2. *Kenneth Rogoff*

Perspectives on Exchange Rate Volatility

8.2.1 Introduction

Will the introduction of the euro mark the beginning of the end of the modern floating exchange rate era? After nearly a quarter-century of volatile major-currency exchange rates, do we think we now understand exchange rate fluctuations and know how to deal with them? This paper offers a rather sober view of what economists know—and do not know—about the causes and consequences of exchange market volatility.

8.2.2 The Nagging Persistence of Exchange Rate Volatility

During the macroeconomic chaos of the 1970s, the popular perception among economists was that if governments could only manage to whip inflation, calm in foreign exchange markets would surely follow. In the meantime, the only advice economists could give for dealing with exchange rate volatility was to run for cover. The 1970s view laid the blame for unstable exchange rates squarely at the doorstep of the monetary authorities. If officials' plans for monetary policy were hard to predict—and during the 1970s, they *were* hard to predict—then there was no way of ruling out sustained large divergences in countries' price levels.[1] Even a very loose interpretation of the doctrine of "purchasing power parity" suggests that price level instability is incompatible with exchange rate stability.

The theoretical case against the hapless monetary authorities was greatly strengthened by Rudiger Dornbusch's (1976) celebrated "overshooting" model. By introducing forward-looking "rational" expectations into the canonical Keynesian model of open economy macroeconomics (due to Mundell and Fleming), Dornbusch showed that monetary policy shifts can easily lead to disproportionately large movements in exchange rates. Under certain plausible assumptions, the sluggishness of wages and prices means that the exchange rate must bear a disproportionate burden of the adjustment to monetary shocks, at least in the short run. Ergo, a little monetary instability can lead to a lot of exchange rate instability; a lot of monetary instability can lead to near chaos—pretty much the situation in the 1970s, at least in comparison with the 1950s and 1960s.

The theory seemed to fit the facts, and it was intrinsically very elegant to boot (a big selling point in any science). Unfortunately today, as inflation con-

1. Obviously, money demand instability also became much more severe in the 1970s, though in principle such instability can be offset by adjustments in the money supply.

tinues to subside, it is becoming increasingly clear that monetary instability is at most a piece of the exchange rate volatility puzzle. It certainly cannot carry the full burden—or the blame—attributed to it by monetary models of the 1970s (or 1980s, for that matter). Consumer price index (CPI) inflation across Europe, the United States, and Japan has fallen drastically over the past twenty years, converging toward the 1 to 2 percent range. (Taking into account the much-ballyhooed upward bias in the CPI, "true" cost-of-living inflation is probably only 0 to 1 percent.) Moreover, market concern over the possibility of a relapse into high inflation continues to recede as improvements in monetary institutions—especially greater de jure and de facto central bank independence—strengthen the hand of anti-inflation conservative elements within governments.

Yet despite the drop in inflation, exchange rates across the big three currencies (the dollar, the euro, and the yen) are still remarkably volatile. Can concern over long-run divergences in inflation rates possibly explain why, between the spring of 1995 and May 1997, the dollar appreciated by roughly 60 percent against the yen and 30 percent against the mark? Indeed by comparison with some of the larger monthly swings in the major currency cross-rates, the mid-August 1997 devaluations in Asia (ranging from 17 to 34 percent cumulated through mid-September) do not seem quite so horrific. One may well ask, has the conquest of inflation brought any drop at all in major-currency exchange rate volatility?

Figure 8.1 asks just this question for the yen-dollar, mark-dollar, and trade-weighted dollar exchange rates. The figure divides the floating rate period 1975–98 into three-year intervals and looks the volatility of month-to-month changes in the exchange rate within each period.[2] Interestingly, the standard deviation of month-to-month changes in the trade-weighted dollar (*filled diamonds*) has indeed been steadily dropping since the late 1980s, from a high of 2.7 percent per month during 1987–89 to 1.6 percent over the most recent period.

The bilateral dollar rates against the deutsche mark and yen are generally much more volatile, each averaging 3.3 percent per month over the entire period versus 2.1 percent for the trade-weighted dollar. As the graph shows, volatility of the mark-dollar (now euro-dollar) rate has been falling, though not as dramatically as for the trade-weighted dollar. The volatility of the yen-dollar rate has barely fallen at all, remaining almost 3.0 percent per month.

