

SCHOOLS BRIEF

Why currencies overshoot

This brief in our series on the modern classics of economics looks at exchange rates. The fourth of our chosen studies, published in 1976, started by assuming that foreign-exchange markets are “efficient” and “rational”—and then explained why currencies are nonetheless unstable

EXPECTATIONS AND EXCHANGE-RATE DYNAMICS. By Rudiger Dornbusch. *Journal of Political Economy*, vol 84, 1976.

THE exchange rates of the main industrial economies have been free to float only since 1973, when the Bretton Woods system of fixed exchange rates collapsed. The large swings in currencies during the past 17 years have stimulated new interest among economists in theories to explain the forces that drive exchange rates. These new theories have focused on the role of internationally traded capital and investors' expectations.

Under the Bretton Woods arrangements, countries had to maintain their currencies (by official buying and selling) within 1% of their fixed rates against the dollar. The rules said that a country could change its fixed rate only if its balance of payments was in “fundamental disequilibrium”.

Long before the system broke down, most economists had advocated floating exchange rates. If rates were free to move, they said, governments would regain the use of monetary policy for domestic economic goals. Also exchange rates would move automatically to reflect changes in relative prices; real exchange rates (nominal exchange rates adjusted for differences in inflation) would therefore be steadier, and trade imbalances smaller.

Floating proved a disappointment. Currencies fluctuated by far more than was necessary to offset relative-price movements. So real exchange rates have actually been far more volatile in the 1970s and 1980s than in the three previous decades of fixed currencies.

Exchange rates have also moved perversely. Currencies appreciated in countries with big trade deficits and high inflation. The dollar, for example, rose by 30% against the yen and by 76% against the D-mark from 1980 to

early 1985 even though its inflation rate was far higher than Japan's and West Germany's. The loss of competitiveness helped to transform America's current-account balance into a large and growing deficit, yet, for a while, the dollar carried on climbing.

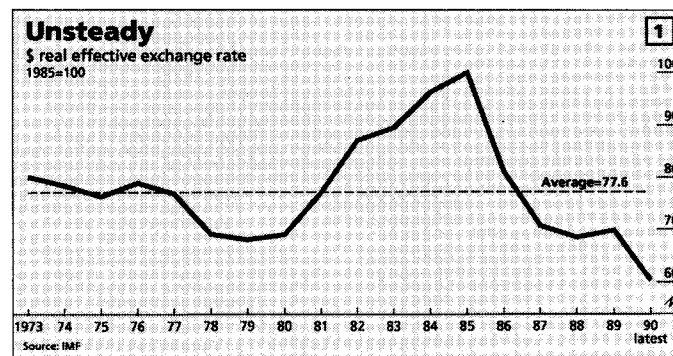
It would be easy to blame exchange-rate volatility on inefficiencies in the foreign-exchange market or on the irrational behaviour of speculators. But the most widely accepted theory of exchange rates, developed by Rudiger Dornbusch, now of the Massachusetts Institute of Technology, shows otherwise. In ‘Expectations and Exchange-rate Dynamics’ Mr Dornbusch argued that big swings in ex

change rates should move in line with relative inflation rates. So, for example, if America's inflation rate is 6% and Germany's 3%, then the dollar should fall by 3% a year against the D-mark to maintain PPP.

Some economists then mated PPP with the quantity theory of money, which says that changes in the level of prices are caused by changes in the money supply. The offspring was an exchange-rate theory known as the monetary approach. This said that exchange rates are determined by differences in the rates at which countries' money supplies grow.

Suppose that exchange rates start in equilibrium at PPP, with \$1 equalling DM2, say. Then if America doubles its money supply, prices will eventually double, leaving each dollar worth (in terms of purchasing power) half as many D-marks as before. The exchange rate falls to \$1 equals DM1.

While PPPs are backed by a powerful economic logic, they have proved useless in forecasting exchange-rate movements. If the relative PPP theory held, real exchange rates would be fairly constant over time. As chart 1 shows, they are anything but.



change rates are exactly what you should expect if the foreign-exchange market is efficient.

