

Japanese Trade Balance Adjustment to Yen Appreciation

Between 1985 and 1988 the Japanese yen appreciated 47 percent on a nominal trade-weighted basis. During this same period the Japanese trade surplus increased by \$39 billion. This trade performance contrasts sharply with the U.S. experience from 1980 to 1985, when nominal dollar appreciation of about the same magnitude resulted in a U.S. trade balance deterioration of \$95 billion. Although in real, or volume, terms the difference in the trade performance of the two countries is somewhat smaller, it is also striking. This article investigates why the Japanese trade performance remained so strong in the face of Japan's large nominal exchange rate appreciation.

The article finds that three factors were important in explaining Japan's trade strength measured in both nominal and real terms. These factors also accounted for most of the difference in Japanese and U.S. trade performance. The first factor was simply a starting base effect. Because Japanese exports were substantially larger than Japanese imports in 1985, Japanese imports would have had to grow significantly faster than exports just to keep Japan's trade surplus from rising. Japan's trade performance was also aided by its commodity composition. Raw materials accounted for over half of Japanese imports in 1985 but represented a negligible proportion of Japanese exports. This trade composition made Japan's trade balance less responsive to the relative price and demand conditions that were working to push it down. The third factor supporting Japan's trade balance was the much smaller real appreciation of the yen, especially when measured in terms of relative export prices, compared with its nominal rise. Falling Japanese prices in yen terms enabled

Japan to maintain a much better price competitiveness position than the nominal rise in the yen alone would have suggested. These falling yen prices reflected a sharp drop in imported raw material input prices as well as significant profit cutting by Japanese export industries. Japan's nominal trade balance was further bolstered by the sharply falling world price of oil. Finally, the conversion of Japan's nominal trade balance from yen into depreciated dollars entailed a significant currency translation effect, raising the dollar value of Japan's nominal trade balance.

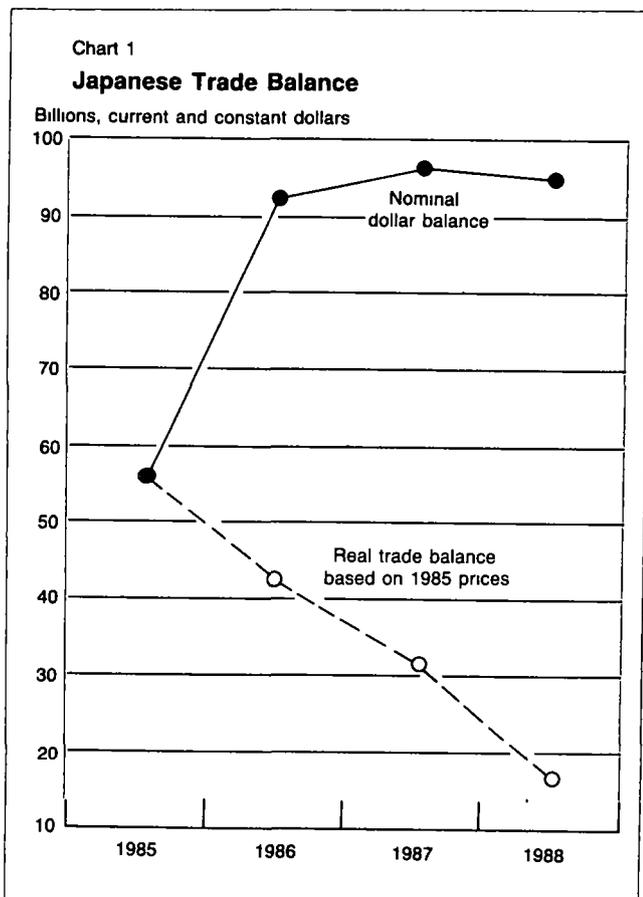
These conclusions about the sources of Japan's trade strength are important for what they exclude as well as for what they include. The analysis suggests that some factors often mentioned as lying behind Japan's robust trade performance—superior Japanese business ability, a world investment boom, and the expansion of Japanese export trade to a growing number of Japanese foreign subsidiaries—appear to have played a minor or no role in that performance to date. Falling Japanese profit rates, moreover, were important in explaining Japan's real trade balance strength but they were considerably less important in explaining developments in Japan's nominal trade balance.

The primary focus of this article is Japan's real trade balance. The article begins with an accounting of the starting base, demand growth, and relative price factors that helped shape Japan's real trade balance evolution. Subsequent sections treat the influence of both Japan's distinctive commodity composition and domestic and foreign demand growth on Japan's trade performance. Also examined in some detail is the change

in Japan's relative price position, broken down into its components—nominal appreciation, unit labor cost, profit margins, and raw material input prices. Throughout the discussion, the Japanese experience in responding to yen appreciation is compared with the U.S. experience under dollar appreciation in order to identify those developments offering unique support to Japan's trade balance adjustment. The analysis of Japan's real trade balance culminates in conclusions about what did and did not contribute to Japan's strong performance. Following a brief accounting of developments in Japan's nominal trade balance, the country's trade behavior in 1989 is discussed. A final section examines the implications of the analysis for Japan's future trade balance evolution.

Major factors underlying Japan's real trade balance performance

In real terms, based on 1985 prices, the Japanese trade surplus fell from \$56 billion in 1985 to \$16 billion in 1988 (Chart 1). This fall was the consequence of a 4



percent rise in the volume of Japanese exports and a 41 percent rise in the volume of Japanese imports. Corresponding figures for the United States provide a benchmark for comparison: the real U.S. trade balance, based on 1980 prices, fell from a deficit of \$26 billion in 1980 to a deficit of \$171 billion in 1985. During these two periods the yen and dollar appreciated 47 percent and 46 percent, respectively, on a nominal trade-weighted basis (Chart 2).¹

Japan's stronger trade balance performance reflected both significantly faster export volume growth and slightly more moderate import volume growth than that achieved by the United States. However, it is important to consider Japan's trade volume growth rates in combination with the starting bases to which these growth rates were applied.² The volume of Japanese exports in 1985 was about one and a half times as large as the volume of Japanese imports. This export-to-import ratio meant that imports had to grow roughly 50 percent faster than exports just to keep Japan's trade surplus from rising.

