WHAT HURTS MOST?: G-3 EXCHANGE RATE OR INTEREST RATE VOLATILITY

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1. Introduction

While fashions concerning appropriate exchange rate arrangements have shifted over the years, advocacy of establishing a target zone surrounding the world's three major currencies has remained a hardy perennial. The early expressions of a target-zone approach (pioneered by McKinnon, 1979 and 1997, and Williamson, 1986, and recently summarized by Clarida, 1999) mostly emphasized the benefits to industrial countries. But in recent years, analysts apportioned some of the blame for financial crises back on the shoulders of volatile bilateral exchange rates of industrial countries that exacerbated strains associated with smaller countries' tendency to smooth the values of their own currencies vis-a-vis the dollar. With local currencies in terms of the dollar relatively stable, movements in the exchange values of the currencies of major countries–in particular a prolonged appreciation of the U.S. dollar vis-a-vis the yen and the deutsche mark in advance of Asia's troubles–worsened the

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competitive position of many emerging market economies. Because the currencies of those smaller economies were often pegged, or at least tied to some extent in a managed float, linked to the dollar, the strong dollar made their goods more expensive in many other markets. One solution to reducing shocks emanating from abroad, the argument runs, would be to reduce the variability of the G-3 currencies by establishing target bands around them.[2] This paper examines the emerging-market-economy aspect of the argument for target zone but will be silent on the costs and benefits for the industrial countries.

It turns out that the consequences for emerging markets of damped fluctuations in G-3 exchange rates depends importantly on the policy mechanism that damps those fluctuations. In principle, exchange rates could be induced to stay within a target bands through some combination of three tools. First, national authorities could rely on sterilized intervention to enforce some corridor on bilateral exchange rates. Effectively, this would pit the foreign exchange reserves available to national authorities against the resources commanded by market participants in a battle over some desired level of the exchange rate. Experience teaches that more often than not, the private sector brings more resources to bear, as witnessed by the spectacular collapses of the Exchange Rate Mechanism in 1991, the Mexican peso in 1994, and the Asian financial crises. This shows through in the academic literature by the lack of empirical support for the effectiveness of sterilized intervention in industrial countries, documented by Dominguez and Frankel (1993). Second, national

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[2] Of course, since European monetary union, the G-3 currencies cover at least thirteen countries–the United States, Japan, and the eleven nations that have adopted the euro.

authorities could impose some form of exchange or capital control, in effect hobbling market attempts to exert pressure on the exchange rate. Such restrictions could take the form of a transactions tax, as suggested by James Tobin (1978), or framed as prudential reserve requirements, as offered by Eichengreen and Wyplosz (1993). Opponents of such efforts generally argue that capital controls generate financial innovation that undercuts them over time. Thus, they either become increasingly complicated or irrelevant, as discussed by Garber (1997). Third, monetary policy makers in the major countries could alter domestic market conditions to keep the foreign exchange value of their currencies in a desired range. This could take the form of allowing intervention in the currency market to affect domestic reserves–that is, not sterilizing intervention–or more directly keying the domestic policy rate to the exchange value of the currency.

Given the reality of the ineffectiveness of sterilized intervention and the apparent distaste of policy makers to return to controls on capital controls that helped keep exchange rates stable over the Bretton Woods era, a commitment to damping G-3 exchange rate fluctuations requires a willingness on the part of G-3 authorities to use domestic monetary policy to that end. But if G-3 interest rates must move more to enforce smaller fluctuations in exchange rates, the net effect on emerging markets becomes less self-evident. While trading patterns can become more stable in an environment of predictable G-3 exchange rates, interest costs do not. The welfare consequences to an emerging market economy, therefore, depend on initial conditions, the specification of behavior, and the dynamic nature of the tradeoff of damped G-3 exchange rate fluctuations for heightened interest rate
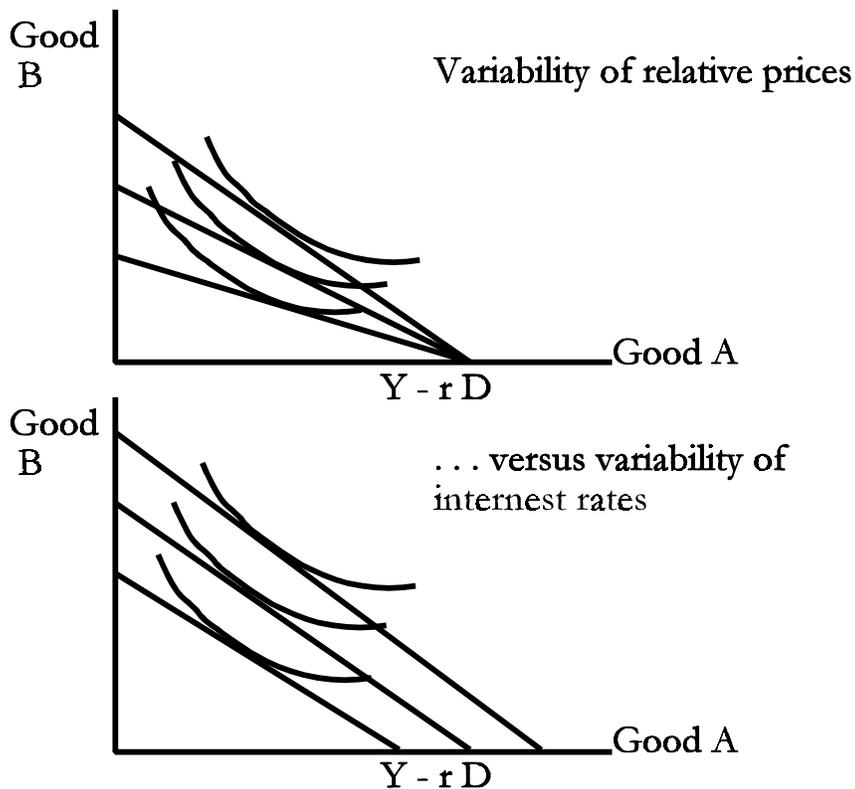
variability.

