The international value of the dollar: An inflation-adjusted index

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The value of the dollar relative to a number of major currencies has declined markedly since early 1985. Yet, measures of U.S. international trade continued to deteriorate in 1986. The current account deficit during the first half of 1986 was running at an annual rate of nearly $140 billion, compared with a deficit of $118 billion in 1985, and a $6 billion surplus as recently as 1981.

Aggregate measures of the international value of the dollar are useful in looking at the relationship between the international value of the dollar and trade. Such measures help us address such questions as: how far the dollar has really declined; how much decline is enough; and how the value of the dollar relates to U.S. international competitiveness. But to answer these questions, the measure itself must be appropriate to the question and be as sturdy and as accurate as possible.

In this paper we argue that to look at international competitiveness the use of a nominal dollar-value index, which may be informative about developments of short duration, can be misleading over longer periods. Consequently, questions about competitiveness should rely on an aggregate exchange rate index that is adjusted to compensate for relative price movements between countries.

We develop a relative-price adjusted aggregate dollar index (7-Gr) and (for comparative purposes) a parallel nominal index (7-Gn) that cover the period 1971 through the third quarter of 1986. (The 7-G notation is a standard identification referring to the Seventh Federal Reserve District.) Currencies of sixteen major trading-partner countries are included in the index. The relative importance of each currency in the index is determined by a 12-quarter moving average weight based on the U.S.'s export-plus-import trade with each country. (A concurrent line of research is being conducted that considers the comparative aspects of various aggregate indexes and will be reported on at a later date.)

To place the dramatic developments in the exchange rate markets during the last five years in perspective, an overview of the entire period since floating exchange rates became established in early 1973 is important. This is particularly true as we look at what has happened to a real-sector measure of the international exchange value of the dollar. We derive a number of interesting observations from the 7-G indexes. The 7-Gr (real) index indicates that the international value of the dollar was stronger in the 1970s than is generally thought, and that the dollar's advance in the early 1980s was greater and its subsequent decline in 1985-1986 was more moderate than the comparable nominal indexes show. Finally, there is some indication—needing further study—that the 7-Gr index may show a consistent relationship with current account balances, as in 1971, 1974, and 1979-80. If this observation is reliable, the dollar is still well above such a "balance" level at this time.

The aggregate measure of a currency's value

A number of issues are involved in the construction of an aggregate index of the dollar's value. The number of countries to be included and the weights assigned to those countries have received the most attention.

Concurrent research by us indicates that differences attributable to various weighting schemes in the development of an aggregated dollar exchange index, while interesting, are of little practical significance. This issue will be examined in more detail in a future article. More interesting, and more important from longer term perspective, is the impact of relative price changes (inflation) on an aggregate

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exchange rate index. To that issue we now turn.

The 7-G nominal and real-dollar indexes

An exchange rate is the nominal "price" of one currency in terms of another. Because an exchange rate is a nominal price, changes in that price do not necessarily reflect a divergence in the economic relationships between countries which determine competitive positions. When the price relationship between two countries' currencies is changing, the relationship between other economic variables—real and nominal—is also likely to be changing. Of particular interest is what is happening to the relative rates of productivity and inflation between the two countries.

Only by coincidence does the relative change in productivity or inflation for any two countries change in proportion to the observed change in the nominal exchange rate. Consequently, an attempt to measure the "real" economic consequences of a relative change in the exchange rate between currencies requires that the nominal exchange rate be adjusted to take into account the divergence in real economic developments that occurred between the respective economies. Of the two adjustment measures noted—relative rates of productivity and relative rates of inflation—an adjustment based on relative rates of inflation seems to hold more promise for reflecting the relative or real competitive differences of the various economies.

Changes in relative productivity between countries would be an ideal measure of the change in the real competitive characteristics of the respective economies. But changing structural relationships between manufacturing and service industries, especially during the past decade, make aggregate productivity measures difficult to interpret domestically and nearly useless for a cross-country comparison. This is further complicated by the lack of comparably defined measures across countries, indeed, the absence of such measures for some countries. Thus, relative productivity measures as real adjustment factors are virtually precluded from rigorous empirical use.

On the other hand, a real adjustment factor based on the relative change in prices has several advantages, not the least of which is the availability of data. In a market economy, prices incorporate, albeit indirectly, a broad spectrum of real and nominal economic forces pressing on the economy.[1] To the degree that components related to price change (due to advances in productivity, quality differences, inflation, and so forth) can be isolated to accurately identify the non-real influences on the economy, a country's price index is a useful tool in the measurement of the progression of relative economic developments between countries. On this basis we select price indexes and relative price movements between countries as an adjustment factor for developing a real exchange rate.