The quantitative significance of Japan's starting trade surplus in keeping Japan's ending surplus relatively high can be gauged by applying actual Japanese export and import volume growth rates to a hypothetical Japanese starting position of balanced trade. If Japanese imports and exports in 1985 were set equal to a level halfway between their actual levels and then

¹Effective exchange rate movements and export and import volume changes are provided by the International Monetary Fund, *International Financial Statistics*, various issues. Exchange rate changes are calculated relative to the exchange rates of seventeen industrial countries. Real trade balance changes are computed based on export and import volume growth rates applied to nominal base year trade levels for Japan and the United States. The volume growth rates are calculated based on unit value price indexes, consequently, they are little affected by changes in base years. However, applying these volume growth rates to nominal base year exports and imports during each country's appreciation period means that the real trade balance change reported for Japan is based on 1985 prices whereas the real trade balance change reported for the United States is based on 1980 prices. To the extent prices changed between 1980 and 1985, the calculated real trade balance changes for the two countries are not strictly comparable. However, deviations from purchasing power parity exchange rates and differences in commodity composition make any cross-country comparison of real trade balance changes measured in constant dollar terms problematic. Since the quantitatively estimated effects of the factors lying behind Japanese and U.S. real trade balance adjustment presented in the text are also based on volume growth applied to 1985 nominal export and import levels for Japan and 1980 nominal export and import levels for the United States, they accurately account for the difference in the two countries' real trade balance adjustment measured from these respective base year starting points.

²The starting trade balance measured in real terms depends upon the choice of base year prices used to convert nominal exports and imports into volume levels. Since Japan currently reports its trade volume growth from a 1985 basis, 1985 base year prices are used in the above analysis.

both grew at their actual rates through 1988, the Japanese real trade balance would have fallen \$15 billion more than it actually did between 1985 and 1988

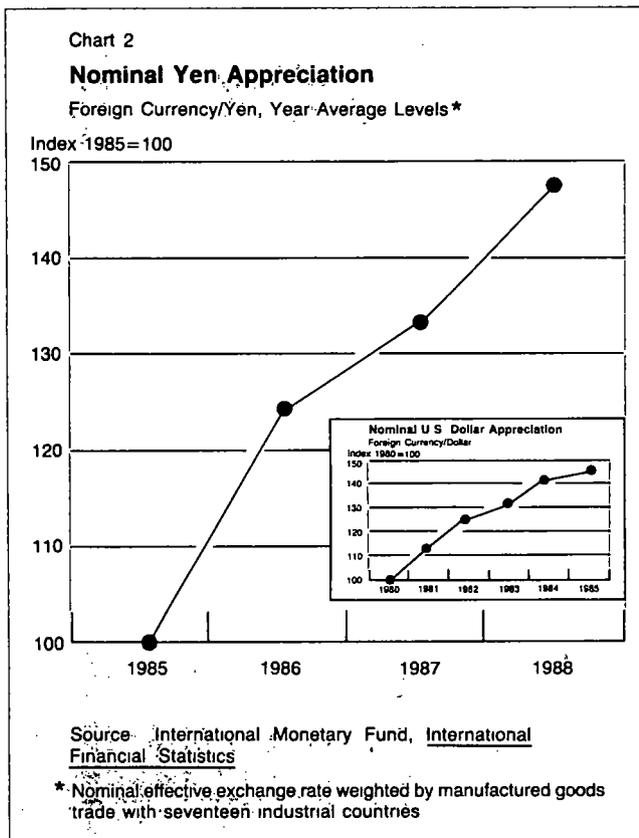
Several developments contributed to the growth rates observed for Japanese exports and imports. Japan's 4 percent export volume growth was promoted by a cumulative 11 percent growth in demand in other industrial countries during the 1985-88 period.³ This foreign demand growth more than offset the negative impact on export volume from the rise in Japanese export prices relative to foreign prices attributable to yen appreciation. Foreign demand growth had a greater impact partly because the actual increase in Japanese export prices relative to foreign prices was

³Demand growth is defined as growth in GNP plus imports minus exports. It measures growth in a country's demand for all domestic and imported goods and services. Throughout this article, industrial country demand and price changes are used as a proxy for unavailable world data. This substitution may skew some of the results. However, applying the trade elasticities discussed in the text to industrial country data appears to explain Japanese export and import growth reasonably well.

only 9 percent despite the 47 percent nominal appreciation of the yen.⁴

This surprisingly small Japanese relative export price rise was primarily due to a 23 percent fall in the yen price of Japanese exports.⁵ Some rise in foreign wholesale prices during the period also helped support Japan's price competitiveness. The 23 percent fall in Japanese yen export prices reflected two major factors. The first was a sharp drop in Japanese domestic wholesale prices, these prices fell 8 percent between 1985 and 1988.⁶ The second factor was substantial price reductions through dramatic cutting of profit margins in Japan's export sector. In fact, Japanese export prices fell fifteen percentage points more than Japanese domestic wholesale prices in almost every industry during this period (Table 1).

The quantitative impact that world demand growth and relative price changes had on Japanese export volume can be roughly gauged by applying econometrically estimated export volume elasticities to these changes. The Japanese export volume elasticity with respect to foreign demand is about 1.8, the Japanese export volume elasticity with respect to relative price changes is about -1.1.⁷ On the basis of these export



⁴International Financial Statistics

⁵Japan's 23 percent yen price decline offset all but thirteen percentage points of the yen's forty-seven percentage point nominal appreciation. Mathematically, the yen change in export prices times yen appreciation equals $(1 - 0.23) \times 1.47 = 1.13$

⁶Domestic wholesale prices and domestic wholesale prices for manufactured goods only both fell 8 percent during this period.