This paper will proceed in four parts. Section 2 summarizes the main arguments put forth for reducing G-3 volatility from an emerging market economy's perspective. Section 3 considers two small models, one to explain how the dynamic comovement of the exchange rate and policy interest rates depend on the degree of commitment to a target zone and another to calculate the welfare consequences for a small open economy. Section 4 will examine the link between the volatility of exchange rates in emerging market economies with that of the G-3 currencies. Section 5 will try to place the advocacy of G-3 target zones in the broader debate on exchange rate regimes in emerging-market economies.

2. Some Background

The advocates of limiting the volatility of the bilateral exchange rates of G-3 currencies tend not to work from a specific model and usually emphasize the advantages for industrial countries. Rather than review that work, we intend to interpret it from a small-country perspective. The argument that excessive volatility of G-3 exchange rates imposes significant costs on emerging markets seems to rely mostly on a spending channel. A large swing in the dollar's value on the foreign exchange market in terms of the yen and the euro translates directly into changes in the competitiveness of those countries that link their currencies to the dollar–either through a hard peg or a softer managed float. (And to be sure, the evidence amassed by Calvo and Reinhart (2000) of the widespread "fear of floating" that makes authorities unwilling to trust a flexible exchange rate would place a large number of emerging market economies in this group.)

In essence, this mechanism can be seen in a basic single-period, two-good model of

Variability of relative prices

Good B (vertical axis), Good A (horizontal axis), Y - r D

. . . versus variability of internest rates

Good B (vertical axis), Good A (horizontal axis), Y - r D

trade for a small open economy, as in the figure. This figure is drawn for a country taking as given the relative price of the two traded goods that receives an endowment in terms of good A, which is the same good in which its external debt is denominated and pegs its currency to that of country A.[3] Volatility of the relative price of the trade goods–which might stem solely from nominal changes in exchange rates between the industrial countries if the small country fixes its exchange rate or prices to the industrial country market–pivot the budget line and thus alter the desired consumption combination in the small country. Hence, there is a cost associated with developments on the foreign exchange market for the small country.

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[3] Behind the scenes of this model in the larger industrial world, it is simplest to think of two large countries, A and B, specialized in the production of their namesake good.

The problem, however, is that the G-3 countries would be only able to deliver reduced volatility of their cross rates by policy action, not just be announcing good intentions. Reduced G-3 exchange rate volatility will only be accomplished if the major central banks change short-term interest rates in response to incipient changes in cross rates. For most emerging-market economies, which are debtors, such coordination of G-3 monetary policy could deliver more stable terms of trade at the expense of a more variable interest service. That is, as in the bottom of the figure, the budget's line slope would be more predictable but its position less certain. As a result, the implications for utility are not obvious.

3. Theory

This informal discussion highlights only the effects of changes in relative prices on the consumption decision in a single period of a country small on the world market. To the extent that the efforts to stabilize G-3 exchange rates are dynamic and require G-3 central banks to move their interest rates persistently in response to target deviations, the characterization of the small country will have to have an intertemporal element as well. The dynamic pattern and the degree of comovement between G-3 exchange and interest rates will depend on policy preferences on the sources of shocks. Rather than work through one world model, we propose examining two simpler models, first to make broader generalizations about G-3 variables and then to offer more precise predictions about welfare in a small country. We would consider:

1. **A two-country model** emphasizing the aggregate demand channel implicit in

the advocacy of G-3 target zones would have:

- complete specialization of production

- utility (of the Stone-Geary type) defined over the two goods in each country, which Ogaki, Ostry, and Reinhart (1996) assert explains spending behavior in many developing countries

- two local monies introduced by a cash-in-advance constraint

- an exchange rate pinned down by uncovered interest parity

- prices set at staggered and overlapping intervals

- monetary policy set by interest-rate-smoothing rules

By introducing the exchange rate–and increasing its weight–in the policy rule, we can consider differing levels of commitment to a target zone. The joint movement of the exchange rate and the two policy interest rates to different shocks (aggregate supply, aggregate demand, and the exchange-rate risk premium) over time will be the key input into the small-country model. Note that the large-country model is only of interest for its implications for the smaller country. We will not use it to speak to the advantages or disadvantages of target zones for the G-3 countries.

