Evaluating the Price Competitiveness of U.S. Exports

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An index developed by the authors is used to track the U.S. dollar's performance against a number of foreign currencies. The authors' comparison of the index with the relative export growth rates of Japan and Germany suggests that in the 1990s the dollar stayed near levels that put the United States and its main export rivals on an equal footing. Nevertheless, the dollar's rise in 1997, if sustained, will make it more difficult for U.S. firms to keep pace with their competitors.

Assessing a nation's price competitiveness in the world markets is an elusive exercise. When U.S. dollar exchange rates fluctuate significantly, as they did in 1997, policymakers want to track the effects on their country's competitive position, because international trade can be a major determinant of economic growth. But how can policymakers gauge the extent to which competitiveness is improving or worsening? One common indicator is a dollar index, which is calculated using exchange rate and price data for a selected group of countries. Such an index measures how a currency depreciation or an improved inflation performance can enhance a country's competitiveness.

In this edition of *Current Issues*, we construct a dollar index to assess the price competitiveness of U.S. exports since 1980. Our index allows us to quantify changes in the prices of U.S. goods relative to the prices of competing foreign-produced goods in the world markets. We begin by looking at the price competitiveness of U.S. and Japanese producers to clarify the construction and usefulness of the index. We then provide some insight into how the index is linked to exports by comparing the growth rate of U.S. exports to major markets with the corresponding export growth rates for Japan and Germany—two prominent industrial-economy exporters and the nation's main competitors in the world markets.

We find that the dramatic swings in the price competitiveness of U.S. exports in the 1980s have been followed by a relatively stable level of price competitiveness in the 1990s. The dollar's sharp run-up during the first half of the 1980s had a significant negative impact on U.S. foreign sales relative to those of Germany and Japan, while the dollar's fall in the latter half helped U.S. firms regain market share. In the 1990s, exchange rates and relative inflation rates have been much more stable, holding to levels that have enabled all three countries to enjoy similar export growth rates. The key exception is that U.S. exports have done much better in Canada and Mexico because of trade liberalization efforts. More recently, the dollar's rise in 1997 has hurt U.S. price competitiveness, although the appreciation has been fairly modest compared with that recorded in the 1980s.

Measuring Price Competitiveness
Exchange Rates and Inflation Rates. Nominal exchange rate movements and domestic inflation rates are the fundamental determinants of price competitiveness. In the case of exchange rates, consider a consumer deciding whether to purchase a certain good from a U.S. or a Japanese producer. To identify the better deal, the consumer will compare the prices of the two goods in a common currency—say, U.S. dollars. The current nominal yen-dollar exchange rate is used by the consumer to convert the yen

price of the Japanese-produced good into dollars. This relative price will guide the purchase decision and thus serve as an indicator of the price competitiveness of the U.S. and Japanese producers. Fluctuations in the nominal yen-dollar exchange rate will alter the relative price of the good and thus alter the competitiveness of the producers in the two countries.

Changes in the prices of domestically produced goods can affect a nation's competitiveness in the same way as a currency fluctuation. For instance, rising domestic prices for either U.S. or Japanese goods for any given nominal yen-dollar exchange rate will raise the goods' prices in dollar terms. The country with the lower inflation rate will therefore see its goods becoming relatively less expensive in dollar terms, and these falling relative prices will signal an improvement in its competitiveness.

It is important to consider both nominal exchange rates and inflation when measuring price competitiveness. For example, the nominal yen in 1997 was roughly 40 percent stronger against the dollar than it had been in 1980—a change that would seem to place Japanese exporters at a sizable disadvantage relative to their U.S. counterparts. However, when we also consider the inflation factor, we find that much of the nominal yen's strength has been offset over this period. The *real* yen—the nominal yen adjusted for inflation—was only 12 percent stronger against the dollar, because Japan experienced less inflation than the United States between 1980 and 1997 (Chart 1).[1] Japan's competitive disadvantage was therefore not as large as suggested by exchange rates alone.