⁷Export and import volume elasticities measure the percentage changes in exports and imports that result from a 1 percent change in foreign and domestic demand growth or a 1 percent change in relative prices. Volume elasticity estimates vary significantly. The above export elasticities are the average of elasticities estimated by Robert Corker, "External Adjustment and the Strong Yen: Recent

Table 1

Japanese Export Prices Compared with Japanese Domestic Prices

(Cumulative Percent Change, 1985-88)

	Export Prices	Domestic Manufactured Goods Prices
All commodities	-21.2	-8.1
Textiles	-19.0	-7.6
Chemicals	-32.5	-10.1
General machinery	-15.7	-2.7
Electrical machinery	-29.2	-15.1
Transport equipment	-15.1	-3.3
Precision instruments	-12.3	-1.0

elasticities, the 11 percent rise in foreign demand supplied about a 20 percent boost to Japanese export volume. The small 9 percent rise in Japanese prices relative to foreign prices cut Japanese export volume by only about 10 percent. These two factors combined explain fairly well the continued strength of Japanese export volume between 1985 and 1988.

The 41 percent increase in Japanese import volume also reflected the effects of demand growth—in this case Japanese demand—and relative price changes. These two developments both promoted growth in Japanese import volume. Relative price changes were more important for imports than for exports because they were much larger. The price of Japanese imports fell 45 percent in yen terms between 1985 and 1988, with about two-thirds of this fall due to the rise in the nominal effective value of the yen.⁸ An approximately 40 percent fall in the dollar price of Japanese petroleum imports also contributed significantly to the decline in Japanese import prices. Moderate foreign inflation did put some mild upward pressure on these prices.

Relative to Japanese domestic prices, Japanese import prices fell roughly 40 percent. This decline reflects the 8 percent drop in Japanese wholesale prices in 1985-88 that was noted earlier.⁹ On the import side, foreign prices fell much more relative to Japanese prices than was the case for the Japanese export sector primarily because of the oil price factor and the absence of significant Japanese profit cutting for

import-competing products.¹⁰

Elasticity analysis can again be used to evaluate the importance of demand growth and relative price changes in promoting imports. The Japanese import volume elasticity with respect to Japanese demand growth is about 1.3, the Japanese import volume elasticity with respect to relative price changes is about -0.4.¹¹ Japanese demand grew a cumulative 18 percent between 1985 and 1988. The elasticity analysis suggests that this demand growth raised Japanese import volume by about 25 percent. It also suggests that the 40 percent relative fall in Japanese import prices boosted Japanese import volume by about 15 percent.

These calculations imply that foreign demand growth was the major force accounting for change in Japanese export volume because the sharply falling yen price of Japanese exports meant there was not much movement in relative prices despite substantial yen appreciation during this period. Japanese demand growth and relative price changes both provided support to import volume growth because, on the import side, foreign prices did fall significantly relative to Japanese prices. The next sections look at Japanese trade composition, relative rates of demand growth, and the factors underlying relative price changes to clarify why this picture emerges. They also compare developments in the determinants of U.S. and Japanese real trade balance adjustment during appreciation to identify the factors that enabled Japan to cope exceptionally well with the yen's rise.

Japanese trade composition and trade elasticities

Japanese trade composition is distinctly different from that of most other industrialized countries, including the United States. Japanese exports are almost entirely

Footnote 7 continued

Japanese Experience," *IMF Staff Papers*, June 1989, and William Helkie, cited in *Realignment of the Yen—Dollar Exchange Rate Aspects of the Adjustment Process in Japan*, by Bonnie E. Loopesko and Robert A. Johnson, International Finance Discussion Paper no. 311, Board of Governors, Federal Reserve System, August 1987. The elasticities from these two sources were chosen because they were relatively up-to-date. Average Japanese export volume elasticities estimated during the 1960s and 1970s were 2.6 with respect to foreign demand and -1.4 with respect to relative price, according to Morris Goldstein and Mohsin Khan, "Income and Price Effects in Foreign Trade," *Handbook on International Economics*, vol. 2 (Amsterdam: North Holland, 1985). Using these earlier elasticities suggests that the combined impact of foreign demand growth and relative price changes would have led to about a 15 percent growth in Japanese export volume over the 1985-88 period. This figure is somewhat larger than the 10 percent export volume growth suggested by the elasticities used in the text and significantly larger than the 5 percent actual Japanese export volume growth.

⁸A 47 percent increase in the value of the yen translates into about a 30 percent fall in yen import prices. Mathematically the yen value of import prices now equals $1/1.47 = 0.68$ of its previous value.

⁹That is, $(1-0.45)/(1-0.08) = 0.60$. Japanese import prices are compared with Japanese wholesale prices in the text despite a substantial difference in commodity composition. This comparison is made because the elasticity estimates used in the text are based on this relative price ratio. Japanese manufactured goods import prices fell roughly 20 percent relative to Japanese domestic manufactured goods prices.

¹⁰The absence of domestic profit cutting may have helped to provide financial support to Japanese producers who were cutting profits on export sales.

¹¹These elasticities are calculated by weighting the subcomponent elasticities for food, fuel, other raw materials, and manufactured goods estimated by Corker and Helkie by their 1985 trade shares. As presented in Goldstein and Khan, elasticities estimated during the 1960s and 1970s averaged 1.2 with respect to Japanese demand growth and -1.0 with respect to relative price changes. The earlier price elasticity estimates were higher than the more recent ones in part because the import subcomponent of fuel, which has a low price elasticity, was a much smaller share of Japanese imports in the 1960s and 1970s. See, for example, M. A. Akhtar ("Manufacturing Import Functions for Canada, Japan and the United States," *Hitotsubashi Journal of Economics*, vol. 22, no. 1 (June 1981)). The average import elasticities provided by Goldstein and Khan would suggest that Japanese import volume increased almost 60 percent because of changes in demand and relative prices. This result is very similar to the outcome of the calculations in the next section of this article that compute how much faster Japanese import volume would have grown if Japan had had a less fuel-intensive import composition.