2. **The small country.** The intertemporal element in a small country's spending decision has been analyzed in the literature on temporary stablizations. We plan to use the model of Reinhart and Smith (1999), amended to consider two traded goods rather than one that is traded and one that is not. That model is

otherwise standard, with money introduced by a Clower constraint and uncovered interest parity pinning down the exchange rate. Given joint processes for the world interest rate and the relative price of the two traded goods–informed by the model in point 1–we would perform repeated stochastic simulations to calculate expected volatility and the variance of utility. As the processes are changed to reflect the trading off of bilateral exchange rate volatility for interest rate volatility by the G-3 authorities, we would recalculate utility, allowing us ultimately to make welfare comparisons.

4. Empirics

The empirical section will document the observed contribution of G-3 exchange rate volatility to a fairly large set of currencies of emerging-market economies over the floating rate period. From the perspective of aggregate economic behavior, the relevant overall exchange rate for a small country would be some index, w^i for country i, as in:

$$w^i = (\$ / s^i)^\sigma (\text{Yen} / s^i)^\nu (\text{Euro} / s^i)^{1-\sigma-\nu}$$

where the notation is obvious and time subscripts have been omitted. We can operationalize this using monthly data on bilateral exchange rates and the Directions of Trade data for some base period to get appropriate weights. Because most of the countries in our sample focus on the dollar, it is more convenient to rewrite this as

$$w^i = (\$ / s^i) \ (\text{Yen} / \$ \ )^\nu (\text{Euro} / \$ \ )^{1-\sigma-\nu}$$

This gives us a simple chain rule for reporting the contributions of changes in the aggregate exchange rate. With this, we will

1. Decompose the variance of the weighted exchange rate into the contributions of the local value of the dollar, the two G-3 bilateral exchange rates, and cross products for various periods. This will likely highlight Calvo and Reinhart's "fear of floating", in that the G-3 terms will often contribute a large share (outside of crisis periods) as local authorities choose to smooth the exchange rate to the dollar.

2. Capture dynamic elements by estimating three-variable VARS in ($/s^i), (Yen/$), and (Euro/S) and constructing variance decompositions of the weighted exchange rate. The small-country assumption allows us to put the local currency in the bottom of the ordering (although during a crisis that might be less tenable). The share of the variance of the weighted index at different horizons attributable to the dollar spot rate will give some dynamic notion both of how large is the potential benefit of making G-3 bilateral rates more predictable and how large is the fear of floating.

3. Look for groupings among our sample. The simplest way will be to sort the variance decomposition results by country at a specific horizon, creating sets of dollar-, yen-, and euro-block countries. A more ambitious approach would be to follow an index-model approach. Placing the local currency at the bottom of the VAR ordering is essentially equivalent to estimating an equation

including the two contemporaneous bilateral G-3 exchange rates. We can

estimate that equation for each emerging market economy and then effectively

perform factor analysis on the residuals using Goldberger's (1971) technique.

We would then hope to find some obvious interpretations to the indexes

associated with the largest roots.

4.   Perform sensitivity analyses on the estimations in points 2 and 3 by including

oil and other commodity prices and U.S. interest rates.

5. Some related considerations

In addition to summarizing the results, the concluding section will try to put the G-3

target zone argument into a broader perspective on the ongoing debate on exchange–rate

arrangements in emerging market economies, which usually hinge on credibility. The

advocates for dollarization, for instance, argue that a nation with an uneven history of

showing a commitment to low inflation can import the reputation of the central bank of the

anchor currency. For the issue at hand in this paper, however, there are no obvious

credibility bonuses to smaller countries should G-3 central banks damp the fluctuations of

their currencies. This also implies that the direct benefits to emerging market economies

should stem only from the lessened volatility of their trade-weighted currencies. But as Rose

(1999) points out, the benefits of reduced exchange rate variability on trade flows, at least,

are small compared to adopting a common currency.

This is also the place to discuss the limitations to our analysis. In particular, our use

of linear–or nearly linear models–may understate the consequences of variability in interest

rates and exchange rates. To the extent that high world interest rates trigger balance sheet problems in emerging markets, the consequences of the tradeoff implied by a target zone may be considerable. Indeed, one repeated message of this paper will be that emerging market economies, which have already surrendered a high degree of autonomy in their monetary policies, often price their goods in foreign–not local–currencies, and can be shut out of world financial markets suddenly, are different from their industrial brethren.