Introducing PPP

Before coming to Mr Dornbusch, consider some of the earlier theories that he was building upon. The simplest model is based on the idea of purchasing-power parity (PPP). This theory says that exchange rates gradually move to equate the prices of internationally traded goods—ie, to ensure that \$100 buys as much in America as \$100-worth of yen buys in Japan.

The “relative” version of the

and services.

The asset-market approach therefore assumes that capital flows are more important than trade flows in determining exchange rates. It argues that if capital is fully mobile, investors will shift their funds, and hence exchange rates will move, until the total expected returns from each currency (ie, interest plus the expected depreciation or appreciation of the currency) are equal.

Suppose, for example, that D-mark deposits offer 5% interest while dollar deposits pay 10%. If the dollar is not expected to change from its current rate, investors will favour the dollar, pushing it higher. The foreign exchange market will only move back to equilibrium when the dollar reaches a level from which investors expect it to depreciate by 5% over a year against the D-mark.

It follows that exchange rates will change when interest-rate differentials change or when expectations about future exchange rates change.

Now, elegantly mix the two approaches. In the long term, equilibrium exchange rates are determined by PPP; in the short term, exchange rates are determined entirely in asset markets, by interest rates and expectations. This is the model Mr Dornbusch uses to explain currency overshooting.

And rational too

If capital is perfectly mobile, currencies will shift until domestic interest rates are equal to foreign interest rates plus the expected rate of change in the currency. But now comes a question familiar to readers of previous briefs in this series: how is that expectation arrived at?

Mr Dornbusch assumed that expectations are “rational”—ie, that investors take account of all available information about current and future events, including a view on the fundamental forces that drive exchange rates. In other words, he assumed that in the long run people expect the exchange rate to return to PPP. He also assumed that investors expect currencies to move at a rate that is proportional to the discrepancy between the current exchange rate and PPP: the bigger the gap, the faster the expected change.

So far, this echoes the simple monetary model. But that model

implicitly assumed that prices and wages are flexible. That is why an increase in the money supply causes a smooth and rapid rise in prices. In practice, **wages and prices are sticky**, and take time to adjust. This has dramatic consequences.

Suppose America's Federal Reserve unexpectedly expands the money supply. Ask first what will happen in the long term. In this monetarist-flavoured model, nothing "real" will change. Prices, the theory says, will rise in proportion to the increase in money; the real money supply will therefore be as before. From this it follows that interest rates, again in the long term, will be the same as at the start. The nominal exchange rate, driven by changes in PPP, will depreciate in proportion to the change in prices—so in the long term the real exchange rate will be unchanged, too.

In the short-term, however, the picture is much more interesting (see chart 2). Immediately after the increase in the money supply, prices are only just beginning to rise. At this stage, thanks to sticky prices, the real money supply is greater than before. As a result, interest rates will drop. Later, as prices increase, the real money supply will shrink back, and the interest rate will rise.

What happens to the exchange rate? Since investors have **rational expectations**, they know that prices will eventually rise to the full extent of the change in the money supply—and that the dollar must depreciate from its starting point. Because of that expected depreciation, investors will require higher interest rates to persuade them to carry on holding dollar assets. But, as explained above, interest rates are for the moment lower than they were originally, not higher.

To restore equilibrium, the dollar must depreciate to less than its long-term value—to a point from which it is expected to appreciate. Then investors will be content to hold dollars because the expected appreciation will compensate them for the period of low interest rates.

In this case the dollar **undershoots**. An unexpected tightening of monetary policy (causing a rise in interest rates) would work in a parallel way. The dollar would initially **overshoot**—to a point at which expected depreciation would just offset the rise in

Defining equilibrium

THE overshooting theory explains divergences in exchange rates from their long-run equilibrium. Unfortunately, the idea of equilibrium is itself unclear. The most common definition is PPP—the rate which equates the prices of a basket of similar tradable goods and services across countries. Estimates of PPPs vary, but Goldman Sachs, an American investment bank, reckons the dollar's PPP at DM2.27—about 50% above the current DM1.48.

Others claim that the equilibrium exchange rate is that needed to achieve a "sustainable" current-account balance. America has become the world's biggest debtor, with a mounting burden of interest to pay. To regain current-account balance it would therefore have to run a trade surplus. Some economists conclude from this that the dollar needs to be kept below its PPP for a while. Mr John Williamson, of the Institute of International Economics, has calculated what he calls fundamental equilibrium exchange rates (FEERs) for the dollar. He defines this as the rate which will produce a current-account deficit small enough to be financed comfortably and indefinitely. He estimates the dollar's FEER at about DM1.41.