manufactured goods while only about three-quarters of industrialized country exports on average are manufactured products. In contrast, Japanese imports are much more concentrated in raw materials than are the imports of other industrialized countries. Of Japanese imports in 1985, 44 percent were fuel, 14 percent food, 15 percent other raw materials, and only 27 percent manufactured goods. The United States may be used as a benchmark for comparison. U.S. imports in 1985 were about 15 percent fuel, 7 percent food, 5 percent other raw materials, and 73 percent manufactured goods.¹²

Japan's unusual trade composition had a significant impact on aggregate Japanese import prices. Because the world price of petroleum dropped sharply in the mid-1980s, the fall in Japan's petroleum import price measured in yen terms was significantly greater than the yen price fall for other Japanese import subcomponents (Table 2). The unusually large share of petroleum in Japanese imports meant that this petroleum price fall had an inordinately large impact on overall Japanese import prices. In fact, if the yen price declines in Japan's import subcomponents were reweighted to reflect the shares of these subcomponents in the import composition of the United States, Japan's import prices would have declined only about 30 percent during 1985-88. This result contrasts significantly with the actual 45 percent decline in Japanese import prices.¹³

Although Japan's trade composition helped push down import prices and thereby promoted a deterioration in Japan's real trade balance, its impact on Japan's trade elasticities more than offset this negative trade

¹²*International Financial Statistics, Supplement on Trade Statistics, 1988*. The average import composition of industrial countries in 1985 was 18 percent fuel, 10 percent food, 7 percent other raw materials, and 65 percent manufactured goods.

¹³Reweightings the price subcomponents to reflect a more normal trade composition on Japan's export side is difficult because Japanese export price data for nonmanufactured goods do not exist. However, reweighting on the export side is less important because Japan's difference in export trade composition from the industrial country average is not that great.

Table 2

Yen Import Price Change

(Cumulative Percent Change, 1985-88)

All imports	- 45
Energy products	- 63
Food	- 33
Other raw materials	- 25
Manufactured goods	- 25

balance factor. Raw material sales, particularly fuel sales, are generally less responsive to exchange rate changes than are manufactured goods sales.¹⁴ Consequently, Japanese import volume, heavily skewed to raw materials, had a significantly lower elasticity response with respect to exchange rate movements than did the import volumes of other industrial countries. Japan's export volume, in contrast, had a slightly higher than average elasticity response to exchange rate movements. Raw material sales are also somewhat less responsive to demand growth than are manufactured goods sales. Therefore, Japanese imports again had a somewhat lower elasticity response to Japanese demand growth than might be expected on the basis of other countries' experiences while Japanese exports had a slightly higher than average elasticity response.

Japanese import elasticities are significantly different from U.S. import elasticities (Table 3).¹⁵ This difference is explained in large part by the difference in trade composition. The composition effect can be seen by taking Japanese trade elasticities that have been estimated for the subcomponents of imports—fuel, food, other raw materials, and manufactured goods—and weighting them according to the hypothetical import share they would have had if Japanese imports had had the same composition pattern as U.S. imports. The resulting hypothetical Japanese import elasticities of 2.0 with respect to Japanese demand and -0.7 with respect to relative price changes are significantly closer to the U.S. import elasticities of 2.0 and -1.1, respectively, than are the actual Japanese elasticities of 1.3 and -0.4.

On the export side, a similar exercise is more difficult because the almost total concentration of Japanese exports in manufactured goods means that Japanese subcomponent elasticity estimates are not available. The export composition of the two countries, however, is much more alike than their import composition. Consequently, although the composition effect on Japan's export elasticities helped keep Japanese exports stronger than they otherwise would have been (because of a stronger response to foreign growth), the effect was smaller than that estimated for Japanese imports.

By contrast, the composition effect on Japanese

¹⁴Manufactured goods are more sensitive to exchange rate changes because the country in question can generally increase its own manufactured goods supply more easily.

¹⁵The U.S. import volume elasticities in this table are obtained from a regression that includes U.S. supply factors. Omitting supply factors may raise the U.S. import volume elasticity with respect to demand. Nevertheless, a reweighting of the Japanese elasticities to reflect a more average import composition would still move them closer to the U.S. elasticities.

import prices and import elasticities had a substantial impact on Japanese trade. Applying the hypothetical import elasticities estimated for Japan on the basis of the U.S. import composition to Japan's rate of demand growth and to the hypothetical Japanese relative import price change, again based on U.S. import composition, implies that Japanese import volume would have grown about fifteen percentage points faster if Japan had not had such an unusual import composition. This hypothetical Japanese import volume growth rate suggests that Japan's import volume (measured in 1985 prices) would have been about \$20 billion greater than the level actually recorded in 1988. Clearly, Japan's unusual import composition was an important factor affecting how Japan adjusted to currency appreciation, particularly in comparison with the U.S. experience.

Demand growth

As noted above, demand growth was relatively brisk in Japan and other industrial countries during the 1985-88 period. Japanese demand growth averaged over 5½ percent annually during this period while foreign demand growth averaged 3½ percent. The strong

growth in Japanese demand boosted Japanese imports by about 25 percent while foreign demand growth raised Japanese exports by around 20 percent. This growth differential favoring imports arose even though Japanese exports were more sensitive to foreign demand growth, measured in elasticity terms, than Japanese imports were to Japanese demand growth.

Demand growth conditions for Japanese trade during 1985-88 may be compared to demand growth conditions for U.S. trade during 1980-85 to see if growth conditions unique to Japan helped support its trade surplus. This comparison is important because a country whose currency is appreciating will frequently raise its rate of domestic demand to maintain employment levels.¹⁶ Therefore, rapid Japanese demand growth does not necessarily mean that demand growth factors were unimportant in explaining Japan's muted trade balance response to appreciation.

