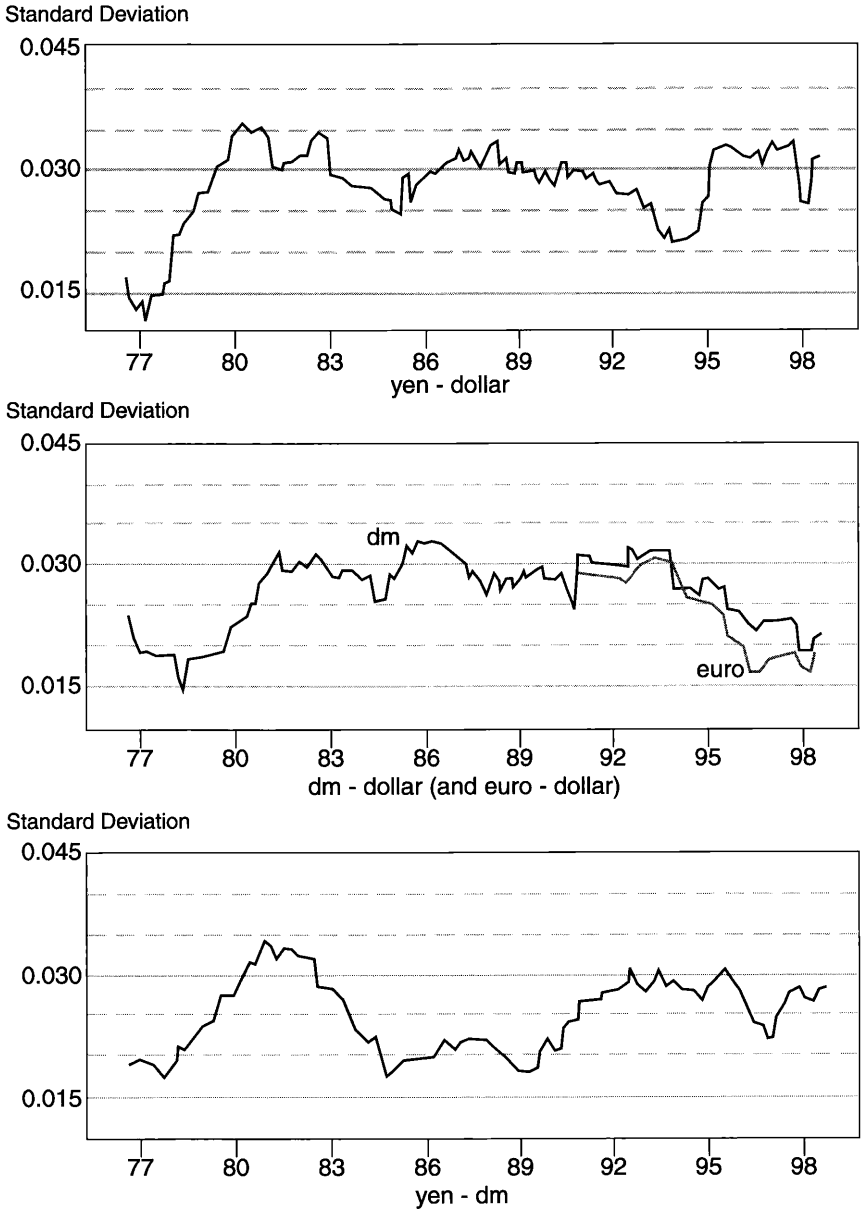
Another, complementary approach to assessing the link between exchange rates and fundamentals in the G3 has been taken by Mark (1995). Mark presents evidence that cumulative nominal exchange rate changes are well explained by the initial deviation of the

exchange rate from its equilibrium value. That is, Mark estimates that if, in a given quarter, the dm-dollar or yen-dollar exchange rate is overvalued relative to the fundamentals, then it will tend to depreciate on average until the initial overvaluation is eliminated in three or four years. In his words, "*the noise that dominates quarter to quarter changes in* [G3 nominal exchange rates] *averages out over long horizons* (Mark 1995, p.210, emphasis added)."

