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# FRBSF WEEKLY LETTER

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## The Real Effects of Exchange Rates

Exchange rates have fluctuated widely since the abandonment of the Bretton Woods fixed rate agreement in 1973. The nominal trade-weighted value of the dollar dropped 13 percent between 1974 and 1979, then rose 63 percent from 1979 to 1985, and then fell 62 percent between 1985 and 1990. What matters, however, is not how much the *nominal* exchange fluctuates, but how much the *real* exchange rate fluctuates. For example, the nominal exchange rate might move around simply in response to differing rates of inflation, in which case the *real* exchange rate would remain unchanged; and it is changes in the *real* exchange rate that affect U.S. competitiveness. If the real value of the dollar is high relative to other currencies, then U.S. products are relatively costlier, and therefore less attractive to markets abroad.

This *Weekly Letter* examines evidence on how changes in real exchange rates affect two price relationships: First, the price of U.S. relative to foreign tradeable goods and services, such as automobiles and tourism; second, the price of U.S. tradeables relative to U.S. nontradeables, like telephone service or haircuts. The results suggest that exchange rates have large effects on the prices of tradeable goods in the U.S. relative to those abroad, despite significant adjustments in the profit margins of foreign producers. At the same time, exchange rates appear to have insignificant effects on the prices of tradeable relative to nontradeable goods in the U.S. This implies that movements in resources between the tradeable and nontradeable goods sectors needed to adjust the balance of international payments have *not* required large changes in the overall distribution of income between labor and capital, or in the returns to labor and capital in tradeable or nontradeable goods sectors of the U.S. economy.

### Relative prices of tradeable and nontradeable goods

The real exchange rate is a commonly used measure of international competitiveness, and it is defined as the price of the home country's goods in terms of foreign currency divided by the

price of foreign goods in that same currency. For example, when the real value of the dollar rises, this means that U.S. goods are becoming less competitive because their prices are rising relative to the prices of foreign goods, measured in terms of the same currency. During the 1970s and 1980s, the real value of the dollar measured in terms of overall price levels certainly moved around quite a lot, suggesting that U.S. competitiveness was affected by exchange rate fluctuations, as were production and distribution in our economy.

But the real exchange rate variation in terms of overall price levels may not tell the whole story. It is possible that the "law of one price" holds for tradeable goods. That is, it may be that through international arbitrage the prices of tradeable goods may be equal across countries. If that were true and if there were no fixed relationship between the prices of tradeable and nontradeable goods, then exchange rate movements could lead to changes in the prices of tradeables relative to nontradeables. For example, a dollar appreciation caused by inflows of foreign capital would tend to depress the price of U.S. tradeable goods to keep them competitive with foreign tradeables, without significantly influencing the price of U.S. nontradeables. In the U.S. this change in prices would decrease production and increase consumption of tradeables, while also increasing production of nontradeables. These developments would worsen the U.S. trade balance, thus offsetting the capital inflow and maintaining a balance in international payments. But the reallocation of resources from tradeables to nontradeables in the U.S. would in this case require significant changes in the prices of one sector compared with the other, and therefore also in the returns to labor and capital in the two sectors.

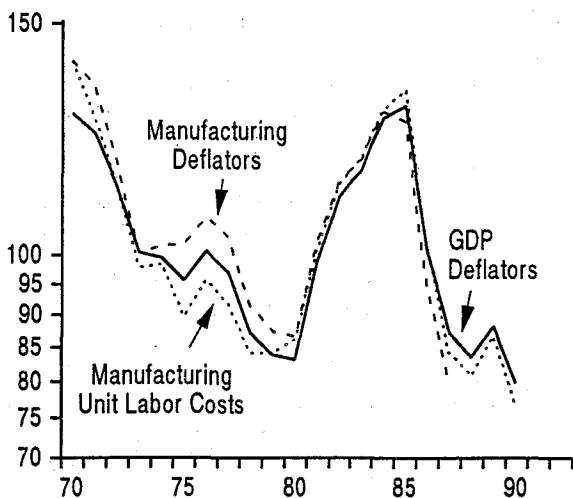
In this situation, the real exchange rate would vary when measured in terms of overall price levels, but it should be roughly constant when measured in terms of the prices of tradeable goods. Whether this is the case can be tested once the tradeable goods sector of the economy

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is identified. The available statistics do not allow a clean separation between tradeable and non-tradeable goods. However, the tradeable goods sector of the economy is fairly well represented by manufacturing. While manufacturing produces only slightly more than 20 percent of the U.S. gross domestic product, about three-fourths of all exports and imports are manufactures. Some trade takes place in travel and transportation services and such professional services as finance and insurance, but most services are not traded internationally. Finally, although the output from resource-based sectors like agriculture, fishing, forestry, mining, and quarrying has a large traded component, relative prices of these sectors have fluctuated quite widely for reasons other than movements in exchange rates. So they are excluded from our rough measure of tradeables.

Figure 1 shows that the real value of the dollar when measured in terms of either prices or unit labor costs of manufactured goods has not stayed constant, but rather has followed much the same path as when measured in terms of GDP deflators, an overall price measure. Thus, arbitrage has not equalized the prices of tradeable goods. Home and foreign traded goods generally appear to be quite imperfect substitutes, violating the "law of one price." Therefore, international adjustment requires changes in the prices of traded goods at home relative to traded goods abroad.

