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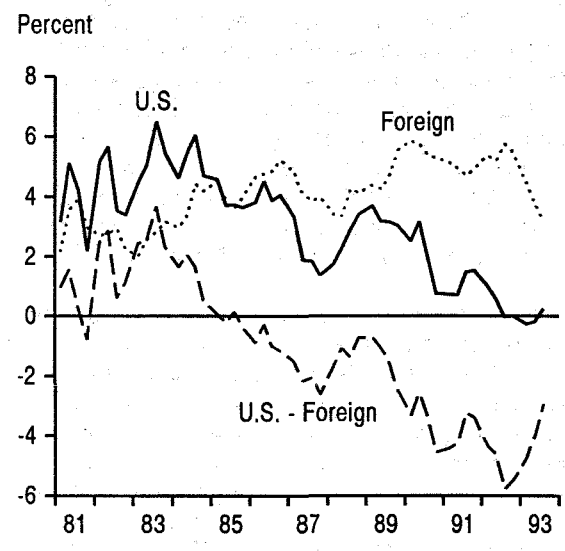
Linkages of National Interest Rates

As government-imposed barriers to the international flow of capital between the major industrialized countries were relaxed in the 1970s and virtually eliminated in the 1980s, the international integration of financial markets increased dramatically. Some have argued that the international integration of financial markets would tend to equalize real interest rates at home and abroad, making them move closely together over time. But the data do not support this argument. The U.S. real interest rate on 91-day Treasury bills first rose well above that on a trade-weighted measure of rates on comparable foreign money market instruments in the early 1980s and then fell well below such rates afterward (Figure 1). The reason for the divergence has to do with the operation of a system of flexible exchange rates.

This *Weekly Letter* first discusses the evidence for the existence of a high degree of international integration of financial markets since the early 1980s. It then explains the effect that such integration would be expected to have on real interest rate differentials under a system of flexible exchange rates, as opposed to one of fixed rates. Finally, it presents estimates of the response of the differential between U.S. and foreign real interest rates to shocks to either rate.

Figure 1
Real Short-Term Interest Rates



Evidence of financial market integration

Nearly complete international integration of financial markets, at least for relatively large borrowers and lenders, is indicated at the short end of the market. U.S. rates tend to move closely together with major "covered" foreign interest rates, that is, covered against exchange rate uncertainty in the forward market. The forward market allows a U.S. investor to sell foreign exchange in the future at a price that is known today, thus eliminating uncertainty in the dollar denominated return on foreign assets. Dealers in forward exchange require a price that compensates them for the expected change in the exchange rate and the risk that the actual change may turn out to be different from expectations. Given the availability of such forward cover, investors in fully integrated markets tend to bid the spot and forward prices of foreign exchange to the point at which the premium on forward foreign exchange relative to spot foreign exchange equals the difference between U.S. and foreign interest rates. In the 1980s the average absolute difference between U.S. and covered foreign short-term interest rates has been only about 25 basis points.

These results indicate almost a complete absence of institutional or governmental barriers to international flows of capital. But they do not necessarily imply an equality between U.S. and foreign real interest rates, that is, nominal interest rates adjusted for inflation. The reason is that the premium or discount on the forward cover does not necessarily equal the difference in inflation rates. As a result, as seen in Figure 1, differences between U.S. and the trade-weighted measure of foreign real interest rates can persist despite the existence of a parity in covered returns.

Linkages under fixed and flexible exchange rates

Under a system of fixed exchange rates, such as the Bretton Woods system that existed from 1946 to 1973, nominal interest rates at home and abroad tend to be closely linked in the absence of governmental controls over capital flows. The

reason is the near absence of exchange rate uncertainty when exchange rates are fixed by monetary authorities to within a small deviation from the official parity. Capital tends to flow to that economy with the higher nominal interest rate, since only a small amount of the difference in interest returns can be offset by changes in the exchange rate. In the process, the increase in the supply of loanable funds in the economy with higher interest rates and the corresponding decrease in the low interest rate economy tends to bring about an equalization of nominal interest rates. Because the system of fixed exchange rates holds together only if price levels at home and abroad are not allowed to get out of line with one another, rates of inflation at home and abroad tend to be similar also. This produces a tendency for an equalization of real interest rates, or nominal rates adjusted for inflation, as well.

Under a system of flexible exchange rates, which characterizes most major currencies since 1973, there still is a strong tendency for capital flows to equalize real interest rates at home and abroad over the long run. But the process is less direct and may not be observable in the short to medium run. Even when there are no institutional or governmental barriers to the international flow of capital, two elements tend to work against the equalization of real interest rates at home and abroad under flexible exchange rates: (1) expected changes in exchange rates, and (2) premiums in interest rates to compensate for the risk of unexpected changes in currency values.

Under flexible exchange rates, if real interest rates are higher at home than abroad, then a capital inflow tends to occur, just as in the fixed rate case. But the capital inflow pushes up the value of the home currency at the same time that it adds to the supply of loanable funds at home. Whether national real interest rates are fully equalized by this process depends in part upon expectations about the future value of the real exchange rate. If investors believe that the upward pressure on interest rates and the exchange rate in the home country is temporary, they will be willing to bring in capital only up to the point at which the expected future depreciation in the real value of the home currency just offsets the difference in real interest rates, except for any differential due to a premium to compensate for exchange rate risk. As a result, variations in the pressures on interest rates at home and abroad produce varying differentials in real interest rates. These are proportional to expected future changes in the real exchange rate towards a longer run equilibrium. Evidence of the importance of this expectational factor is that movements in real interest rate differentials have been significantly associated with movements in real exchange rates (Throop 1993).