A Trade-Weighted Dollar Index. To assess U.S. price competitiveness overall, one needs to measure not only the dollar's value against a single currency, but also its value against the currencies of other industrial and newly industri-

alizing countries that trade and compete with the United States. Such an assessment can be made by constructing a trade-weighted dollar index that averages exchange rate and price data for selected countries, with the weights based on each country's relative importance to the U.S. economy.[2] We have devised such an index, which includes the currencies of thirteen industrial countries and four newly industrializing Asian economies (see box). What distinguishes the latter

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economies—Hong Kong, Singapore, South Korea, and Taiwan—from other developing countries is their production of a broad array of goods that compete directly with U.S.-made products. Another important feature of our index is that the weights given to each currency are allowed to vary over time to reflect changing trade patterns.

Our trade-weighted dollar index shows the large swing in the dollar's value during the 1980s and its relative stability in the 1990s (Chart 2). The index starts in 1980 at roughly 100, then rises steeply to reach an average of 135 in 1985. This means that, on average, the dollar price of goods that make up the U.S. producer price index increased 35 percent against a weighted average of goods in foreign producer price indexes. The dollar fell sharply starting in 1985, and by 1988 was hovering around 100. It has since experienced
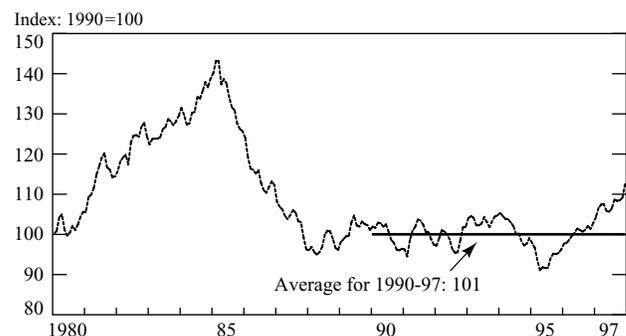
Chart 1
Yen-Dollar Exchange Rates

Index: 1990=100
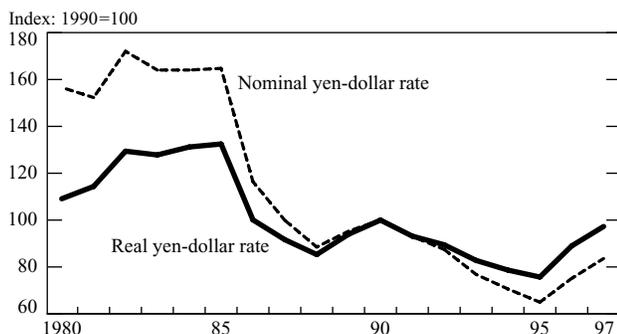
Source: Authors' calculations.

Notes: Real exchange rates are deflated by the Japanese wholesale price index and the U.S. producer price index. An increase in a rate implies a loss of U.S. price competitiveness.

Chart 2
Real Trade-Weighted Dollar

Index: 1990=100

Source: Authors' calculations.

Note: An increase in a rate implies a loss of U.S. price competitiveness.

Constructing the Trade-Weighted Dollar Index

Our index is a trade-weighted average of seventeen major currency values. The method used to construct the index is similar to that used for other real dollar indexes; however, the currencies, weights, and price data used differ.[a]

- The *currencies* used are from thirteen developed countries (ten European countries and Australia, Canada, and Japan) and from Hong Kong, Singapore, South Korea, and Taiwan.[b]

- The *weights* used are based on averages of import and export shares. These averages are allowed to change over time.[c] The import weights are each country's share of U.S. imports. The export component is made up of two equal parts: the share of U.S. exports to each country and each country's share of world exports (excluding sales to the United States). The import and export components are themselves then weighted by the share of each in total U.S. trade (see box table).

- We use wholesale and producer *price data* to calculate a real exchange rate. The real rate is essentially an index of exchange rates divided by a similarly constructed index of U.S. and foreign prices, with price ratios replacing exchange rate values in the calculation.

How the Dollar Index Trade Weights Are Calculated
1990-95 Data

Country	Share of U.S. Imports (1)	Share of U.S. Exports (2)	Share of World Exports* (3)	Trade Weights (4)
Australia	1.0	2.8	2.0	1.6
Belgium	1.3	3.2	6.0	2.7
Canada	27.3	31.3	1.4	22.9
France	3.9	4.3	10.6	5.4
Germany	7.6	6.2	18.6	9.6
Hong Kong	2.6	3.2	5.0	3.2
Ireland	0.6	1.0	1.4	0.8
Italy	3.5	2.4	8.2	4.3
Japan	26.6	15.8	12.5	21.1
Netherlands	1.4	4.3	6.6	3.2
Singapore	3.1	3.5	3.1	3.3
South Korea	4.7	5.3	3.3	4.5
Spain	0.8	1.5	3.2	1.5
Sweden	1.3	0.9	2.6	1.5
Switzerland	1.5	1.7	3.0	1.9
Taiwan	6.6	4.9	4.2	5.6
United Kingdom	6.2	7.7	8.3	6.9
Total	100.0	100.0	100.0	100.0