What price index to use? A general index, a commodity- or industry-specific index, or something in between? The answer to this question depends more on what is being asked of the price-adjusted exchange rate than on the specifics of the price indexes. Questions dealing with the macro-economic relationships of the exchange rate would seem to be concerned most appropriately with general price relationships and the broad scale competitive factors such as the "cost-of-doing-business in an economy." With these specifications we argue that a general index is preferable and that a price index along the lines of a GNP deflator would most closely fit this requirement. Unfortunately, these data are not widely available.

On the other hand, consumer price indexes (CPI) are widely available. They also are broad-scale indexes and more closely parallel the performance of the GNP deflators than do the narrower wholesale/producer price indexes, or the industry- and commodity-specific price indexes.

With any of these price indexes there are problems associated with comparability of coverage across countries and even within countries over time. In addition, measurement error and the bias introduced by the imposition of price/wage distortions through government action require that we interpret relative price-adjusted aggregate exchange rate indexes with some caution.

These caveats apply in particular for those countries where the question of data reliability is a first concern and where the rates of inflation are very high. In the development of measures of relative inflation rates, a hypothetical measurement error of 10 percent, for example, may be acceptable from an empirical point of view for countries with similar and

comparatively low inflation rates of say 4 percent. But, the same degree of error in inflation estimates incorporated in a measure of the relative rates between a country with a 4 percent rate of inflation and one with a nearly 150 percent rate of inflation (the average annual rate for Brazil during the 1980-1985 period) must give observers pause. For these reasons—concerns about data reliability and the bias introduced by measurement error—the high inflation countries are not included in our real aggregate exchange rate index for the dollar even though several of these countries (Mexico and Brazil, in particular) are important trading partners of the United States.[2] Whether the data error and inflation bias issues can eventually be adequately accounted for with these important trading partners is an open question.

Our interest in an aggregate measure of the international value of the dollar lies in the degree to which such a measure reflects the competitiveness of the United States over time. The 7-G dollar indexes utilize quarterly data and are constructed so as to measure the nominal and relative inflation-adjusted (real) change in the value of the dollar against the currencies of 16 major trading partners. In 1985 these countries accounted for 71 percent of U.S. merchandise export/import trade. (See Table 1 for a listing of the countries included.)[3] The major distinguishing factor in country selection, as compared with the Federal Reserve Board's trade-weighted dollar (FRB-TWD) index, is the inclusion of Pacific rim countries—also characteristic of other recently constructed aggregate indexes such as the "Atlanta index."[4] The importance of each country's currency in the index is set by determining the United States' bilateral merchandise export-plus-import trade share attributable to each of the 16 countries.

We selected a weighting scheme that moves the trade weights through time.[5] (See the box for a detailed formulation of the weighting equation.) In order to account for the variation in relative trade shares by country over time, the trade weights incorporate a 12-quarter moving average trade weight. In effect, this means the trade weight applicable to each currency in the current quarter is based on the average share of U.S. bilateral trade by that country for the most recently available 12 consecutive quarters. A moving weight is superior to a fixed-period weight when substantial change in the trade structure is apparent, as has been the case during the past 15 years. Data in Table 1 show the change in trade composition over time.

In 1971, the five Asian-Pacific countries (excluding Japan) included in the index accounted for an 8.9 percent share of the index-related trade. In 1977, their share had increased to 11.7 percent. By 1985, these countries made up 16.6 percent of U.S. bilateral trade with the 16 index countries. The inclusion of Japan makes for an even greater shift—from a 25.5 percent share in 1971 to 29.5 percent in 1977 and 38.1 percent in 1985.[6]

The index outlined so far is the nominal or 7-Gn index. The real, or price-adjusted, index—the 7-Gr index—is a modification of the nominal index. This index is obtained by deflating each foreign currency/dollar exchange rate by the ratio of the foreign CPI divided by the U.S. CPI for the same quarter (before the trade-weight is imposed). Over time a real index of the international value of the dollar is a more meaningful measure of the change in the relative international competitiveness of the currency than is a nominal measure.

Consider the following example: During some period of time the U.S. dollar appreciates against the German mark by 20 percent (from DM 2/$ at time t_0 to DM 2.4/$ at time t_1). This is a change in the nominal exchange rate. During the same period the general price level increases by 5 percent in Germany and by 8 percent in the United States. Setting our price index base equal to 100 at time t_0 the price indexes for the two countries at t_1 will be 105 and 108 for Germany and the United States, respectively. The change in relative prices between the two countries (Germany/U.S.) changes from 1.00 in t_0 to 0.97 in t_1. Thus, the real exchange rate in t_1 is at 2.33 DM/$.