Japan did face a relatively vibrant world trade environment in the mid-1980s that helped to keep its exports growing. Real foreign demand growth was on average much stronger in the mid-1980s than in the early 1980s. However, Japanese demand growth in the mid-1980s was also on average considerably stronger than early 1980s demand growth in the United States. Cumulative demand growth rates both at home and abroad over the entire respective appreciation periods for Japan and the United States were remarkably similar. (The yearly pattern of growth rates was different, but the United States achieved the same cumulative growth as Japan because U.S. demand grew rapidly late in the 1980-85 period following a steep early recession.) Cumulative growth in Japanese demand in the mid-1980s equaled 18 percent, while cumulative growth in U.S. demand in the early 1980s equaled 19 percent. As to foreign demand, Japan faced cumulative foreign growth of 11 percent during 1985-88; the United States faced cumulative foreign growth of 9 percent during 1980-85. These comparisons suggest that demand conditions did not leave Japan in a special position to adjust to currency appreciation.

Relative price changes

Price changes have four basic components—nominal exchange rate movements, changes in unit labor costs, adjustments to profit margins, and changes in raw

Table 3

Import Elasticity Comparison

	Elasticity with Respect to Demand Growth	Elasticity with Respect to Relative Price Changes
Actual Japanese elasticities	1.3	-0.4
Japanese subcomponent elasticities		
Fuel	1.0	-0.1
Food	0.5	-0.6
Other raw materials	1.1	-0.4
Manufactured goods	2.4	-0.9
U.S. elasticities	2.0†	-1.1
Hypothetical Japanese elasticities based on U.S. trade composition	2.0	-0.7

Sources: Japanese import elasticities are averages of estimates in Corker, "External Adjustment," and Helkie, cited in Loopesko and Johnson, *Realignment*. U.S. elasticities are the weighted combination of oil and non-oil import elasticities given in William L. Helkie and Peter Hooper, "An Empirical Analysis of the External Deficit, 1980-86," in Ralph C. Bryant, Gerald Holtham, and Peter Hooper, eds., *External Deficits and the Dollar* (Washington, D.C.: Brookings Institution, 1988), pp. 10-56.

†Elasticity with respect to U.S. income growth

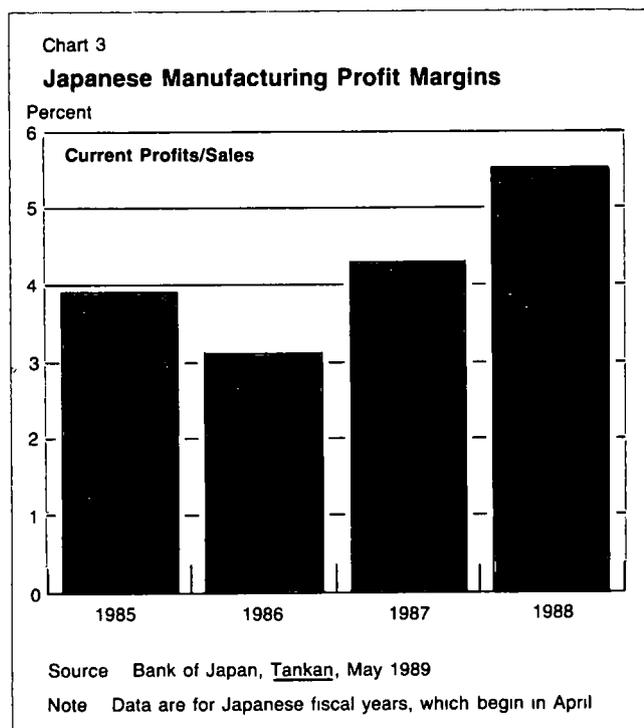
¹⁶A country with an appreciating currency may use expansionary fiscal policy to maintain economic growth. An expansionary fiscal policy is at times an important element in realigning a country's savings/investment gap. Because a country's trade balance equals its savings/investment gap, this realignment is necessary for the trade balance to adjust. Expansionary fiscal policy, through its impact on demand growth, played an important role in bringing down Japan's nominal and real yen trade balance.

material input prices.¹⁷ The 47 percent rise in the nominal effective value of the yen would have had a very significant impact on Japan's real trade balance had the other three price factors remained unchanged. Specifically, given the Japanese trade elasticities, the yen's nominal appreciation could have been expected to lower Japanese export volume by over 50 percent while increasing Japanese import volume by over 10 percent.

Changes in the other three price factors measured in yen terms, however, significantly improved Japan's price competitiveness position, notably on the export side. In fact, because of these three price factors, the yen rose only 9 percent on a real trade-weighted basis calculated from changes in the export prices of Japanese and other industrial country manufactured goods. A comparison of Japanese import prices with Japanese domestic prices suggests that, as noted earlier, relative prices on the import side changed much more sharply.

The most significant factor holding down Japanese export prices was substantial profit cutting on Japanese export sales. Sales of Japanese import-competing goods were not subject to significant profit cutting, for manufacturing sales in general, Japanese

¹⁷Because exchange rate changes are treated separately, changes in unit labor costs, profit margins, and raw material input prices refer to changes measured in yen terms.



profit margins in the mid-1980s stayed near their pre-appreciation levels (Chart 3).¹⁸ Export prices, however, differed sharply from domestic sales prices. Japanese export prices fell on average fifteen percentage points more than Japanese domestic wholesale prices for manufactured goods from 1985-88. This large difference, which was observable in almost every industry, may be attributed to massive cuts in export profit margins. Indeed, since profits account for only a portion of overall export price, profit margins must have been slashed deeply to bring overall export prices down fifteen percentage points relative to domestic prices.

In addition to export profit cutting, a decline in the price of raw material inputs helped to lower the price of Japanese exports and import-competing goods substantially. Japan imports a high proportion of its raw material inputs. When the yen appreciated, the price of these inputs fell in yen terms. A 40 percent fall in the world price of petroleum during 1985-88 brought Japanese raw material input prices down significantly further. In sum, between 1985 and 1988 Japanese raw material prices fell 40 percent, contributing substantially to an 8 percent fall in Japanese domestic wholesale prices.

Changes in unit labor costs also helped to reduce Japanese prices. Japanese unit labor costs in manufacturing declined 4 percent between 1985 and 1988. This fall was due to strong Japanese productivity growth, which continued at the average annual 5½ percent rate that it had achieved in the early 1980s. Japanese labor compensation actually grew at a relatively robust rate from 1985 to 1988, averaging 4.2 percent annually during this period. This rate was just modestly lower than the 4.6 annual rate Japan experienced in the 1980-85 period. Japan's relatively strong growth in labor compensation was important because it helped support the rapid growth in Japanese demand discussed in the previous section.