The "noise" that dominates short-run changes in G3 nominal exchange rates (both real and nominal) has not, in general, diminished appreciably over the last 25 years. Figure 3 depicts volatility for each bilateral nominal exchange rate (actually a rolling standard deviation of monthly log changes) since 1977. We see that the volatility of monthly changes in the yen-dollar and yen-dm exchange rates has, if anything, risen during the 1990s to levels last observed during the early 1980s, and is much higher than during the late 1970s. However, we do observe in recent years a substantial decline in the volatility of the dm-dollar exchange rate back to the ranges observed in the late 1970s. Figure 2 also shows that the recent volatility of the (synthetic) euro-dollar exchange rates leading up to EMU resembled dm-dollar volatility. The volatility of G3 exchange rates that is actually observed was greatly underestimated by the early advocates of floating exchange rates such as Harry Johnson (Obstfeld 1995). They predicted that "flexible exchange rates would tend to remain constant so long as underlying economic conditions (including government policies) remained constant...[I]f economic changes or policy changes occurred...the flexible exchange rate would gradually either appreciate or depreciate as required to preserve equilibrium."

The mere presence of this volatility (or its failure to diminish over time) is not in itself inconsistent with the notion that G3 exchange rates are determined in a rational, efficient asset market that responds only to tangible "news" about fundamentals.[6] The Dornbusch (1976) overshooting model links exchange rate volatility to the jump in nominal exchange rates that occurs under rational expectations in response to a rise in the money supply or a fall in money demand. This in turn creates a divergence between the home and world interest rate. Another possible explanation for exchange rate volatility is the fact that "news" about current fundamentals may also be providing information about the future growth rate of fundamentals, in which case the jumps in the exchange rate may (rationally) be more volatile than the news about current

Figure 3. G3 Exchange Rate Volatility



* The calculated standard deviation for each date is based on the sample of the previous 24 months of monthly log changes in the spot exchange rate.

Source: OECD Main Economic Indicators (various issues)

fundamentals (Mussa 1982). Some of the recent empirical evidence presented in Clarida and Gali (1994) and Eichenbaum and Evans (1995) suggest that the magnitude of overshooting and/or magnification in response to an asset market disturbance may be substantial. For example, Clarida and Gali (1994) estimate that, in response to a rise in money supply (or a fall in money demand) resulting in a long run depreciation of 1.5 percent in the dm-dollar exchange rate, the immediate jump in the nominal exchange rate is in excess of 4.5 percent (more than three times larger).

Although G3 exchange rates since 1973 have exhibited wide swings and volatility that has failed to diminish over time, determination of rates has not been left entirely to the foreign exchange markets. Periodically in the 1970s, and more frequently and systematically since 1985, the G3 countries have led coordinated intervention operations to calm disorderly markets, to 'lean against the wind' as their exchange rates drift away from the official perception of their fundamental equilibrium levels, or to 'lean with the wind' to push exchange rates back to their fundamental equilibrium levels. Perhaps the most explicit, coordinated effort along these lines followed the February 1987 Louvre Accord that, at least according to some observers, established reference zones for the major currencies around their February 1987 levels.

The conventional wisdom on sterilized foreign exchange intervention is that its effects are expected to be small and short-lived unless backed up by changes in monetary policies (Henderson and Sampson 1983; Edison 1993). This is essentially the position of the U.S. Treasury. To the extent that other researchers find more significant effects of sterilized intervention (Dominguez and Frankel 1993; Catte, Gali, and Rebecchini 1992), these effects are often attributed to the signaling effect of intervention. There is nothing that has been learned from the post-Louvre Accord experience, including the experience of the European Monetary System (EMS) in the early 1990s, that would indicate that it is reasonable to base any future G3 exchange rate arrangements on the hope that these arrangements can be enforced in a credible and sustained way without committing national monetary policies to that goal. The evidence indicates that any future agreements made by the G3 to limit exchange rate flexibility must be backed (and made with the understanding that they will be backed up) by a commitment to use monetary policies to enforce those agreements.