Note: To calculate the trade weight for each country (column 4), we first multiply the value in column 1 by imports' share of total U.S. trade (58 percent) and the values in columns 2 and 3 by exports' share of total U.S. trade (42 percent, here divided equally between the share of U.S. exports to the country and the country's share of world exports). We then sum these products. The trade rate for Australia, for example, is computed as follows: 1.0 x .58 + 2.8 x .21 + 2.0 x .21 = 1.6.
* Excludes sales to the United States.

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[a] The Federal Reserve System offers alternative dollar indexes. For instance, the Board of Governors' index uses the currencies of eleven major developed countries and relies on fixed multilateral weights, deflated by the consumer price index. The Federal Reserve Bank of Dallas has 150 exchange rates in its index and uses bilateral weights, deflated by consumer prices. The Federal Reserve Bank of Atlanta produces a dollar index similar to the one constructed here, but it is not adjusted for price movements.

[b] China and Mexico are two major trading partners that are not included. Goods from these countries, as well as from smaller developing Asian economies, generally do not compete with goods produced in the United States.

[c] The averages for each year—known as five-year moving averages—are essentially based on trade flows over the most recent five years for which data are available.

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more modest swings, showing particular weakness in 1995 when the index dropped to 90 and strength in 1997 when the index approached 115 at the end of the year. While this recent upturn represents a significant deviation from the 1990-97 average of roughly 100, the index is still well below the high levels recorded in the mid-1980s.

Relative Export Growth
Having calculated a trade-weighted dollar index, how do we interpret whether a particular index value is favorable

to U.S. firms? One method would be to compare overall U.S. export growth with that of the nation's major foreign competitors. But using aggregate growth rates to evaluate export performance can sometimes be misleading. For instance, relatively slack economic activity in one foreign market will restrain exports to that market from all countries. In the 1990s, Europe experienced slow growth. Since Germany is much more dependent on this market than Japan or the United States, its overall export growth suffered relative to that of these two

countries. Thus, a look at aggregated growth rates would erroneously imply a loss of competitiveness of German firms. Instead, it would be better to compare how all three countries did individually in their sales to Europe. For example, if German exports to Europe were weak, but so were those from Japan and the United States, then the inference to draw is that demand factors—rather than price competitiveness—are driving relative export performance.

By comparing U.S. export growth rates to *specific* foreign markets with the export growth rates of Japan and Germany to the same markets, we obtain a more accurate reading of the competitiveness of U.S. exporters between 1980 and the first three quarters of 1997 (see table). Such a comparison reveals that the dollar's appreciation in the first half of the 1980s hit U.S. exports hard. In volume terms, sales were down to all major markets except Canada, with particularly steep drops evident in sales to Latin America (down 36 percent) and Europe (down 27 percent).[3] Conversely, German and Japanese firms enjoyed robust growth in every major market except Mexico and Latin America. Even in the Latin American market, where economic turmoil hurt all exporters, the weakness of the mark and yen helped to keep German and Japanese exports from falling as steeply as U.S. exports.

The sharp fall in the dollar starting in 1985 led to a boom in U.S. exports that, for the most part, was unmatched by the export performance of the United States' two main competitors. Total U.S. exports grew roughly

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three times faster than German and Japanese exports, with U.S. sales to the developing Asian markets faring well against those of Japan and Germany. Somewhat surprisingly, Japan's sales to Mexico increased during this period and its exporters performed better than U.S. firms in selling to Europe. The success of Japanese firms in the latter half of the 1980s was probably due in part to their heavy direct investment in Mexico and Europe; the reliance of Japanese operations abroad on imported capital goods and intermediate products from Japan also helped to boost exports.