This change is equivalent to a real appreciation in the value of the dollar by 16.5 percent, compared with the 20 percent nominal appreciation. If a German product was priced at 100 marks ($50 nominal and real) in t_0 and its price increased in line with domestic inflation, resulting in a price of 105 marks in t_1, the nominal dollar cost (at a 2.4 DM/$ exchange rate) would have fallen to $43.75. 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 2.33

Table 1
Change in U.S. trade composition over time*

Country	Bilateral trade shares by country for selected years		
	1971	1977	1985
(ranked by 1985 position)	*(percent of 16 country total)*		
Canada**	35.7	35.0	29.8
Japan**	16.6	17.8	21.5
United Kingdom**	8.3	6.6	7.5
West Germany**	9.6	8.4	7.2
Tawain	1.7	3.1	5.2
South Korea	1.8	2.8	4.2
France**	4.0	4.2	4.0
Netherlands**	3.7	4.2	3.4
Italy**	4.6	4.1	3.3
Hong Kong	2.2	2.2	3.0
Belgium-Luxembourg**	3.2	3.0	2.4
Australia	2.7	2.4	2.1
Singapore	0.5	1.2	2.1
Switzerland**	2.0	1.8	1.6
Spain	1.8	2.2	1.4
Sweden**	1.6	1.4	1.3
Regional sub-totals			
Canada	35.7	35.0	29.8
EMS countries***	25.1	23.9	20.3
Other Europe	13.7	12.0	11.8
G-10 plus Switzerland**	89.3	86.5	82.0
Asian-Pacific	25.5	29.5	38.1
Asian-Pacific minus Japan	8.9	11.7	16.6
TOTAL	100.0	100.0	100.0
Note: 16-country total as a percent of total U.S. trade	73	60	71

*Percentages are based on U.S. export-plus-import trade by country.

**Countries included in the Federal Reserve Board's trade-weighted dollar index.

***Eight European countries adhere to the currency conditions of the European Monetary System (EMS) whereby they agree to maintain their exchange rates within a specified range. Six countries (five currencies) are included in the 7-G indexes: the West German mark, French franc, Italian lira, Dutch guilder, and the Belgian-Luxembourg franc. The EMS currencies not included are the Danish kroner and the Irish pound.

mark/dollar would be \$45.06—less than in time t_0 but, nevertheless, higher than indicated by the nominal exchange rate. If the relative rates of inflation recorded in the two countries had stayed the same from one period to the next (that is, the relative price ratio had remained at 1.0), then the real exchange rate in time t_1 would have been the same as the nominal rate, that is, 2.4 DM/\$.

Characteristics of the 7-G aggregate-dollar indexes

We use the Federal Reserve Board's trade-weighted dollar as a standard of reference in this paper. The two 7-G indexes reported here are constructed so as to have a common base with the FRB-TWD index value as of the first quarter of 1973. It is from this common index value of 104.8 for the FRB-TWD and the 7-Gr (real) and 7-Gn (nominal) indexes that we track the developments in the two 7-G indexes. Values for the 7-Gr index are to be found in Table 2.

The initial impression upon examining the track of the 7-Gr and 7-Gn indexes since the early 1970s is that there is a high degree of similarity between these two indexes over time as well as in comparison with the nominal FRB-TWD (see Figures 1, 2, and 3). Nonetheless, there are interesting differences that suggest a divergence in the standard interpre-

Calculating inflation's effect

In order to determine the impact of inflation on the trade-weighted dollar it was necessary to include the consumer price indexes for the United States as well as those of the other countries included in the index.

The ratio of the CPI of country i to the CPI of the United States was used in order to measure the relative movements of prices in country i as compared with the United States.

The exchange rates and the consumer price indexes for all the countries are based at first quarter 1973.

While the Federal Reserve Board's trade-weighted dollar index is weighted on a multilateral basis, the 7-G index uses a bilateral trade-weighting scheme. United States' exports to and imports from each of the countries in the index are aggregated. A twelve-quarter moving average of the total bilateral trade for each country is calculated. Weights are calculated based on the relative share of total bilateral trade within the sixteen countries in the index. The weights are updated each quarter.

Due to the long lag in obtaining current trade estimates, the weights are lagged by one quarter thus allowing a more timely calculation of the trade weighted dollar.