The exchange rate experience of the old G3 (Germany, Japan and United States) may have lessons for the new G3 (Euroland, Japan and United States). In the absence of any new arrangements among the governments to further limit exchange rate volatility, which aspects of the experience of the last 25 years are most likely to characterize the future? First, despite the growing body of empirical evidence that the medium-term direction of bilateral exchange rate movements has appropriately reflected the macroeconomic fundamentals, it most likely will continue to be the case that the bulk of short-run exchange rate volatility and perhaps even the magnitude of medium-run exchange rate swings will be difficult to explain, even after the fact, by observed realizations of the fundamentals (Obstfeld 1995). Second, it is likely that the levels of bilateral G3 exchange rates will continue to wander often and persistently away from empirical estimates of their long-run equilibrium values. This will occur whether these estimates are determined by a PPP relationship or a more elaborate calculation of fundamental equilibrium levels that takes into account shifts in the terms-of-trade and sustainable current account flows. Third, there is reason to believe that the recent observed divergence between declining and modest euro-dollar volatility on the one hand and rising and high yen-dollar and yen-euro volatility on the other may well continue.

The United States and Euroland have similar inflation rates, will likely have similar monetary policy strategies, and are not likely to subject the foreign exchange markets to any large structural fiscal policy surprises. By contrast, Japan has more severe macroeconomic problems, with a newly independent central bank whose monetary policy strategy is still evolving. Wide swings in the yen-dollar and yen-euro exchange rate are not an unlikely prospect until Japan's banking problems, deflation, and debt hangover problems are resolved. Such resolution will certainly require much more than a Japanese commitment to limit exchange rate flexibility, and might well be hampered by it.

Critiques of the Status Quo

Many if not most of the criticisms of the post Bretton-Woods experience with floating exchange rates (the non-system as it is sometimes called) begin with the presumption that much of the short-run volatility in exchange rates, and the failure of the volatility to diminish over time, is the result of bandwagons, destabilizing

speculation, herd behavior, and other pathologies of an international capital market that is thought to be far from efficient. For example, Williamson states, "[t]he 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 behavior rather than rational expectation (Williamson 1998, p.2)." Similarly, Krugman and Miller (1993) argue that, "[t]here is no evidence supporting the view that exchange markets are efficient, or even that speculation will generally be stabilizing. We certainly have no grounds for dismissing the views of experienced market practitioners who warn of the potential for large exchange rate swings that are unjustified by the fundamentals." From the presumption of an inefficient foreign exchange market follows the second critique of the post Bretton-Woods status quo: that the inefficient foreign exchange market not only generates excessive short-run volatility, but also can produce (when these excessive short-run exchange rate changes cumulate over time) significant and sustained misalignments of exchange rates relative to the levels that would be justified by the fundamentals.

The costs of excessive exchange rate volatility are thought, by many authors, to be manageable (but not trivial) due to the ready and ever increasing availability of financial derivative products for hedging short- and intermediate-run foreign exchange exposure. But hedging entails costs, especially as the horizon lengthens, and is not always possible when the foreign currency cash inflows or outflows to be hedged are themselves uncertain.[7] The costs of exchange rate misalignments, if they are in fact as common and as sizable as some suggest, are believed to be "extremely harmful to macroeconomic stability and microeconomic efficiency" (McKinnon and Ohno 1997, p.52). Excessive exchange rate volatility and persistent misalignments are often held responsible for depressing bilateral trade flows, distorting investment decisions, and misallocating the outsourcing locations chosen by multinational firms. These distortions occur through alterations in international relative prices (the terms-of-trade), domestic relative prices (of nontraded goods), and the prices of traded commodities relative to traded differentiated products.

The process is one that McKinnon and Ohno (1997) label "price diffusion." Moreover, the wide swings in bilateral G3 exchange rates that we observe have large effects on the trade flows, capital flows, portfolio composition, and the vulnerability to speculative

attack in the many countries that have chosen to peg their exchange rates to, in particular, the dollar. These swings occur because most countries outside the G3 invoice a large fraction of their international commerce and denominate an even greater portion of their international borrowing in a G3 currency (especially the dollar). Volcker (1995) sums up well (and presciently) the essence of these responses to the existing non-system:

> There is a reluctance to make a sufficiently strong commitment to [exchange rate] stability for fear the effort could fail, at political and economic cost. What is not adequately weighed in the balance, is the disintegrating force of present exchange rate arrangements, with its inherent uncertainties and false pricing signals. The irony...is to observe the enormous energy and political capital dedicated in recent years to reducing already low tariffs to minimal levels, only to see the potential gains in efficiency and trade overwhelmed by the volatility of exchange markets. In the same vein, in all our discussions of the problems of development...of emerging economies, we don't give much weight to their stake in more stable exchange markets. (Volcker 1995, p.8)

III. Recent Proposals For Limiting G3 Exchange Rate Volatility

The essential ingredients of four recent proposals to limit the volatility of G3 exchange rates and to prevent their misalignments are reviewed below. These have been offered by Paul Volcker (1995), Ronald McKinnon (1997), and (two) by John Williamson (1998).