Figure 8.2 also provides a different perspective, comparing the evolution in volatility of the trade-weighted dollar with that of the trade-weighted yen and deutsche mark. Not surprisingly, the volatility of the trade-weighted mark is far lower than that of the dollar, with the standard deviation averaging only 1.2

2. The standard deviations in figs. 8.1 and 8.2 are calculated as $[\Sigma (\Delta e_t)^2/n]^{1/2}$, where Δe_t is the month-to-month change in the log exchange rate and n is the number of observations. Note that we are implicitly assuming that the exchange rate follows a random walk. As we discuss below, this seems to be a very reasonable approximation.

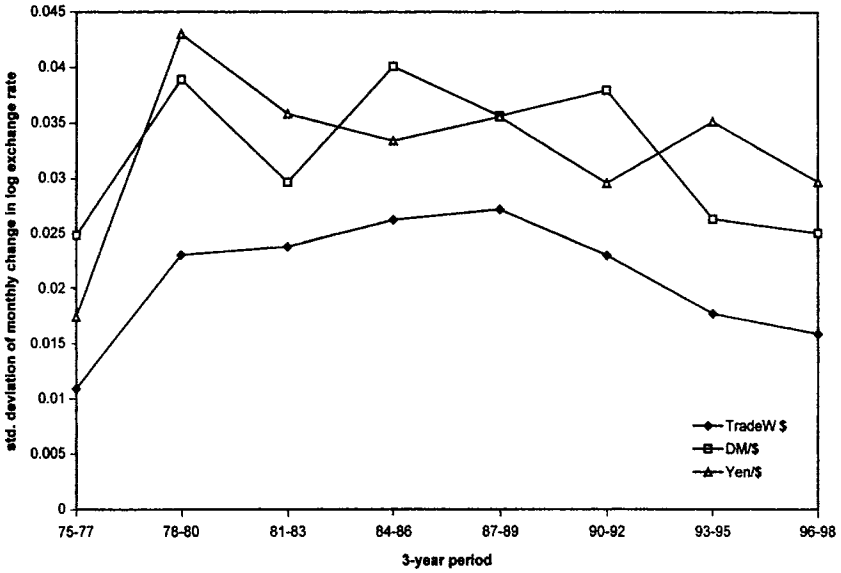

Fig. 8.1 Standard deviation (zero centered) of month-to-month changes in log exchange rate, by three-year intervals, 1975–98
Source: IMF, *International Financial Statistics* (Washington, D.C., 1998), CD-ROM.

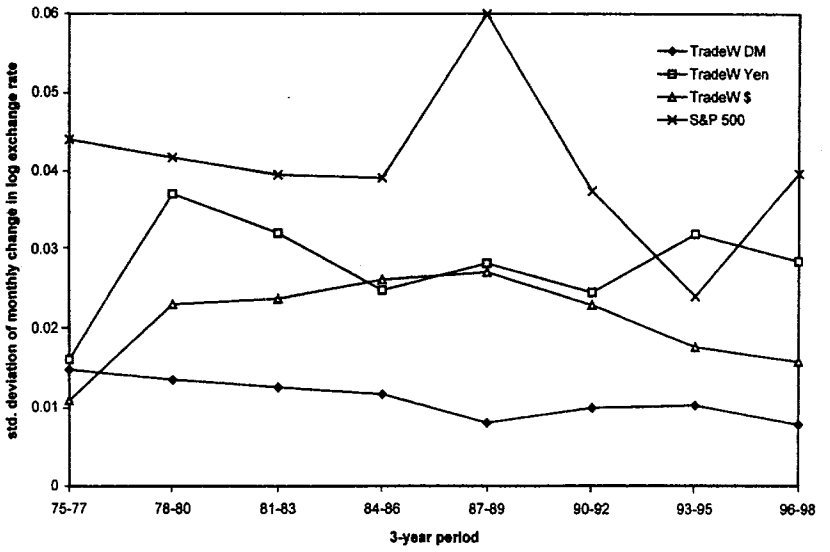

Fig. 8.2 Standard deviation (zero centered) of month-to-month changes in log trade-weighted dollar, deutsche mark, and yen, by three-year intervals, 1975–98
Source: IMF, *International Financial Statistics* (Washington, D.C., 1998), CD-ROM.

percent over the entire period, dropping to 0.8 percent in the 1996–98 subperiod. The low volatility of the trade-weighted mark is not surprising; a large part of Germany's trade is with other countries in the former European Monetary System (EMS). Even counting occasional realignments, cross-country EMS exchange rates were relatively stable even before the advent of the euro.