The 7-G real trade-weighted dollar is calculated by the following formula:

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

where

$7\text{-}Gr_t$ = the 7-G real trade weighted dollar in quarter t,
$CPI_{i,t}$ = the consumer price index of country i in quarter t,
$CPI_{U.S.,t}$ = the consumer price index of the United States in quarter t,
$XR_{i,t}$ = the number of units of currency i per dollar in quarter t ,
$XR_{i,0}$ = the number of units of currency i per dollar in base period (first quarter 1973),

$$\overline{W}_{i,t} = \frac{\overline{X}_{i,t} + \overline{M}_{i,t}}{\sum_{i=1}^{16} \left(\overline{X}_{i,t} + \overline{M}_{i,t} \right)} = \text{the trade weight of country } i \text{ in quarter } t,$$

$$\overline{X}_{i,t} = \frac{\sum_{j=t-12}^{t-1} X_{i,j}}{12} = \text{12-quarter moving average of U.S. exports to country } i \text{ in quarter } t, \text{ and}$$

$$\overline{M}_{i,t} = \frac{\sum_{j=t-12}^{t-1} M_{i,j}}{12} = \text{12-quarter moving average of U.S. imports from country } i \text{ in quarter } t.$$

Table 2
7-Gr real trade-weighted dollar*

Year	Q1	Q2	Q3	Q4	Annual average
1971	110.9	111.2	110.5	107.9	110.1
1972	105.5	105.2	106.2	107.3	106.0
1973	104.8	101.8	100.0	102.8	102.3
1974	107.8	105.4	107.9	108.4	107.4
1975	106.8	109.1	113.5	115.1	111.1
1976	116.1	118.1	117.3	119.2	117.7
1977	120.9	121.1	121.6	120.5	121.0
1978	117.6	116.1	111.4	109.6	113.7
1979	109.8	110.3	107.8	108.7	109.1
1980	108.2	107.3	105.2	107.1	107.0
1981	110.2	116.9	121.7	119.0	116.9
1982	123.7	128.7	133.0	136.1	130.4
1983	134.6	137.5	140.9	141.8	138.7
1984	142.2	143.4	148.8	151.7	146.5
1985	158.9	155.5	149.1	141.0	151.1
1986	135.7	130.9	125.3	—	—

*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.

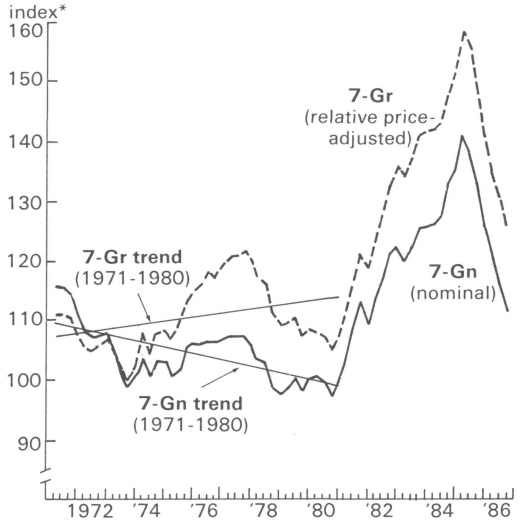
tation of what has happened to U.S. trade during the last 15 years.

While at first glance we see a similar pattern of ups and downs in the real and nominal indexes during the 1970s, in fact the overall trend of the 7-Gr index during this period is markedly different from that of the nominal indexes, either the 7-Gn, the FRB-TWD (see Figures 1 and 3), or nominal indexes in general. Taking into account changes in relative inflation, the international value of the dollar showed an irregular but decidedly upward trend during the decade of the 1970s—this despite the short-lived dip in 1973, when floating exchange rates went into effect, and the prolonged decline in the dollar against other major exchange rates during 1977-1980. Statistically, the slope of the trend-line during the 1970s was positive and significant.

The peak value for the 7-Gn and FRB-TWD indexes, 116 and 120 respectively, during this period occurred in the first quarter of 1971, just prior to the de facto dollar devaluation in August of 1971 and formal devaluation at the end of the year. The low point for these indexes came in the third quarter of 1980 with the 7-Gn dropping 17 percent below its peak and the FRB-TWD down 34 percent from its peak.[7] The slopes for both nominal indexes during the 1970s were negative and statistically significant.

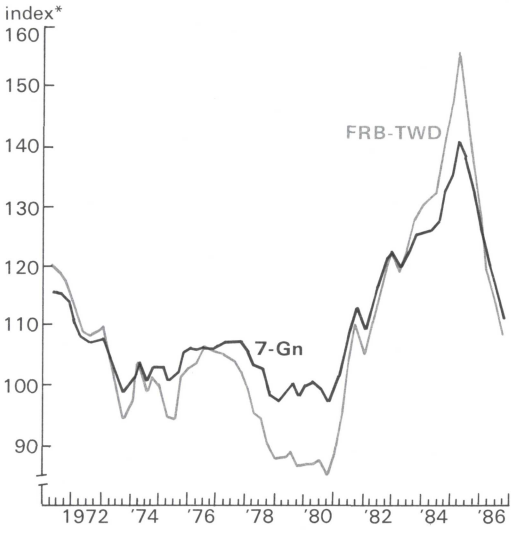
By comparison, in the third quarter of 1980 the 7-Gr index was about 6 percent below the predevaluation peak in the second quarter of 1971. Furthermore, the trough for this index, about 11 percent below the second quarter

Figure 1
The 7-G trade-weighted dollar indexes



*The 7-G indexes are 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.