The Volcker Proposal

In his Stamp Lecture presented at London University in 1995, Paul Volcker called for a set of G3 exchange rate arrangements that would [have central banks] "moderate and reverse exchange rate fluctuations among the key currencies before they become extreme, rather than being forced to respond defensively, after substantial risk to the world economy is already evident." The Volcker proposal contains the following provisions. First, the participating countries (Euroland, Japan, and United States), in consultation with the IMF, would reach a consensus on "broadly appropriate equilibrium values" for their *nominal bilateral* exchange rates. These would be the central parities of the new system. Actual nominal bilateral exchange rates would be allowed to fluctuate within a *target zone* of plus or minus 10 percent around these central parities. The proposal allows for an initial transition period during which fluctuations of up to plus or minus 15 percent would be permitted.

Second, the G3 countries would need to be prepared jointly to defend the target zones with intervention, and on a substantial scale if necessary. Inframarginal intervention would not be discouraged. Third, the proposal recognizes that, almost certainly, sterilized intervention would not always in all circumstances be enough, even with wide bands, to maintain the integrity of the target zone. Thus the Volcker proposal on page 7 calls for the G3 central banks to "modify their monetary policies in support of the exchange rate objective."

> Relatively wide and potentially movable exchange rate ranges are in a sense a compromise between the logical extremes of fixed and floating rates. The idea, for all its analytical appeal, does not lend itself to slogans or sound bites, nor to instinctive political or public support. The question will be asked, when the defense of the range is required, if 10 percent is all right, what about 11 or 12 or more? Is it really worth spending money in the exchange markets, modifying monetary policy, and taking care to balance the budget just to save another percentage point or two?
>
> The answer must be yes. What is at issue is not that last percent but whether governments will succeed in inducing the market itself to stabilize exchange rates. The success or failure in that effort is plainly dependent on the credibility of official intentions. But when that credibility is established, markets will work with governments, not against them, to maintain a sense of equilibrium. (Volcker 1995, p.8)

The proposal is clear that countries will, at least on occasion, need to modify their monetary policies in support of the exchange rate commitment, but it is silent on the assignment of this responsibility between the weak and strong currency country. However, the proposal does call for the IMF to work with and, when necessary, to lead the G3 countries in determining a course of action for coordinating the changes in monetary and/or fiscal policies necessary to support the exchange rate objective.[8]

The Volcker proposal recognizes that "the extent to which countries are prepared to announce publicly the 'equilibrium ranges' and the frequency with which they might be modified are sensitive points", yet it seems clear that Volcker intends that the target zone for nominal bilateral G3 exchange rates be publicly announced (perhaps after a transition period?). Moreover, Volcker argues that an appeal of the wide band target zone is that it facilitates making any necessary changes in the central parities in a way that minimizes

the possibilities of one-way bets. It calls for such changes to be made, whenever possible, in amounts that are substantially smaller than the width of the band, so that the exchange rate need not move much, or perhaps at all, when such adjustments are made.

The Williamson Proposals

John Williamson has, more than anyone else, promoted the idea of implementing a target zone arrangement with wide bands around exchange rate levels that are consistent with medium-term equilibrium in the current account. In a recent article Williamson (1998) outlined two proposals for setting up such a system: a proposal for a moving or "crawling" band system and another, closely related, proposal for a system of "monitoring bands".

According to Williamson (1998), a moving band involves a central bank undertaking a public obligation to maintain the exchange rate within a wide, publicly announced band (of plus or minus 10 percent or even 15 percent) around a parity that is periodically adjusted in small steps, so as to keep the band in line with fundamentals. Williamson envisions three factors that would contribute to a systematic adjustment (or crawl) in the central parity. First, a G3 country would certainly want to adjust the nominal exchange rate by the amount of the inflation differential with another G3 country or, in the case of a central parity expressed in terms of a basket, the other countries with which the home country is trying to stabilize the exchange rate. Second, a country might desire for its central parities to adjust gradually so as to allow for a real appreciation following a rise in aggregate demand or for a real depreciation following a fall in aggregate demand. Third, a country experiencing a rapid rise in productivity in the traded goods sector relative to the service sector might wish to pursue a gradual nominal appreciation of the exchange rate.[9] [10]