The importance of premia for exchange rate risk as an additional factor contributing to divergences in real interest rates is suggested by evidence from surveys of market expectations of future exchange rates. If currency risk premia were small, we would expect fairly small differences in anticipated returns on comparable assets calculated using survey data as a measure of expected exchange rate changes. But Pigott (1993–1994) shows that this is not the case. Therefore, changing currency risk premia probably also contribute to variation in differentials between real national interest rates. Unfortunately, empirical studies to date have had little success in isolating the fundamental economic factors that tend to cause changes in these currency risk premia.

Empirical evidence

To determine the extent to which U.S. real interest rates tend to be equalized with real rates abroad over a longer run, a simple dynamic model (an "error correction" model) was estimated for the period of fully integrated financial markets since the early 1980s (Throop 1994). Figure 2 shows the effect on the differential between the U.S. and the trade-weighted foreign real short-term interest rate of a 1 percentage point shock to the U.S. rate, and Figure 3 indicates the effect on the same differential of a 1 percentage point shock to the foreign rate. The shaded areas indicate a 95 percent confidence interval around these estimated "impulse-response" functions based on the observed distribution of errors in the historical sample.

A positive shock of 1 percentage point to the U.S. rate is estimated to raise the U.S. rate by close to 1 percentage point, but to have little effect on the foreign rate. As a result, the estimated response of the U.S. minus the foreign interest rate to a 1 percentage point shock to the U.S. rate is not significantly different from 1 percentage point and is significantly different from zero over a period of up to 16 quarters (Figure 2). (A zero response would correspond to the case of an equalization of interest rates, either by the U.S. rate falling or the foreign rate rising sufficiently after the shock.)

Similarly, Figure 3 indicates that the response of the differential to a 1 percentage point shock to the foreign rate is not significantly different from minus 1 percentage point and is also significantly different from zero. Thus, shocks to either real

Figure 2
Effect of Shock to U.S. Real Interest Rate on the Differential

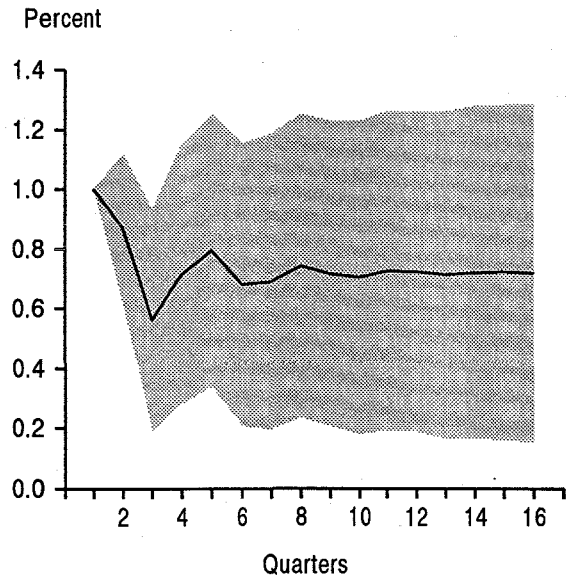
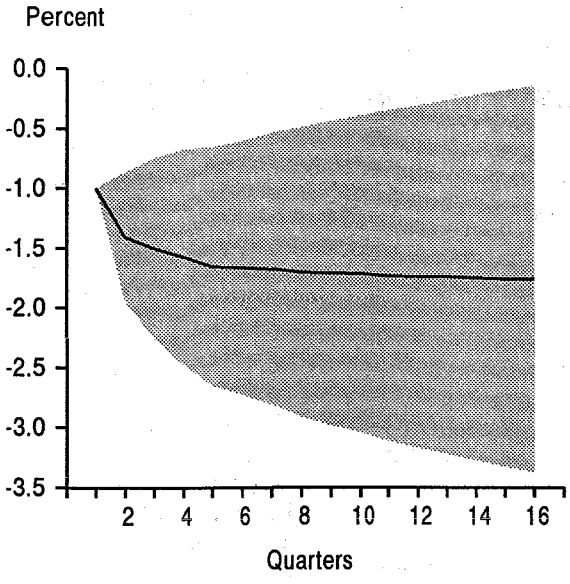


Figure 3
Effect of Shock to Foreign Real Interest Rate on the Differential



interest rate have close to a one-to-one effect on the differential, with no significant tendency for this effect to die out over 16 quarters. Moreover, a further statistical test indicates that in the long run, there has been no significant tendency for real short-term interest rates at home and abroad to move in the same direction during the period of fully integrated financial markets.

Conclusion

Since the early 1980s, national financial markets in the U.S. and other major countries have been fully integrated, in that they essentially operate without government-imposed barriers to the international flow of capital. Yet, we have shown that the responses of U.S. and foreign real interest rates to one another have been extremely weak. This is not surprising. Under a system of flexible exchange rates, national real interest rates can be kept apart for extended periods of time by time-varying expectations of changes in exchange rates and varying premia for bearing exchange rate risk. As a consequence, U.S. and foreign central banks have been able to influence their domestic interest rates quite independently from the influence of interest rates abroad, despite a high degree of international integration of financial markets.

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MONETARY POLICY OBJECTIVES FOR 1994

On July 20, Federal Reserve Board Chairman Alan Greenspan presented a mid-year report to the Congress on the Federal Reserve's monetary policy objectives for the remainder of 1994. The report reviews economic and financial developments in 1994 and presents the economic outlook heading into 1995. For single or multiple copies of the report, write to the Public Information Department, Federal Reserve Bank of San Francisco, P.O. Box 7702, San Francisco, CA 94120; phone (415) 974-2246 or fax (415) 974-3341.

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