To evaluate Japan's price competitiveness during the years 1980-85, changes in Japanese prices must be considered in relation to changes in foreign prices. Unfortunately, studies comparing changes in Japanese profit rates, the single most important factor holding Japanese export prices down, with changes in the profit rates of Japan's trade partners are not available. However, an assessment of the change in Japan's value-added deflator in manufacturing relative to changes in foreign value-added deflators is available.¹⁹

¹⁸Bank of Japan, *Tankan Short-term Economic Survey of Enterprises in Japan*, May 1989.

¹⁹Comparisons of relative changes in unit labor costs, value-added deflators, wholesale prices, and export prices in manufacturing may be derived from the real effective exchange rate series provided in *International Financial Statistics*, various issues.

Value-added deflators combine labor costs and profit rates. A comparison of changes in unit labor costs alone is also available. Consequently, the importance of changes in relative profit rates may be inferred from the data after the impact of changes in relative unit labor costs is assessed. Similarly, it is difficult to find a comprehensive comparison of changes in Japanese raw material prices, the second most important factor holding Japanese overall prices down, with changes in the raw material prices of Japan's trade partners. But a comparison of changes in Japanese and foreign wholesale prices in manufacturing is available.²⁰ Wholesale prices are a combination of labor costs, profit rates, and raw material prices. Consequently, after the relative changes in labor costs and profit rates are analyzed, the relative changes in raw material costs may be inferred from the wholesale price data. The wholesale price data analysis also indicates how important changes in raw material costs are to overall manufactured goods price changes.

As noted, Japanese unit labor costs in manufacturing fell 4 percent between 1985 and 1988. During this period, manufacturing unit labor costs in other industrial countries, measured on a Japanese trade-weighted basis, rose 2 percent.²¹ As a result, Japan gained 6 percent in relative labor cost competitiveness.

Now, to assess the impact of relative profit changes, consider the change in the value-added deflators. Japan's value-added deflator fell 9 percent relative to the trade-weighted value-added deflators of its major competitors. Since Japan's unit labor costs fell 6 percent relative to foreign unit labor costs, a fall in Japanese profit rates relative to those abroad may be taken as responsible for the additional three percentage point fall in Japan's value-added deflator relative to foreign deflators.

This value-added deflator comparison implies that Japanese profit rates fell significantly more than 9 percent relative to foreign profit rates. That is, since Japan's labor costs fell only 6 percent relative to foreign labor costs, Japan's profit rates must have fallen substantially more than 9 percent relative to rates abroad in order for the combined impact of changes in relative labor costs and profit rates to equal 9 percent. Moreover, since Japanese profit rates fell only for exports, not for domestic sales, and exports only

²⁰Wholesale price indexes for manufactured goods are apt to differ less in composition across countries than are wholesale price indexes for raw materials.

²¹Bureau of Labor Statistics, *International Comparisons of Manufacturing Productivity and Labor Cost Trends, 1988*, News Release. Other industrial countries include Canada, Denmark, France, Germany, Italy, the Netherlands, Sweden, the United Kingdom, and the United States.

accounted for about 10 percent of Japanese manufacturing output,²² the comparison on the export side is even more dramatic. Profit cutting pulled down Japanese export prices about fifteen percentage points more than falling unit labor costs alone did, as the 15 percent difference between the change in Japan's export prices and the change in Japan's wholesale prices attests. In other words, export profit rates had to have fallen much more than 15 percent to explain the difference between Japanese export and domestic price levels.

Evaluating changes in relative raw material prices is complicated by the lack of raw material price indexes for all of Japan's major trade partners. Nevertheless, a Japanese trade-weighted average of the indexes for those countries that do report raw material prices fell 10 percent between 1985 and 1988.²³ In contrast, Japanese raw material prices fell 40 percent during this period, in large part because yen appreciation reduced the price of raw material imports. Japan clearly gained substantial price competitiveness from these relative movements in raw material prices.

A more comprehensive comparison of raw material price changes in Japan and other industrial countries may be inferred from a comparison of changes in overall manufacturing wholesale price indexes. Japanese domestic wholesale prices fell 8 percent between 1985 and 1988, while the trade-weighted average of wholesale prices for Japan's trade partners rose 6 percent.²⁴ The resulting fourteen percentage point difference in wholesale price movements suggests that Japanese raw material prices had to have fallen more than 14 percent relative to prices abroad. That is, because the combined relative change in Japan's labor costs, profit margins, and raw material prices equaled 14 percent and the combined impact of relative changes in Japan's labor costs and profit rates alone equaled only 9 percent, the fall in relative raw material prices had to be greater than 14 percent. Alternatively viewed, sharply falling raw material prices contributed five percentage points to Japan's fourteen percentage point fall in rela-

²²Statistics Bureau, Management and Coordination Agency, *Monthly Statistics of Japan*, Japanese input/output price table.

²³Countries reporting raw material wholesale prices include Belgium, Germany, Japan, the Netherlands, Switzerland, the United Kingdom, and the United States. Other countries included in the more comprehensive industrial country data used in this article are Austria, Australia, Canada, Denmark, Finland, France, Iceland, Ireland, Italy, New Zealand, Norway, Spain, and Sweden.