Figure 2
The 7-Gn and the FRB trade-weighted dollar indexes



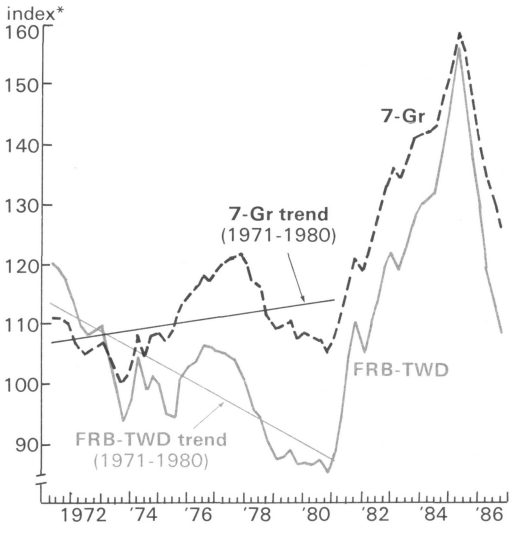
*The 7-Gn index is constructed to have a common base with the Federal Reserve Board's trade-weighted dollar as of the first quarter of 1973, which equals 104.8.

Table 3
Trade-weighted relative-price index

Year	Q1	Q2	Q3	Q4	Annual average
1971	95.8	96.2	96.5	97.0	96.4
1972	97.5	98.0	98.8	99.4	98.4
1973	100.0	100.7	101.1	101.8	100.9
1974	103.8	104.8	104.8	105.3	104.7
1975	106.0	107.4	107.7	108.4	107.4
1976	109.4	110.5	110.3	111.6	110.5
1977	112.3	112.7	113.1	113.6	112.9
1978	113.4	112.9	112.4	111.7	112.6
1979	110.9	110.2	109.2	108.5	109.7
1980	107.7	107.1	107.7	107.6	107.5
1981	107.6	108.3	107.7	108.4	108.0
1982	109.4	110.1	109.8	111.1	110.1
1983	112.2	112.5	112.3	112.7	112.4
1984	112.6	112.5	111.9	112.0	112.2
1985	112.3	112.3	111.9	111.7	112.1
1986	111.9	112.6	112.2	—	—

1971 level, occurred in the third quarter of 1973, shortly after the breakdown of Bretton Woods and the initiation of the currency float in February/March of that year. Lower inflation growth in the United States, as compared with its trading partners, throughout the period 1971 to mid-1978 contributed to a substantially stronger real value of the dollar during this period than has been commonly acknowledged—based on the observation of

Figure 3
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.

nominal aggregate indexes (relative price weights are presented in Table 3). Indeed, during the 1970s the 7-Gr index peaked in the third quarter of 1977 at a value of nearly 122—9 percent above the predevaluation level in 1971.

On the other side of the coin, when the decline in the dollar occurred in the late 1970s the magnitude of the fall (as measured by a relative- price-adjusted index) was exacerbated by a coincident deterioration in the relative inflation performance of the U.S. economy (U.S. prices increased more rapidly than did prices abroad, thus, the relative-price ratio decreased) against its major trading partners, from mid-1978 through mid-1980. Consequently, the 7-Gr index dropped more sharply during the late 1970s than did the 7-Gn index (see Table 4, columns 1 and 2).

The FRB-TWD index dropped more sharply than either of the 7-G indexes, a result attributable to the different trade-weighting scheme and the more restricted selection of countries incorporated in the FRB-TWD index. In this connection, however, it is interesting to note that the FRB-TWD index, when adjusted for relative price changes (FRB-TWDr) between the United States and the ten countries included in that index, also declined appreciably more during the late 1970s than did the nominal FRB-TWD index (see Table 4, columns 3 and 4).[8]

In late 1980, U.S. inflation performance once again began to improve relative to that of its major trading partners. This development, in conjunction with an increasing nominal value of the dollar, resulted in an acceleration in the real appreciation of the dollar at a more rapid rate than was recorded for the nominal value of the dollar. Improvement in inflation performance in the United States, relative to its major trading partners, continued into early 1983. During this period, 1980-Q3 to 1983-Q1, the 7-Gr index rose 25 percent as compared with a 21 percent gain in the 7-Gn index (the gain in the nominal FRB-TWD index, about 34 percent, was well above gains recorded for the 7-G indexes).