The trade-weighted yen has been much more unstable in recent years than the dollar or the deutsche mark (euro), and its volatility has even risen slightly since the mid-1980s. Partly this is due to the fact that many of Japan's Asian trading partners peg to the dollar rather than the yen; the fact that Japan's economic growth has been out of synch with the United States and Europe is probably also a factor.

Finally, to put the exchange rate numbers in perspective, figure 8.2 includes a measure of the volatility of the S&P 500 stock index. As one can see, stock price changes, with a standard deviation of 4.1 percent over the entire period, are generally even more volatile than exchange rates (including even the bilateral rates in fig. 8.1).[3]

Thus, overall, exchange rate volatility has indeed fallen somewhat in recent years. Whether one can attribute this decline to the general fall in inflation, or to the switch in central bank operating procedures toward greater emphasis on smoothing fluctuations in very short-term interest rates, is unclear. But what is clear is that despite great successes in the battle against inflation, exchange rate volatility across the major currencies is still quite significant.

8.2.3 Explaining Exchange Rate Fluctuations (or Not)

In retrospect, economists should have realized that the elegant theories of the 1970s overstated the important of monetary factors—and ergo the role of central banks—in causing exchange rate volatility. Ever since the early 1980s, well before low inflation had settled in, a steady stream of negative empirical results began to cast doubt on monetary instability and overshooting as the key elements of exchange rate volatility. Researchers have long been finding that standard monetary models, even when they appear to fit the data well within a given sample period, tend to perform poorly in out-of-sample testing.[4]

The extent to which monetary models (or, indeed, *any* existing structural models of exchange rates) fail to explain even medium-term volatility is difficult to overstate. The out-of-sample forecasting performance of the models is so mediocre that at horizons of one month to two years they fail to outperform a naive random walk model (which says that the best forecast of any future exchange rate is today's rate). Almost incredibly, this result holds *even* when the model forecasts are based on actual realized values of the explanatory variables.

3. Obstfeld and Rogoff (1996, chap. 9) also made this point.

4. This result was demonstrated for various major currency exchange rates in Meese and Rogoff (1983a, 1983b) and has since survived extensive empirical testing. For an excellent survey of the literature, see Frankel and Rose (1995).

What does this mean, exactly? Examples of explanatory variables in structural exchange rate equations are countries' relative output growth, interest rates, and money supplies. Obviously, if these variables are extremely hard to predict (say because one or both countries have highly erratic monetary policy), then of course it will be difficult to predict exchange rates one year hence. Prediction will be difficult no matter how well a model can explain exchange rate changes after the fact. But the inability of models to forecast exchange rates runs deeper than that. It turns out that even if one gives models the (seemingly prohibitive) advantage of forecasting with actual realized (one year hence) values of outputs, interest rates, and the like, they *still* fail to outperform the naive random walk model. True, this extreme result breaks down at very long horizons, over two years (see Meese and Rogoff 1983b; Mark 1995), but again even this success relies on using out-of-sample information about the explanatory variables. Therefore, it is by no means established that monetary models can forecast exchange rates in any meaningful way.

The skeptical reader might react to the negative forecasting results we have been discussing by saying to himself or herself: "Well, surely a market-based variable such as the forward exchange consistently outpredicts the naive random walk model." Nothing could be farther from the truth. Indeed, as Lewis (1995) noted, hundreds of studies have consistently found that, if anything, forward exchange rates tend to point in the wrong direction! More precisely, in regressions of the actual realized change in the spot rate on the "forward premium" (the difference between today's forward rate and today's spot rate), one tends to find a negative correlation! A literal interpretation of this result says one *can* use the three-month forward rate to predict the spot rate three months hence. But (ignoring risk), the money-making strategy involves betting *against* the forward rate. The results in table 8.1 for the dollar-yen and dollar-mark thirty-day forward rates are representative of the kind of results one finds in this literature.