Export Volume Growth, 1980-97
Percentage Change

	Total	Developing Asia	Canada	Mexico	Latin America (Excluding Mexico)	Europe (Excluding Germany)
1980-85						
Germany	29	78	111	-10	-19	25
Japan	46	42	100	-11	-3	22
United States	-16	-10	16	-21	-36	-27
1986-90						
Germany	20	31	-17	22	3	51
Japan	17	56	6	64	-18	109
United States	62	123	54	83	29	86
1991-97						
Germany	23	95	27	66	81	9
Japan	37	86	-18	59	102	8
United States	59	92	65	123	116	24
Memo:						
Share of total exports, 1990						
Germany	100	5	4	1	1	63
Japan	100	31	2	1	2	14
United States	100	15	21	7	7	22

Source: International Monetary Fund, *Direction of Trade Statistics*.

Notes: Export volume data are calculated by converting dollar export values into local currency terms and then deflating them by aggregate export price indexes for each country. Data for 1997 are through September, annualized. Developing Asia includes all countries in Asia except Japan. Regional totals in the memo rows do not sum to 100 because exports to other areas of the world are not included.

The comparable export growth rates for all three countries during the 1990s suggest that our average index value for this period of around 100 represents a neutral level—one that does not give any country a significant price advantage over the others. All three countries have done extremely well in selling to developing Asia and all have done relatively poorly in Europe, although U.S. firms have fared the best there. In Latin America, U.S. and Japanese firms have


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enjoyed fast growth, while German firms have had somewhat less success. U.S. firms have done substantially better in Canada and Mexico, where the United States–Canada Free Trade Agreement in 1989 and the subsequent North American Free Trade Agreement (NAFTA) in 1994 have played a substantial role in boosting U.S. sales. Total U.S. export growth in the 1990s has been higher than German or Japanese growth because of these successful trade liberalization efforts in North America.

The dollar's rise in 1997 deserves special consideration. In interpreting this rise, it may be useful to compare the dollar's sharp—though temporary—drop in 1995, when our dollar index went below 90 in the second quarter of the year. To determine whether the dollar's weakness derailed Japanese and German exports in 1995 and 1996, we examine the three countries' export volumes in the 1990s to four major regions (Chart 3). Looking first at developing Asia and Europe, we see that a modest drop occurred in the growth of German and Japanese exports relative to U.S. exports after 1994. Japan did noticeably worse in Latin America while Germany and Japan did poorly in Mexico and Canada, in part because of NAFTA. In general, however, German and Japanese firms largely managed to protect export sales during this temporary fall in the dollar's value, mainly by cutting production costs and accepting lower profits in order to minimize market share losses to U.S. firms.[4] This episode suggests that the dollar's strength at the end of 1997, if sustained, will jeopardize U.S. competitiveness, compelling U.S. firms to adopt strategies like those that German and Japanese firms used to limit losses in 1995.

In sum, growth rates of U.S., German, and Japanese exports to developing Asia, Latin America—and, to a lesser extent, Europe—were similar from 1990 to 1997, indicating at best modest price competitiveness gains for U.S. firms in those regions when our dollar index