**Figure 1**  
**Real Value of Dollar**

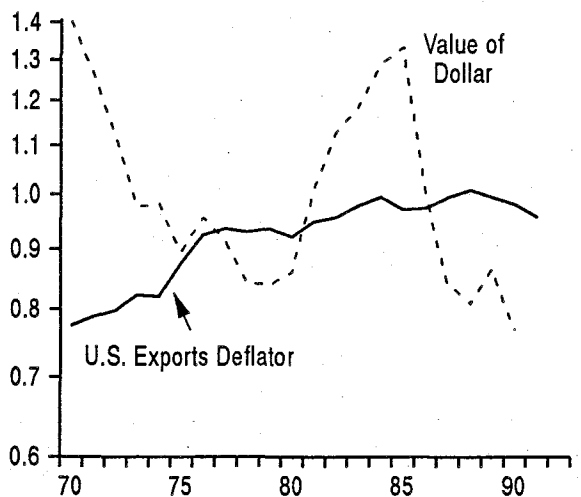


Furthermore, prices of tradeables and nontradeables have followed quite similar paths over time, both domestically and abroad. There has been a gradual downward trend in the prices of manufactured goods relative to other prices, which has not been interrupted by ups and downs in the value of the dollar. This suggests that the main effect of changes in exchange rates has been to alter the prices of both tradeables and nontradeables at home relative to those abroad, rather than the prices of tradeables relative to nontradeables. Thus, a dollar appreciation tends to reduce the demand for U.S. tradeables by reducing the demand for U.S. exports, and increasing the demand for U.S. imports. But the required reallocation of resources from tradeables to nontradeables in the U.S. takes place relatively smoothly, without requiring large changes in the prices of one sector compared with the other, or in the returns to labor and capital in those sectors.

## Relative prices of U.S. and foreign tradeable goods

The effect of changes in exchange rates on the prices of tradeable goods is seen from the point of view of U.S. exporters in Figure 2. Despite large swings in the real value of the dollar (measured in terms of unit labor costs in manufacturing), the dollar price of U.S. exports has been

**Figure 2**  
**U.S. Manufactured Exports Deflator Relative to U.S. Labor Costs vs. Real Value of Dollar\***

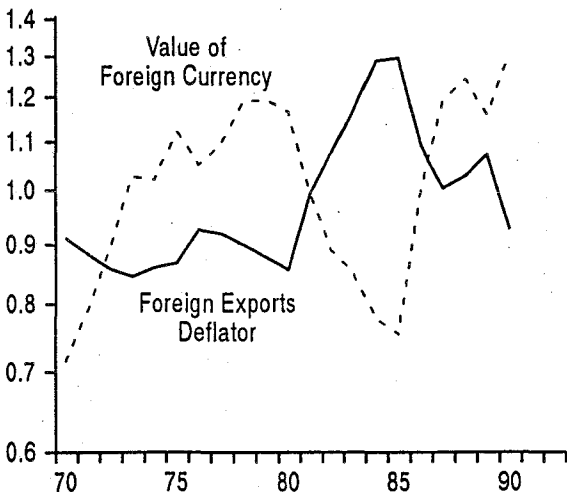


\*In terms of manufacturing unit labor costs

relatively constant. Thus, U.S. producers generally have not absorbed changes in exchange rates through changes in their profit margins; as a result, changes in the value of the dollar have been almost completely passed through to foreign purchasers. Consequently, changes in exchange rates have had roughly proportional effects on the relative prices of U.S. tradeable goods in foreign markets.

In contrast, Figure 3 shows that foreign producers have let their profit margins on exports to the U.S. increase when foreign currencies have weakened relative to the dollar and decrease when foreign currencies have strengthened. To do this, they have had to sell exportable goods at different prices at home and abroad. As a result, the response of the dollar price of U.S. imports to changes in exchange rates has been reduced. From 1979 to 1985 for example, the real value of foreign currency dropped by 37 percent, but dollar prices of imports fell relative to U.S. costs by only 11 percent over the same period. Similarly, between 1985 and 1990, when the real value of foreign currency rose 73 percent, dollar prices of U.S. imports rose relative to U.S. costs by only 22 percent.

**Figure 3**  
**Foreign Manufactured Exports Deflator**  
**Relative to Foreign Labor Costs vs.**  
**Real Value of Foreign Currency\***



\*In terms of manufacturing unit labor costs

What accounts for this "pricing to market" on the part of foreign producers? The most important factors appear to be the costs of sales, distribution, and service infrastructure and uncertainty about exchange rates. Foreign exporters do not wish to incur the cost of expanding this infrastructure unless exchange rates can be expected to be permanently favorable. Similarly, once the infrastructure is built, it will not be abandoned unless it is believed that exchange rates will be unfavorable for some time. Thus, foreign exporters typically will take a "wait and see" attitude towards changing prices in other national markets. To do this, however, requires charging different prices for the exportable goods at home and abroad. The enforcement of such price discrimination appears to be less worthwhile for U.S. producers, whose foreign markets are a relatively small proportion of total sales.

### Conclusion

The evidence shows that changes in exchange rates have significant *real* effects and do much more than simply offset changes in overall national price levels. Fluctuations in the dollar have been accompanied by changes in the prices of tradeable goods at home relative to those abroad, which have been needed in order to maintain an overall balance in international payments. These adjustments have taken place with little change in the prices of tradeable relative to nontradeable goods either at home or abroad, however, because resources have been able to move fairly easily between these two sectors without large price incentives. As a result, large swings in the real exchange rate have not produced sharp changes in the overall distribution of income between labor and capital, or in the returns to labor and capital in the tradeable and nontradeable goods sectors. But "pricing to market" by foreign producers has significantly limited the response of U.S. import prices to changes in the value of the dollar, requiring larger changes in the dollar than would otherwise have been necessary.

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The *FRBSF Weekly Letter* appears on an abbreviated schedule in June, July, August, and December.