If the forward rate were truly an unbiased predictor of the future spot rate, one would expect to find coefficient β_1 on the forward premium near one (on average if the forward rate is 4 percent above today's spot rate, the realized exchange rate will be 4 percent above as well.) Instead, the coefficient β_1 is

Table 8.1 **Forward Premium Puzzle**

Exchange Rate	β_0	β_1
Dollar-yen	.005	−2.62
	(.004)	(1.01)
Dollar-mark	−.001	−.64
	(.003)	(1.15)

Data Source: Datastream International.

Note: Representative regressions for the dollar-yen and dollar-mark exchange rates; nonoverlapping monthly data, 1989:2–97:9. Equation is $e_{t+1} - e_t = \beta_0 + \beta_1(f_t - e_t) + \varepsilon_{t+1}$, where e_t is the log of the time t spot rate and f_t is the log of the thirty-day forward rate. Numbers in parentheses are standard errors.

actually negative. (Here it is not significantly less than zero for the dollar-mark rate, but in larger samples, it often is.)

Of course, there is no theoretical quandary here, since the forward rate incorporates a risk premium, and it is perfectly possible that on average, the risk premium tends to outweigh the trend change in exchange rates (and tends to be negatively correlated with it). It is also quite likely that there is a "peso problem" in the data—the floating rate period is still very young, and markets incorporate expectations of unlikely events (say a significant global conflagration) that (happily) have not been witnessed in the sample (see Rogoff 1980; Lewis 1992). These expectations appear to impart a bias in the forward rate that would disappear in a sufficiently large sample. Overall, though, a reasonable interpretation of results is that there is simply no evidence that the forward rate outperforms the random walk model.

Lest we leave the reader with an image of total darkness in the realm of exchange rate forecasting, one should mention a couple of bright spots. First, there is an increasing consensus across a broad number of studies that purchasing power parity (PPP) considerations do matter for long-run exchange rate determination (see Froot and Rogoff 1995; Rogoff 1996). (The most widely tested form of PPP test posits that over long periods, changes in exchange rates reflect cumulative inflation differentials.) The half-life of PPP deviations, however, appears to be extremely long, on the order of three to four years. That is, if a 10 percent appreciation of the nominal yen-dollar rate leads to a corresponding change in the real (CPI-adjusted) yen-dollar rate, then, on average, roughly 5 percent of the shock will have dissipated after four years. This, of course, does not tell us what happens to the nominal exchange rate because part or all of the adjustment can take place through relative price movements rather than the exchange rate. But at least it is evidence that there is some anchor out there for exchange rates.

Second, newer theoretical models emphasizing nonmonetary factors have increasingly come to supplant the classic Keynesian framework of Mundell, Fleming, and Dornbusch. These "new open economy macroeconomics" models emphasize other factors in addition to money, including government spending and productivity shocks. Whereas it is extremely unlikely that even these newer models will be able to explain very short term fluctuations in exchange rates, early evidence suggests that the other factors they emphasize may be at least as important as monetary factors in medium- to long-run exchange rate determination (see Obstfeld and Rogoff 1996, chaps. 4 and 10).

Overall, the empirical evidence on exchange rates overwhelmingly supports the view that simply making monetary policy more stable and predictable can only go part way toward quelling exchange rate volatility. The steady deregulation of global capital markets since the 1960s and the stunning pace of innovation in global finance make stabilizing exchange rates a much more complex problem that it was in the halcyon days of the Bretton Woods system of fixed exchange rates.

8.2.4 What Are the Costs of Exchange Rate Volatility?

Though simply bringing down inflation is not enough, it *is* possible in principle to stabilize the yen-dollar and mark-dollar exchange rates should global monetary authorities attach a sufficiently high weight to that objective. For example, the United States and Japan could in principle slavishly peg their currencies to the euro. Other mechanisms for fixing exchange rates might allocate the right to steer global monetary policy more evenly, but as the European experience has shown us, the coordination problems involved in such a system can be quite severe, absent political integration. I will return to these issues in the final section of this paper.