Chart 3
German, Japanese, and U.S. Export Volumes to Key Regions
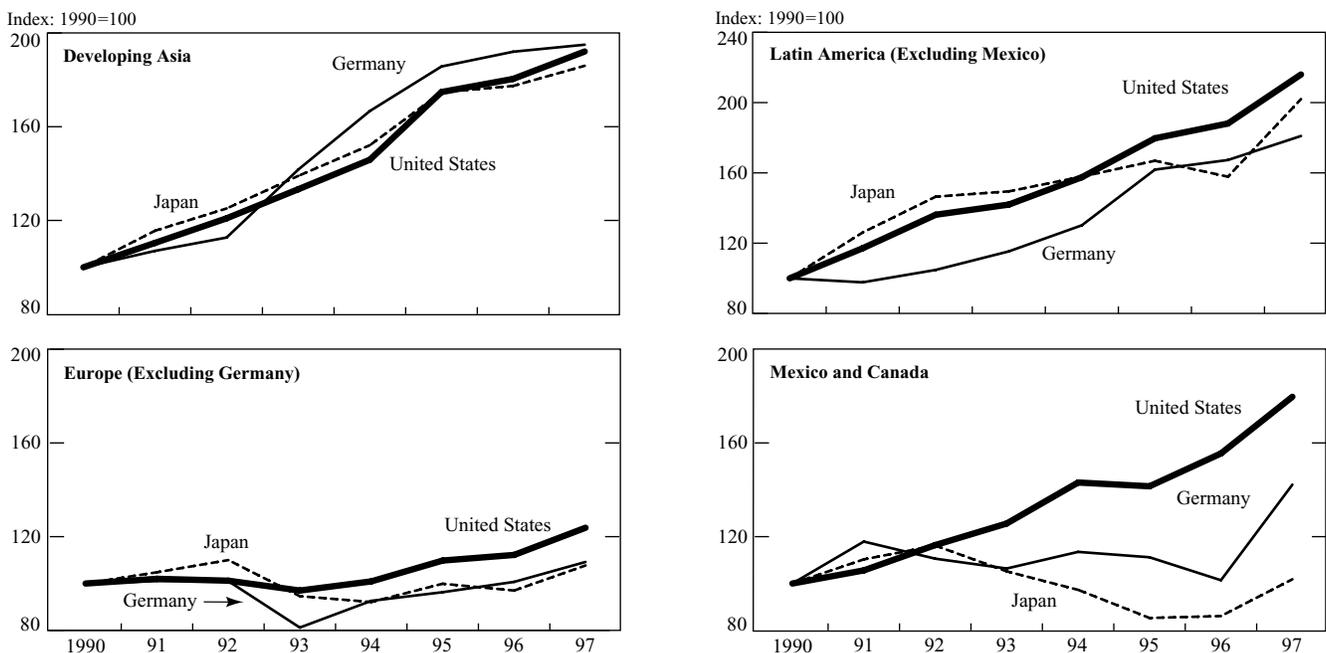
Source: International Monetary Fund, *Direction of Trade Statistics*.

Notes: Data for 1997 are through September, annualized. Developing Asia includes all countries in Asia except Japan.

hovered around 100. While overall U.S. export sales were stronger than German or Japanese sales, the difference is due largely to the removal of North American trade barriers rather than a weak dollar.

Conclusion

There is little confusion over export competitiveness when exchange rates move as they did in the 1980s. The sharp run-up in the dollar squashed U.S. exports in the first half of the decade, while the dollar's reversal enabled sales to surge in the second half.

In the 1990s, the effect of exchange rates on U.S. price competitiveness has been much less dramatic. Our trade-weighted dollar index shows that the dollar has remained relatively stable for most of this period. A comparison of U.S. export performance with that of the nation's major competitors suggests that the dollar has not heavily influenced trade during this period. U.S. export growth has been modestly better than that of Germany and Japan, but NAFTA accounts for much of this difference.

Looking forward, it is clear that the dollar's rise in 1997, if sustained, will hurt U.S. price competitiveness. To keep up with foreign firms, U.S. exporters will have to pursue cost-cutting measures and perhaps accept lower profit margins. Nevertheless, our trade-weighted dollar index puts the recent rise in perspective. At the end of 1997, the index was relatively high, but not substantially out of the bounds in which it had fluctuated during the earlier part of the decade. Further sharp increases in the dollar's strength would be necessary to push our index of price competitiveness to the high levels of the mid-1980s.

Notes

1. Price indexes are used to compute real exchange rates. Wholesale and producer price indexes are preferable to consumer price indexes in these calculations: because consumer price indexes include prices for services such as housing and medical care, they are less relevant to trade flows. Nevertheless, the wider availability of consumer price indexes internationally means that they are used in some real exchange rate indexes.

2. The construction of trade-weighted exchange rate indexes is discussed in greater detail in Turner and Van't dack (1993).

3. In this section, "Latin America" excludes Mexico, "Europe" excludes Germany, and "developing Asia" includes all countries in Asia except Japan.

4. Relative export growth is not the only measure of competitiveness. Rising profitability of U.S. firms that compete internationally can reasonably be judged as a gain in U.S. competitiveness. Klitgaard (1996) notes that the yen's appreciation in 1990-95 led to steep declines in export prices, cutting into the profits of Japanese firms—a signal of declining competitiveness—but sustaining the firms' export growth rates. If the criterion is profitability, Japanese firms lost more from the yen's rise in this period than is suggested by export performance. However, while the notion of linking profitability and competitiveness is appealing, practical considerations—namely, that profits earned from export sales are generally not reported separately either by U.S. or foreign firms—limit the application of the concept in quantifying competitiveness.

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