Since early 1983, the relative rate of inflation between the United States and the aggregate of its major trading partners has remained essentially stable. Consequently, we should expect an end to the divergence observed earlier between the nominal and real

Table 4
Percent changes in the real and nominal aggregate exchange rate indexes for selected periods*

Year and quarter	(1) 7-Gr	(2) 7-Gn	(3) FRB-TWDr	(4) FRB-TWD
1971-Q2 to 1973-Q3	−10.6	−15.6	−19.9	−23.8
1971-Q2 to 1976-'77 "peak"	8.9 ('77-Q3)	−7.1 ('77-Q1)	1.1 ('77-Q1)	−11.6 ('76-Q2)
1971-Q2 to 1980-Q3	−5.5	−16.8	−27.0	−33.7
1971-Q2 to 1985-Q1	35.7	20.2	38.6	26.8
1971-Q2 to 1986-Q3	12.0	−3.4	1.7	−9.9
1976-'77 "peak" to 1980-Q3	−14.5	−9.7	−28.1	−22.1
1980-Q3 to 1983-Q1	24.6	20.5	36.6	33.5
1980-Q3 to 1986-Q3	17.5	13.4	28.7	23.8
1980-Q3 to 1985-Q1	41.2	37.0	65.4	60.5
1983-Q1 to 1986-Q3	−7.1	−7.1	−7.9	−9.7
1985-Q1 to 1986-Q3	−23.7	−23.5	−36.7	−36.8

*Percentages are calculated on a logarithmic basis.

indexes. In fact, this is what happened. The proportionate changes in the indexes from 1983-Q1, through the run-up in the dollar in 1985-Q1 and the subsequent decline to 1986-Q3 are remarkably similar. From the beginning of this period to the end, the 7-Gr index declined a net 7 percent, the 7-Gn index declined a net 7 percent, the nominal FRB-TWD index declined a net 10 percent, and the FRB-TWDr inflation-adjusted index dropped a net 8 percent.

How much has the dollar declined since the first quarter peak in 1985? The 7-Gr index indicates a decline of 24 percent through the third quarter of 1986, virtually identical to the decline recorded by the 7-Gn index. These rates of decline are somewhat less than those recorded by the FRB-TWD, which shows a 37 percent drop (here again the relative price-adjusted FRB-TWDr recorded a rate of decline that was virtually identical to its parallel nominal index).

In sum, since early 1983 a nominal measure of the international value of the dollar can be said to have been a good proxy for the real dollar exchange rate. The same cannot be said for much of the 1970s and early 1980s. The downward trend of the nominal value of the dollar indicated by the aggregate measures during the 1970s sent misleading signals as to what was happening to the competitive position of the dollar, and the United States in the world economy. While there were periods during which the dollar did depreciate, and substantially so, the overall trend in competitive terms, as measured by what happened to the real exchange rate of the dollar, was not down but up! During the early 1980s, when the rate of the dollar's appreciation soared, the nominal indexes tended to understate the rate of appreciation and quite possibly the degree to which the United States' real competitive position was deteriorating.

It is our contention then that the deterioration in the U.S. trade position during the 1980s, to the extent that it was attributable to a worsening in the competitive position of the dollar, was due to not only a real strengthening in the dollar during the 1980s but also to a generally unrecognized real strengthening of the dollar during much of the 1970s.

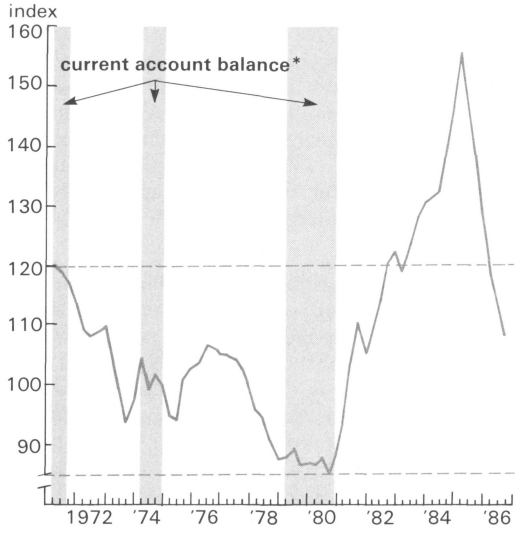
The aggregate exchange rate indexes and the current account

In current discussion of trade and the international value of the dollar, the recurrent question typically involves some variation of the following: When, or will, the decline in the dollar result in U.S. trade once again being in balance?