Here I want to tackle a different question. How serious are the costs of exchange rate volatility, and how great would the gains be to removing it? At a casual level, it would seem that the costs of exchange rate volatility are rather obvious. Exchange rate volatility presents significant problems for exporters and importers, not to mention any company considering building a plant abroad. At a mundane level, the estimated cost of a two-week trip to Europe can easily rise or fall 10 percent between the time one embarks and the time one returns. But if society is to devote significant resources to squeezing major-currency exchange rate volatility out of the system, it would be nice to have a more quantitative feel for the benefits, rather than simply relying on casual empiricism. Is it a wrench in the works of global trade (a perspective one often hears from Europe), or is it merely a relatively minor irritant?

An obvious point to make is that the ability of firms and individuals to hedge against exchange rate risk places an upper bound on the size of the costs. Hedging may be expensive, but not infinitely so, especially as international capital markets deepen and opportunities for portfolio diversification multiply. Even without hedging exchange risk through financial instruments, a company may still be able to mitigate the effects of exchange rate volatility by simply shifting its purchases and sales in response to price signals. The same is true at the individual level; when the costs of German cars rise due to an appreciation of the euro, Americans can shift demand toward domestic and Japanese models. Demand for international travel is similarly quite price elastic. There is no question that more Europeans come to visit New York when the dollar is weak. Thus the ability of individuals and companies to shift demand across time and goods tempers the costs of volatility.

However, there is an important sense in which the above discussion misses a fundamental point. Even with perfect forward markets—in all things, not just exchange rates—there is no way for the world as a whole to hedge against global risks. For this reason, much of literature on risk premiums in forward exchange markets—or in stocks and bonds, for that matter—neglects the inconveniences of the trading of individual risk and focuses on the equilibrium costs of global risks. Generally speaking, though, this line of reasoning leads to the conclusion that the costs of insuring against global risks should not be

all that large, since global output is simply not all that volatile. For example, the standard deviation of postwar U.S. consumption has averaged under 3 percent per year. Even if this risk cannot be diversified away, it is not easy to construct models where the welfare effects are large.[5] (This same logic underlies the so-called equity premium puzzle. How can stocks offer such a consistently high rate of return relative to bonds if the risks to aggregate output are so low?)

Thus the benefits of eliminating exchange rate volatility must lie elsewhere, since the benefits of reducing consumption volatility (and consumption is presumably the ultimate welfare objective) are not likely to be very large even if exchange rates truly are a major cause. Of course, all of this discussion is predicated on the assumption that markets are very complete and global volatility is what matters. This view is too extreme, even if it is true that global capital market innovation is constantly reducing the costs of diversification. Still, these kinds of considerations should cause one to question just how great an evil exchange rate volatility can be.

Empirical evidence comparisons on the volatility of output and trade under fixed versus flexible exchange rates tend to underscore the difficulty of detecting the real effects of exchange rate volatility. It is true that if one looks across a broad spectrum of postwar experiences with fixed and flexible exchange rates, real rates are far more volatile under floating.[6] The reason is that domestic CPIs tend to fluctuate far less than nominal exchange rates. Thus if the nominal exchange rate is fixed, fluctuations in the real exchange rate are inevitably going to be much less. One can try to explain away this fact by arguing that flexible rates tend to be adopted precisely in situations where real shocks are more volatile (indeed, this is precisely the prescription of the classic Mundell-Fleming model). But a careful look at the historical circumstances under which shifts between fixed and floating rates have taken place shows that this argument is quite weak. Real exchange volatility tends to rise precipitously within weeks, if not hours, of when a country shifts to flexible rates. Whereas it is possible that there has been reverse causality in some circumstances, the finding that real exchange rates become more volatile after floating is universal. Surely, the relative rigidity of price levels is the main explanation, not the endogeneity of exchange rate regimes. (The relative inflexibility of prices compared to exchange rates remains even when one looks at very disaggregated price data, and even when one looks at goods that one would typically regard as highly traded.)[7]

So floating indeed makes real exchange rates more volatile. The open question, however, is whether real exchange rate volatility has an effect on any

5. This point was first raised by Lucas (1988); for a discussion, see Obstfeld and Rogoff (1996, chap. 5).

6. This point is made very forcefully by Mussa (1986).

7. Again, for a survey, see Rogoff (1996).

other macroeconomic variables. Are trade flows greater under fixed rates than flexible rates? Is output, consumption, or investment more volatile? The small number of studies that have looked at this question tend to find that the exchange rate regime has little or no influence on volatility of macroaggregates (see Baxter and Stockman 1989; Flood and Rose 1995). Admittedly, the evidence is far less conclusive or systematic than the evidence on real exchange rate variability. But at the very least, it appears that differences do not (or at least have not yet) jumped out of the data.