²⁴Differences in wholesale price movements across countries may reflect differences in the composition of wholesale price indexes. However, petroleum products, which showed the largest price movement in this period, had a weight in the Japanese price index that was about equal (under 10 percent) to its weight in the U.S. price index. The United States is Japan's major trade partner.

tive wholesale prices

Combined, the domestic price factors of profit cutting, declining raw material input prices, and falling unit labor costs were important in keeping Japan price-competitive in the face of the large nominal appreciation of the yen. On the export side, these factors explain why Japanese prices rose only 9 percent relative to foreign prices despite the 47 percent nominal rise in the yen. Given Japan's export elasticity of -1.1 with respect to price, the thirty-eight percentage point difference in these two measures boosted Japanese export volume more than 40 percent, or \$70 billion (based on 1985 prices), beyond what it otherwise would have been. On the import side, falling raw material input prices and unit labor costs boosted the price competitiveness of Japanese import-competing manufactured goods by about 9 percent, offsetting some of the increase in import volume resulting from the sharp fall in import prices. Given Japan's import volume elasticity of -0.4 with respect to price, these two factors cut Japanese import volume more than 5 percent, or about \$10 billion, from what it otherwise would have been.

Since all countries try to hold domestic costs down as their currencies appreciate, it is instructive to compare the price developments in Japan and the United States during yen and dollar appreciation, respectively. Such an analysis helps identify which price factors gave Japan an exceptional ability to maintain a strong trade performance. Although profit cutting, falling raw material prices, and declining unit labor costs were all important in explaining the evolution of Japan's real trade balance during the period of yen appreciation, a comparison with the earlier U.S. appreciation experience suggests that Japan's falling raw material prices were the most important determinant of the difference

Table 4

U.S. Export Prices Compared with U.S. Domestic Prices

(Cumulative Percent Change, 1980-85)

	Export Prices†	Domestic Producers' Prices
All commodities	5	15
Food, feed, beverages	-12	-9
Industrial supplies	-4	14
Capital goods	14	25
Automobiles and parts	34	28
Consumer goods	5	19

†Fixed-weight export price indexes from the U.S. National Income and Product Accounts

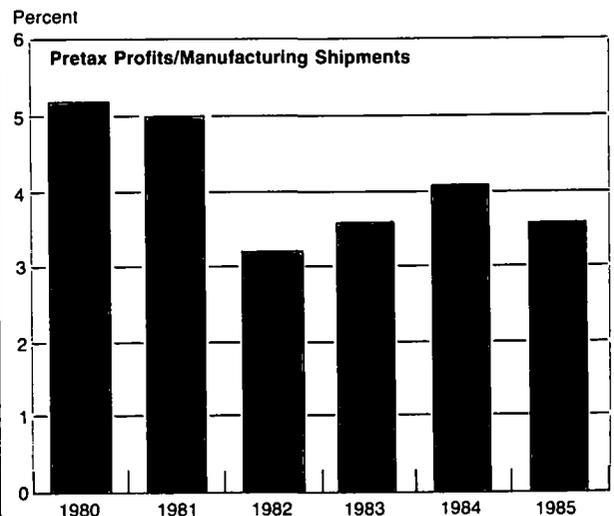
in the two countries' trade performances. In fact, Japan and the United States experienced remarkably similar changes in relative unit labor costs and profit cutting during their respective episodes of currency appreciation while raw material price developments were very different.

Consider profit developments first. U.S. export prices fell about ten percentage points relative to U.S. wholesale prices during the 1980-85 period (Table 4). This price fall was not spread as evenly across sectors as the Japanese export price fall relative to domestic prices of fifteen percentage points. In particular, in the automobile sector, where U.S. exports are primarily intra-firm trade across the Canadian border, export prices actually rose relative to domestic prices. Nevertheless, on average, profit cutting in the U.S. export sector appears to have been significant.

Moreover, for U.S. manufacturing in general, profit rates were significantly lower in 1985 than they had been in 1980 (Chart 4). The recession in the early 1980s initially brought U.S. profit rates down, but even when the U.S. economy was growing at a brisk pace in 1984 and 1985, trade pressure arising from dollar appreciation held profit rates to a relatively low level. Indeed, since the United States started its appreciation period with imports larger than exports, the fact that U.S. profit rates were down in both export and domestic import-competing industries meant that profit cutting may have had an even bigger impact on the U.S. trade balance than it did on the Japanese trade balance. The

Chart 4

U.S. Manufacturing Profit Margins



greater fall in the U.S. relative value-added deflator for manufacturing relative to the fall in the Japanese value-added deflator shows the importance of across-the-board profit cutting for the U.S. trade balance.

Before drawing profit implications from the change in the U.S. value-added deflator, however, it is necessary to examine changes in unit labor costs. U.S. unit labor costs fell 6 percent relative to the U.S. trade-weighted average of foreign unit labor costs during 1980-85.²⁵ This fall is actually identical to the fall in Japanese relative unit labor costs during 1985-88. Consequently, differences in relative unit labor cost developments do not explain why the Japanese and U.S. real trade balances moved so differently in response to appreciation nor why the Japanese and U.S. relative value-added deflators fell to a different extent.

The U.S. value-added deflator in manufacturing fell 11 percent relative to the deflators of U.S. trade partners during 1980-85. This fall was greater than the 9 percent relative fall in the Japanese value-added deflator. Since Japanese and U.S. unit labor costs moved similarly, the greater fall in the U.S. relative

value-added deflator implies more extensive U.S. profit cutting during dollar appreciation than Japanese profit cutting during yen appreciation. Consequently, profit cutting does not appear to explain the large difference in Japanese and U.S. trade balance changes.

In contrast, relative changes in raw material prices do emerge as an important determinant of the difference in trade balance adjustment. A comparison of Japanese and U.S. relative raw material price movements reveals a significant difference in price changes in the two countries. Evidence from countries that report raw material wholesale prices suggests that while Japanese raw material prices were down 30 percent relative to those of Japan's trade partners during yen appreciation, U.S. raw material prices were only down about 15 percent relative to those of U.S. trade partners during dollar appreciation (Chart 5).²⁶ This substantial discrepancy may be traced to the fact that the United States is a large raw materials producer while Japan is not. Since U.S. raw material prices reflect to a large degree U.S. domestic prices, they did not change very much in dollar terms during the period of dollar appreciation. Because Japan imports a large proportion of its raw materials, its raw material prices primarily reflect import prices. Therefore, when the yen rose, Japanese raw material prices fell sharply in yen terms.