From an economic perspective we need to draw a distinction between "in balance" and "in equilibrium." An economic state of trade being in balance, or as in the following discussion, the current account being in balance (where net international trade in goods, services, and unilateral transfers equals zero), is often meant in popular usage to denote a condition of equilibrium in the international trade sector. But balance in this sense does not necessarily equate with equilibrium. Indeed, on a long-term basis a mature industrial economy, such as that of the United States, would be expected to record a net "outflow" of capital in the form of net direct investment and lending abroad—especially with respect to the economically developing areas. This means that the long-term current account balance of such a mature economy must be positive—the equilibrium current account would run somewhere on the surplus side of "balance." Thus, in equilibrium, exports of goods and services from a mature industrial economy would exceed the sum of its imports and its net unilateral transfers to persons abroad.

The experience of recent years has been just the opposite, with the United States sucking in savings from abroad through capital account inflows. On the other side of the ledger, the current account dropped more deeply into deficit. Thus, while a U.S. current account "in balance" should not in all likelihood be thought of as a long-term equilibrium position, a current account position that over time is moving toward balance from present levels would most certainly be moving in the right direction.

Figure 4
The FRB trade-weighted dollar and periods of current account "balance"

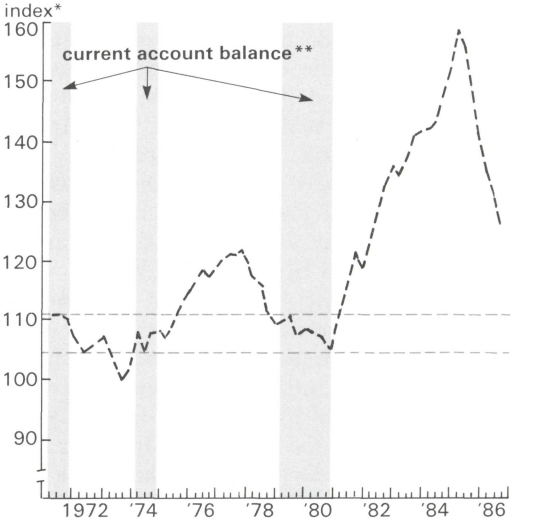


*The current account balance is defined here to include periods where the annual current account was within the range of plus or minus $2 billion.

The current account. During the 1960s the U.S. current account recorded an accumulated surplus of $33 billion. In the 1970s the surplus disappeared and a cumulative deficit of $5 billion was recorded. In the 1980s the deficit soared. For the five years ending with 1986 the accumulated current account deficit exceeded $410 billion—approximately $140 billion of that total was recorded in 1986.

Since the early 1970s there have been three periods during which the U.S. current account has been in approximate balance. We arbitrarily consider a current account of plus-or-minus $2 billion to be "in balance." This definition of balance was met during calendar years 1971, 1974, and the two years 1979-1980.

Figure 5
The 7-Gr trade-weighted dollar and periods of current account "balance"



*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.
**The current account balance is defined here to include periods where the annual current account was within the range of plus or minus $2 billion.

Examination of the nominal aggregate dollar exchange rate indexes with respect to the three time periods, shows a wide range of divergence, (see for example, Figure 4—the FRB-TWD and the current account balance).

The 7-Gr index, on the other hand, possesses an interesting property in this regard. During each of the three periods as the current account was "moving through" balance the annual average index readings were remarkably consistent, converging to levels that ranged within a band of three percentage points. The index in 1971 averaged 110.1, in 1974 it averaged 107.4, and during 1979-1980 it averaged 108.1 (Figure 5 graphically records the range of the quarterly index during the three "in balance" periods). Taken at face value the result indicates that the relative inflation-adjusted international value of the dollar, at about 125 in the third quarter of 1986, was still well above the level at which a current account "in balance" would appear to be a reasonable possibility.[9]

Whether the convergence in the levels of the 7-Gr real dollar index during periods of current account balance is meaningful remains an open question. Still, we find this apparent property of the index an interesting development and one that we intend to explore further.

The current situation

Since the 1985 peak in the aggregate exchange value of the dollar the decline in the real and nominal dollar using the 7-G formulation has been virtually identical. The decline was somewhat less than recorded by the FRB-TWD standard. On the other hand, the increase during the first five years of the decade as recorded by the 7-G formulations was less than that recorded by the FRB-TWD.

Placed in the longer term perspective, however, the depreciation in the dollar since early 1985 as a proportion of the appreciation during 1980-1985 indicates a similar "recovery ratio" was recorded by the real 7-Gr index and a formulation of the FRB-TWDr index constructed to adjust for inflation (the ratios were 0.61 and 0.63, respectively). A like comparison for the nominal 7-Gn and the FRB-TWD indexes also showed similar recovery ratios (values of 0.71 and 0.67, respectively).