A third reason why exchange rate volatility may not be all that problematic comes out of recent efforts to provide microfoundations for the classic exchange rate theories of the 1970s (see Obstfeld and Rogoff 1996, chap. 10). This new research suggests that while exchange rate volatility may have adverse effects, they are not necessarily first order. If the major distortions in the economy include factors such as labor market distortions, tax distortions, and monopoly distortions, then the welfare effects of exchange rate movements depend to a large extent on whether they exacerbate or ameliorate these distortions. At the moment, the empirics of this question are not resolved.

In sum, the costs of exchange rate volatility are not firmly established, and the weight of recent research points to the possibility that they are distinctly smaller than one might have thought previously. We have already seen that stock markets are more volatile than exchange rates. But should one consider stock market volatility a profound macroeconomic problem? Certainly, some regional economies are dramatically affected by big swings in the S&P 500. Wall Street plays a big role in New York City's economy, and the earnings due to the stock market boom are an important factor in the city's recent rising fortunes (just as the bust of the late 1980s made it temporarily much easier to find New York taxicabs in the rain). Overall, though, squelching stock market volatility is not seen as a pressing national priority that should dominate all macroeconomic decisions (as Europe has chosen to make the goal of achieving intra-EMS exchange rate stability).

8.2.5 What Can Be Done about Yen-Dollar-Euro Exchange Rate Volatility?

One can put a different spin on the embarrassing difficulty researchers have in showing that macroeconomic performance is significantly affected by the exchange rate regime. Flood and Rose (1995) have argued that if there is no obvious macroeconomic cost in shifting to fixed rates, and if there might be gains at the microeconomic level (albeit hard to measure), then why not prefer fixed rates? One answer, of course, is that a sustained exchange rate peg may not even be feasible. Over the past decade, speculators have targeted and overrun one fixed rate regime after another, so that today, by any measure, there are very few long-standing (more than ten years) fixed rate regimes. According to

Table 8.2 **Foreign Exchange Reserves and the Monetary Base, September 1994**

Country	Monetary Base (% of GDP)	Reserves (% of GDP)	Reserves/Base (%)
Belgium	6.7	12.1	180
Denmark	8.6	8.1	94
Finland	11.2	10.4	93
France	4.6	4.6	100
Germany	9.9	6.2	63
Ireland	9.1	16.1	177
Italy	11.9	5.6	48
Mexico	3.9	4.7	120
Netherlands	10.0	13.6	136
Norway	6.3	18.7	297
Portugal	25.0	28.0	112
Spain	12.6	9.6	76
Sweden	13.0	12.1	93
United Kingdom	3.7	4.3	116

Sources: IMF, *International Financial Statistics* (Washington, D.C., 1996), CD-ROM; Obstfeld and Rogoff (1996, 566).

the Bank for International Settlements, the daily flow through foreign exchange markets is $1.2 trillion per day (Ito and Folkerts-Landau 1996), far in excess of the combined reserve holdings (including gold) of any central bank.[8] If speculators are determined to attack an individual country's currency, what chance can it have to defend?

Actually, from a technical perspective, most countries have more than adequate reserves (even without borrowing) to defend their currencies against attack, should they be determined to do so. Table 8.2, for example, shows that all of the European countries whose exchange rates fell to attacks in 1992–93 had sufficient reserves to buy back most if not all their outstanding currency supplies.[9]

But the reason exchange rate attacks can still succeed, even where the central bank has more than adequate reserves, is that governments are often extremely reluctant to raise interest rates to the extent necessary to fend off a major sustained attack. In practice, central banks tend to rely on massive sterilized intervention rather than sharp reductions in the monetary base to fend off exchange rate attacks. The idea is to placate speculators by altering the cur-

8. The exchange market flows certainly include some double counting, but on the other hand, so too do gross measures of global foreign exchange reserves (since Japanese holdings of U.S. Treasury bills are obviously a debt for the United States).