Exchange rates against \$

	Actual Nov 27 1990	PPP	FEER
Yen	128.3	206.0	114.0
DM	1.48	2.27	1.41
£	0.51	0.71	0.63

Sources: Goldman Sachs; Inst. for International Economics

interest rates.

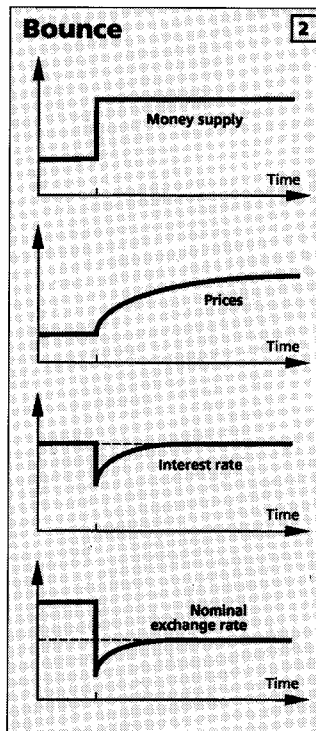
Within this framework it is easy to see why divergences from PPP can be bigger under flexible exchange rates than under fixed rates. When exchange rates are fixed, and provided that inflation is low, changes in the relative prices of domestic and foreign goods occur relatively slowly. Under a floating-rate system, in contrast, exchange rates can move suddenly; if prices are sticky, real exchange rates may swing dramatically.

Can this model explain the dollar's surge in 1980-84? In part, yes. After the Fed's unexpectedly tight monetary policy of 1979-80, the dollar rose far above its expected PPP value. The dollar started to fall in 1985; now, after a spell of looser monetary policy, it seems to be undershooting.

However, the asset-market theory is far from complete—as Mr Dornbusch himself is the first to point out. If the theory were true then currencies would actually jump around much more than they do. In practice, exchange rates do not always move when monetary conditions unexpectedly change. America's monetary policy has often shifted during the 1980s, but the dollar has only occasionally moved in response. Also, the tendency of exchange rates to

move towards PPP even in the very long term seems much weaker than the theory seems to require.

Still, Mr Dornbusch's paper was extremely influential. It highlighted the role that expectations play in determining current exchange rates, and it showed that unstable currencies



are not necessarily evidence of inefficiency in financial markets.

Thanks to Mr Dornbusch and others, modern economists have a better understanding of the causes of **exchange-rate volatility**. They are, however, less sure of what governments should do about it.

Remedies

Unsurprisingly, enthusiasm for floating exchange rates has waned in the past ten years. Some economists now argue for a return to fixed exchange rates. The European Community is even considering a merger of its 12 currencies into one—the ultimate fixed-rate system.

Other economists, perhaps the majority, prefer managed exchange rates to rigidly fixed ones; one model is the present **exchange-rate mechanism** of the European Monetary System. Dyed-in-the-wool monetarists—led, as ever, by Milton Friedman—still insist that governments should take care of domestic monetary policy and let exchange rates look after themselves.

Even though Mr Dornbusch has examined the intrinsic volatility of floating exchange rates, he is himself no fixer. He says that many of the charges levelled against floating rates are no more convincing than the drunk driver's complaint, on smashing up his car, that the roads are unsafe.

Arguably, the biggest portion of blame for the overshooting of the dollar in the 1980s lies not with the exchange-rate system itself but with the "domestic" economic policies pursued by America and the other big economies. For much of the 1980s America mixed a loose fiscal policy with a tight monetary policy. This contributed to massive swings in capital flows across the foreign exchanges and created a needlessly uncertain financial climate. Occasional attempts to stabilise exchange rates, notably after the Louvre accord of 1987, failed partly because the economic policies of the would-be stabilisers were incompatible.

This experience, like Europe's with the ERM, suggests that managing exchange rates might make sense when governments are willing to co-ordinate their economic policies. If they are not, economies will have to live with roller-coaster currencies.