Technical correction: The inflation-adjusted index of the dollar

The article, "The international value of the dollar: An inflation-adjusted index" in the January/February 1987 issue of *Economic Perspectives*[1] contained an error in the formulation of the equation that specified the inflation-adjusted aggregate exchange rate of the dollar. As formula (1) is specified on page 21, the relative prices term is inverted. The correction is as follows: The ratio of the CPI for the United States to the CPI for country i is used to measure the relative movement of prices in the United States as compared with the movement of prices in country i. The corrected equation (1) for the calculation of the Chicago real trade-weighted dollar follows:

$$(1) \qquad 7\text{-}Gr_t = 100 \left[\prod_{i=1}^{16} \left(\frac{CPI_{U.S.,t}}{CPI_{i,t}} \; \frac{XR_{i,t}}{XR_{i,0}} \right)^{\overline{W}_{i,t}} \right]$$

where
$7\text{-}Gr_t$ = the Chicago real trade-weighted dollar in quarter t.

An equivalent formulation for applying the deflator to nominal exchange rates is:

$$(2) \qquad 7\text{-}Gr_t = 100 \left[\prod_{i=1}^{16} \left(\frac{XR_{i,t}}{XR_{i,0}} \div \frac{CPI_{i,t}}{CPI_{U.S.,t}} \right)^{\overline{W}_{i,t}} \right]$$

In the example at the bottom of page 19 the real DM/\$ exchange rate in t_1 should be 2.47 DM/\$ with the real appreciation between t_0 and t_1 being 23.4 percent as compared with the 20 percent nominal appreciation. The third sentence of the final paragraph of that example should read: "However, the dollar cost in terms of the claim on U.S. real resources necessary to acquire that product at a real exchange rate of 2.47 mark/dollar would be \$42.51—less than in time t_0 and less than indicated by the nominal exchange rate. The relative increase in U.S. prices contributed to a boost in the real appreciation of the dollar above that of the nominal appreciation."

Recall that during the period of inquiry, 1971-1986, U.S. prices *relative* to price trends in the countries included in the 7-G indexes performed as follows: During 1971-1977, U.S. prices declined; during 1978-1980, U.S. prices increased; during 1981-1983, U.S. prices declined; and during 1984-1986 U.S. prices remained stable. The relative price movements in conjunction with nominal dollar exchange rate trends exerted the following modifying influences during the 16-year period under study:

(1) During 1971-1977 the nominal value of the dollar declined. Falling relative U.S. prices exacerbated the decline. Thus, the relative-price adjusted exchange rate declined more than the nominal exchange rate. The real competitive position of the dollar improved more during that period than is reflected by a nominal measure of the aggregate value of the dollar.

(2) During 1978-1980 the nominal value of the dollar continued to decline. However, the trend in U.S. relative prices turned upward in 1978. As a result, the impact of U.S. inflation began to offset the continued decline in the nominal aggregate value of the dollar. Consequently, in real terms the competitive position of the dollar began to deteriorate in the first-quarter of 1979. This was well before the turn-around indicated by the nominal indexes, which indicate that the competitive position of the dollar began to deteriorate in the fourth quarter of 1980.

(3) During 1981 to mid-1983 the nominal value of the dollar increased. U.S. relative prices declined. Thus, the real deterioration in the dollar's competitive position during this period was somewhat less than indicated by the nominal index.

(4) From mid-1983 into 1986 there was virtually no change in U.S. relative prices, consequently, during this period the nominal aggregate index is a near

perfect proxy for the relative-price adjusted index.

Due to the correction in the relative price term we will restate, with some modification, our initial conclusions.

First, the trend of the 7-Gr real dollar index, as corrected here, was negative during the 1970s (rather than positive as initially reported). (The 7-Gr index, of course, remained unchanged.) Indeed, because U.S. prices were declining during this period, relative to other index-country prices, the real dollar index declined more (the dollar became more competitive in international markets) than the nominal index.