To pin down the central parity, Williamson suggests deriving it from an estimate of the real, effective exchange rate that would be consistent with "macroeconomic balance" in the medium term. Macroeconomic balance, in turn, requires both internal balance (full employment) and external balance. External balance is defined as a current account deficit (or surplus) that is sustainable and consistent with the medium-term current account positions of other countries (Henning and Williamson 1994). Although in practice many countries choose a central parity expressed as a bilateral

nominal exchange rate, and much of the discussion about future G3 exchange rate arrangements presumes that such arrangements would be defined in terms of bilateral nominal G3 exchange rates, Williamson (1998) points out on page 8 that choosing a bilateral nominal exchange rate "has the advantage of simplicity, but it can also have a severe disadvantage for a country with a diversified trading pattern." For this reason, some countries, such as Chile, establish central parities with respect to baskets of currencies of their major trading partners. Indeed, in his earlier writings Williamson was explicit in recommending that the major countries "negotiate a set of mutually consistent target [zones] for their [nominal] effective exchange rates (Williamson 1986, p.166)."

The commitment implied by announcing the band is to intervene at the margins to prevent the rate from going outside the band. However, Williamson states that most countries that operate wide bands (and, we would add, the EMS countries that were operating with much narrower bands [Svensson 1992]) also make a practice of intervening within the margins, typically to discourage the rate from approaching the edge of the band. This practice contrasts with the original theoretical target zone models that assumed away inframarginal interventions and thus implied that the exchange rate should spend most of its time near the edge of the band (Bertola and Caballero 1992). Indeed, as Svensson (1994) points out, target zone systems that have in practice succeeded in stabilizing exchange rates have done so by committing monetary policy (which sometimes appears under the label of non-sterilized intervention) to that objective, *even when the exchange rate is, and so as to maintain it,* inside the band. Williamson (1998, p.10) acknowledges that "intervention alone is unlikely to suffice to defend a band against strong market pressure.

The next line of defense is usually *to change monetary policy,* tightening it when the problem is a too weak currency (emphasis added)." Williamson (1998) is silent on the assignment of responsibility in the cases in which more than one currency threatens to breach its target zone.[11] However, in earlier work, Williamson (1986, p.167) endorsed "a regime of discretion, whereby the strong currency countries would act [to depreciate their currencies] if the participating countries judged that deflation posed a more serious global threat than inflation, and the weak currency countries would act [to appreciate their currencies] in the converse case."

Williamson (1998, p.7) also outlines a closely related proposal for a "monitoring" band. The key difference between the moving wide band just discussed and a monitoring band is that "the latter does not involve an obligation to defend the edge of the band. 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 that 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." Williamson suggests that the width of a monitoring band should be narrower, say plus or minus 5 percent, than the width chosen for a target zone with 'hard' margins, plus or minus 10 percent, since under the former there is no obligation to defend the band, but only a promise to start defending the band once the margin has been crossed. According to Williamson, the "advantage of [a monitoring band] 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 all bets are now off (Williamson 1998, p.12)." Again, Williamson is silent on the assignment of responsibility in the cases in which more than one currency threatens to breach its monitoring zone.

The McKinnon Proposal

Ronald McKinnon (1997) has recently proposed a common monetary standard for the 21st century (CMS21), which is among the most ambitious and fully articulated proposals for a new G3 exchange rate and monetary regime. This is so, despite the fact that it was published in 1997 before EMU came into existence. If anything, EMU makes it easier to interpret McKinnon's proposal. In presenting it, we will substitute 'ECB' (European Central Bank) for 'Bundesbank' and 'Euroland' for 'Germany'. McKinnon's proposal embodies the following elements. First, the G3 would publicly announce a target zone for the bilateral yen-dollar and euro-dollar exchange rates of plus or minus 5 percent around central parities that are consistent with PPP for traded manufactures. Second, the G3 would defend these parities through non- (or only partially) sterilized intervention. The arrangement would be entirely symmetric. For example, if the yen weakened against the dollar, the Bank of Japan would be expected to tighten Japanese monetary policy by selling dollars and