9. Table 8.2 does not include central bank forward positions, which if large can complicate the analysis of reserve adequacy. Though forward contracts do not involve any capital outlay, capital gains and losses suffered on forward contracts lower effective reserves. (The Bank of England is rumored to have lost more than $7 billion dollars this way within a matter of a few hours during the attack on the pound in 1992.)

rency denomination of bond supplies held by the public, an operation that has very little effect on interest rates. While such intervention may or may not be effective at influencing exchange rates during "normal times" (see chap. 3.2 by Kathryn Dominguez), during crises, the effects tend to be far too small to fend off speculators.

What of the example of Europe, which by any measure has achieved a significant level of stability in intra-European rates? Can the EMS serve as a blueprint for the United States, Europe, and Japan? Not in the near term. Even with the high degree of political harmonization in Europe, it is not clear that EMS exchange rates would have stabilized in the mid-1990s if officials had not continued taking dramatic steps toward the ultimate goal of a single currency. It seems highly unlikely that such stubbornly independent regions as Europe, the United States, and Japan would presently be capable of agreeing on a world monetary policy, or that any two or three would be willing to adopt the monetary policy of the third. Of course, if all three regions were willing to permanently relinquish their right to engage in countercyclical monetary policy, and all agreed on targeting zero inflation, the difficulties in coordination would be much less. But even if the (developed) world is an optimal currency area in the sense of Mundell (1961), this does not mean that these countries have the political desire to place nearly as much emphasis on exchange rate stability as the countries of Europe have. The European experience clearly demonstrates that political will is at least as important as any other factor.

What about capital levies on exchange market transactions? Could such taxes, if universally implemented, put "sand in the wheels" of exchange markets as Tobin (1978) advocated? Perhaps, and some recent writers have advocated taking this idea seriously (see, e.g., Eichengreen and Wyplosz 1993). But there are reasons to be profoundly skeptical. First of all, as Kenen (1996) convincingly showed, the practical problems in implementing a Tobin tax are enormous, and problems of evasion would be rampant. And Kenen did not even consider how such laws would create an attractive opportunity for organized crime. The potential costs in terms of microeconomic inefficiency are likely to be considerable, even if difficult to measure. Deep, liquid markets have been essential to many of the financial innovations witnessed by the United States in recent years. These financial innovations have had many spillovers, from making mortgage markets for individuals more liquid to facilitating the corporate restructuring that took place in the United States during the 1980s. Capital market levies would greatly reduce market liquidity and slow the rate of financial innovation throughout the world. It is possible that some smaller economies might benefit from market-based capital levies to help mitigate the notorious "capital inflows" problem. But even this is highly debatable. For the United States, Japan, and Europe, it seems likely that the costs of capital market levies would exceed any potential benefits, even if as a practical matter they did succeed in reducing exchange rate volatility.

8.2.6 Conclusions

Central banks have been remarkably successful in subduing inflation in recent years, but the level of exchange rate volatility among the big three currencies (dollar, euro, and yen) has subsided only slightly. Aside from having some vague idea that financial market shifts are the major culprit behind exchange rate volatility, economists' understanding of the empirical sources of short-term exchange rate volatility is still quite limited. The old idea of purchasing power parity has some force, but only over very long horizons.

At the same time economists are having trouble explaining exchange rate volatility, they are also having difficulty in explaining exactly why it should have profound effects on welfare. Macroeconomic performance is not conspicuously different under fixed versus flexible rates. Nor is it obvious that eliminating exchange rate volatility would have much effect on the volatility of aggregate consumption. So our main conclusion is that exchange market volatility is clearly a nuisance but not necessarily one worth making the focus of international macroeconomic policy.

The view expressed here clearly contrasts with that of mainstream Europe, in which fixed exchange rates have taken on a near religious significance and are thought to be able to cure all evils from unemployment to arthritis. I would argue that European integration has likely been a success in spite of the move to one money, rather than because of it.

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