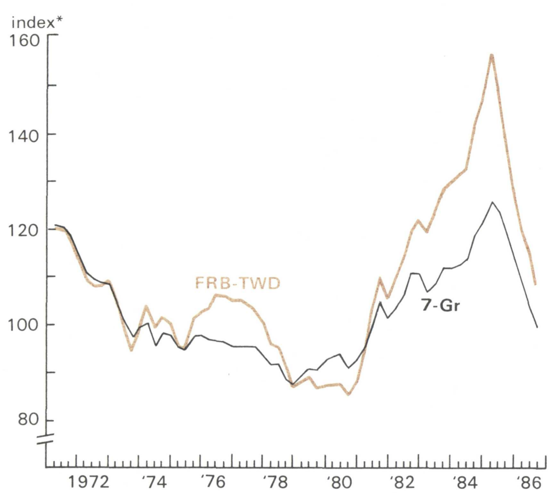
However, the turn-around in the trend, and thus the beginning of the deterioration in the competitive position of the dollar, commenced substantially earlier than indicated by nominal indexes. The 7-Gr index, as corrected here, "bottomed out" in the fourth quarter of 1978 and had increased 8 percent by the time the nominal indexes—the 7-Gn and the FRB-TWD—reached their low points in the third quarter of 1980.

Second, the initial formulation of the real index indicated a somewhat surprising convergence of the index level during three periods of current account balance—1971, 1974, and 1979-1980. Evidence of such a convergence disappears in the corrected index. Index levels during 1971, when fixed exchange rates remained in force during much of the year, were far outside the index range in 1974 and 1979-1980 (this is also true for the nominal indexes). Indeed, this is less surprising than was the initial finding, given the apparent overvaluation of the dollar that led to its devaluation at the end of 1971, again in 1973, and the subsequent floating of the dollar. Evidence of convergence is also much weaker in the latter two periods. While the range of the 7-Gr index as corrected here (98.0 for the year 1974 and 90.4 for the two years 1979-1980) remains narrower than the range observed for the FRB-TWD we do not consider this to be an especially interesting property of the index.

Third, the conclusion concerning the magnitude in the decline of the dollar and its longer term "recovery ratio" remains fully supported, indeed, is strengthened. The decline in the dollar since early 1985, as measured by the more broadly based 7-G nominal and price-adjusted indexes, has been more moderate than suggested by the more narrowly based indexes such as the FRB-TWD. Both 7-G indexes indicated a depreciation of about 23.5 percent between the first quarter of 1985 and the third quarter of 1986. By comparison, both the FRB-TWD index and a FRB-TWD index modified to account for relative price changes indicated a depreciation of about 37 percent.

However, placed in a longer term perspective the recovery ratio, which sets the

The 7-Gr and the FRB trade-weighted dollar indexes



*The 7-Gr index is constructed to have a common base with the Federal Reserve Board's trade-weighted dollar as of the first quarter of 1973, which equals 104.8.

7-Gr real trade-weighted dollar*

Year	Q1	Q2	Q3	Q4	Annual average
1971	120.9	120.2	118.8	114.6	118.6
1972	110.9	109.5	108.7	108.7	109.5
1973	104.8	100.4	97.9	99.2	100.6
1974	100.0	95.9	98.2	97.8	98.0
1975	95.0	94.6	97.9	98.0	96.4
1976	97.0	96.7	96.4	95.8	96.5
1977	95.9	95.4	95.0	93.4	94.9
1978	91.4	91.1	88.2	87.9	89.7
1979	89.3	90.9	90.4	92.3	90.7
1980	93.3	93.4	90.7	92.5	92.5
1981	95.1	99.7	104.9	101.2	100.2
1982	103.4	106.2	110.3	110.3	107.6
1983	106.9	108.7	111.8	111.7	109.8
1984	112.2	113.4	118.9	120.9	116.4
1985	125.9	123.3	119.1	113.1	120.4
1986	108.4	103.2	99.7	—	—

*The 7-Gr index is constructed to have a common base with the Federal Reserve Board's trade-weighted dollar as of the first quarter of 1973.

magnitude of the dollar's depreciation since the first quarter of 1985 in relation to the magnitude of the dollar's appreciation (since the late 1970s when the real indexes turned up and 1980 when the nominal indexes turned up), indicates that the decline in the dollar relative to its earlier appreciation for the nominal and real comparisons and for the 7-G and FRB comparisons are virtually identical. As of the third quarter of 1986 the recovery ratios for the corrected 7-Gr index and the relative-price adjusted formulation of the FRB-TWD were 0.69 and 0.70, respectively. The recovery ratios for the nominal indexes were nearly identical to those of the relative-price adjusted indexes. The 7-Gn index and the FRB-TWD index both recorded recovery ratios of 0.68.

——— Jack L. Hervey and William A. Strauss

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[1] Vol XI, issue 1, pp. 17-28, Federal Reserve Bank of Chicago.