Results of the 7-Gr index also indicate that to understand the international competitiveness of the dollar during the 1980s we need to reevaluate developments during the 1970s. Contrary to the general perception that the dollar depreciated sharply during the 1970s we found that the 7-Gr index indicated that the exchange value of the dollar remained strong, and in fact actually trended upward during the decade. The low point in the international value of the dollar came in 1973 following the initiation of the currency float rather than late in the decade as the standard indexes indicate. Consequently, the dollar entered the period of intense adverse pressure on its international competitiveness—that is, the rapid appreciation in the first half of the 1980s—as a considerably stronger currency than is commonly thought.

Finally, beginning in 1971 the 7-Gr index records a remarkable consistency in the aggregate international exchange value of the dollar (at an average annual level of 107-110) during periods when the U.S. current account has been "in balance," a characteristic not observed in other aggregate indexes. This would seem to indicate that the relative-price adjusted value of the dollar—at a level of 125 in the third quarter of 1986—has some considerable distance to decline before it can be reasonably expected that the current account will approach balance.

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[1] Even the assumption of a market economy for the industrial countries has problems. For example, during the early 1970s the United States had in force price, wage, and capital controls. France only recently began to relax price controls imposed in March of 1983. Japan's capital markets have been heavily restricted during much of the 15-year period under study. Trade restrictions and the emergence of counter trade as an apparently significant factor in international trade further confounds the issues.

[2] Another and possibly more telling argument against the inclusion of some of the developing countries in a dollar index (at least without significant modification of their bilateral trade data with the United States) is that substantial portions of their trade with the United States, especially exports, may be characterized by a "world price" (such as petroleum or other primary commodities). Furthermore, their production and export of such "world price" commodities are not appreciably influenced by changes in exchange rates but rather may be more strongly influenced by the countries' need to acquire foreign exchange.

[3] U.S. trade with Belgium and Luxembourg is counted as trade with a single entity. The two countries maintain a single exchange control area vis-à-vis other countries. The price index incorporated for the real exchange rate adjustment is based on the CPI for Belgium. Slight differences in the two countries' inflation rates do occur over time, but the differences are not so large that we consider it necessary to treat the two countries separately in the construction of this index. Thus, Belgium-Luxembourg enter into the index as a single country-weight.

[4] See an article by Jeffrey A. Rosensweig, "A New Dollar Index" in the *Economic Review* of the Federal Reserve Bank of Atlanta, June/July 1986.

[5] A fixed-weight index based near the beginning or the end of the period results in a bias in the index as we move through time. Given the fact that the Asian-Pacific countries (those included in the 7-G indexes are: Australia, Hong Kong, Japan, South Korea, Singapore, and Taiwan) have substantially increased their share of U.S. trade since the early 1970s, a front-weighted index would under-weight the importance of these countries in the aggregate index during the 1980s. On the other hand a current-period weight, while more accurately reflecting the current structure, would over-weight the importance of these countries in prior years. Fixed-period weights have the analytical advantage of a constant and known frame of reference. Moving weights, on the other hand, make interpretation of the level of the index in one period against the level in another somewhat "fuzzy" due to the constantly moving point of reference.

[6] Excluding Japan, the five Asian-Pacific countries included in the index accounted for the following percentages of total United States merchandise export/import trade: in 1971, 6.6 percent; in 1977, 7.2 percent; in 1985, 11.5 percent. Including Japan the percentages were: in 1971, 19.3 percent; in 1977, 18.5 percent; in 1985, 27.9 percent. The fall-off in these countries' share of the total U.S. trade in 1977 is due primarily to the increased importance of petroleum imports in the U.S. trade total after 1973—imports that were priced in dollars.

[7] Percentage changes in the indexes are reported on a logarithmic basis. For example, the calculated percentage change for the 7-Gn index between time t_0 and t_1 is: $\ln(7\text{-}Gn_{t_1} / 7\text{-}Gn_{t_0})$.

[8] For this computation the FRB-TWD was recreated, applying the FRB-TWD weights to quarterly exchange rate data. The real adjustment incorporated the relative price ratios used in the 7-Gr index for the ten countries that make up the FRB-TWD index: Germany, Japan, France, the United Kingdom, Canada, Italy, the Netherlands, Belgium, Sweden, and Switzerland.

[9] Even if a 7-Gr index level of around 107-110 were historically consistent with current account balance, since 1980 there have occurred numerous structural changes in world trade. In particular, former traditional international markets of the United States—agricultural, capital goods, and the like—have been taken over by foreign competitors that five or ten years ago were at best self-sufficient in the production of goods for which they are now major exporters. These former markets for U.S. goods and the third-country markets they have wrested away from U.S. exporters will not be easily recovered. This structural change implies an even further decline in the real aggregate value of the dollar would be required to bring about current account balance.

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