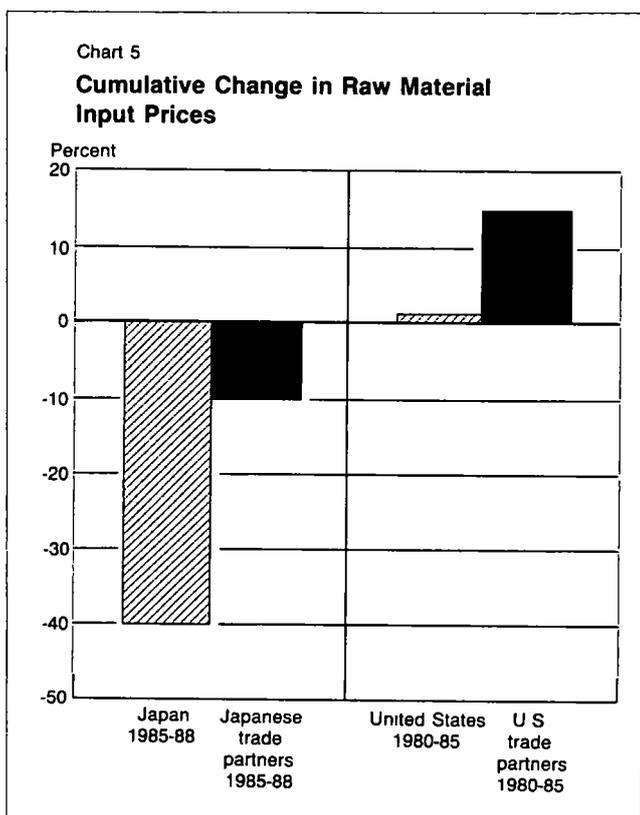
The impact of differences in relative raw material price changes can be seen by comparing changes in Japanese and U.S. relative wholesale prices. As noted, Japanese wholesale prices fell 14 percent relative to the wholesale prices of Japan's trade partners during yen appreciation. U.S. wholesale prices fell only 7 percent relative to the wholesale prices of U.S. trade partners during dollar depreciation. Since unit labor cost developments were the same for both countries and U.S. profit rates actually fell more than Japanese profit rates, the greater fall in Japanese wholesale prices is directly attributable to the much sharper fall in Japanese raw material input prices. Movements in raw material input prices thus gave Japan a unique advantage in adjusting to currency appreciation.

Other potential factors affecting Japanese real trade balance adjustment

Three other possible factors have received considerable attention as sources of Japan's strong trade performance. Some observers have attributed this strong performance to an exceptionally competitive Japanese business ability. Others have pointed to a world invest-

²⁶Canada is a major U.S. trade partner that does not report raw material wholesale prices. Since Canadian prices move relatively closely with U.S. prices, however, the measured fall in U.S. raw material prices relative to those abroad would have been smaller if Canadian prices were included in the comparison.

²⁵Bureau of Labor Statistics



ment boom that has supported Japanese capital goods exports, and still others to an upsurge in demand for Japanese exports to service rapidly growing Japanese overseas direct investment. The analysis in this article suggests that none of these factors was of major significance in keeping Japan's trade surplus high.

The foregoing analysis of factors underlying differences in Japanese and U.S. trade balance adjustment implies that business ability distinctions do not explain the variation in the Japanese and U.S. experiences. Abstracting from the starting balance effect, the prime economic factors behind the very large disparity between Japanese and U.S. adjustment to currency appreciation appear to be differences in the two countries' import elasticities and the trade balance boost Japan received from falling imported raw material prices. The import elasticity differences also reflect the distinctive role raw materials played in Japanese trade. Adding the effect of different starting trade balances to the estimated quantitative impact of these raw material factors more than accounts for the difference in the response of the Japanese and U.S. trade balances to currency appreciation, as Table 5 reveals.

For this table, the impact of different starting trade balances is calculated by measuring how the disparity between the real Japanese and the real U.S. trade balance adjustments differs from the disparity that would have arisen if the countries' respective export and import volumes had grown at actual rates but from a balanced trade position. In this balanced position, exports and imports are set equal to the numeric average of actual 1985 Japanese exports and imports.²⁷ The elasticity effect listed in the table shows the change that would have occurred in Japanese trade if Japanese import volume had responded in the manner suggested by a combination of Japan's import subcomponent elasticities, weighted to reflect the composition of U.S. trade. This calculation also involves the reweighting of Japanese import prices to reflect how they would have moved in aggregate if Japan's import composition equaled that of the United States. The raw material price effect in the table is derived by computing how the actual growth in Japanese export and import volumes differs from the growth that would have taken place (based on Japan's export and import volume elasticities) had falling Japanese raw material input prices had the same limited impact on Japanese relative wholesale prices as more moderately falling U.S. raw material input prices had on U.S. relative wholesale prices. These hypothetical Japanese export and import changes are netted together. The

²⁷By starting the exercise with identical export and import levels, this analysis also adjusts for the difference in the two countries' overall trade size.

importance of these calculations attributing the difference in Japanese and U.S. trade balance adjustment solely to the effects of different starting balances and raw materials trade lies in what they exclude. Specifically, the calculations suggest that the trade balance adjustment disparity between Japan and the United States had relatively little to do with different business strategies or abilities to compete.²⁸

As for the arguments concerning a world investment boom and Japanese overseas direct investment, the earlier analysis explains Japanese export growth reasonably well as the outcome of other factors already discussed, namely, foreign demand growth and relative price changes. In fact, actual Japanese export growth was slightly slower than a combination of the last-named factors suggested. Consequently, there does not appear to be strong evidence that a major world investment boom led to a temporary surge in Japan's

²⁸This conclusion does not mean that Japanese and U.S. producers followed identical business practices. Nevertheless, Japanese practices generally cited as having a positive effect on Japanese competitiveness (such as strict attention to quality control) appear to have offset practices generally viewed as having a negative effect on Japanese competitiveness (such as relatively inflexible supply relationships) to the same extent positive practices offset negative practices in the United States.

Table 5

Comparison of Japanese and U.S. Real Trade Balance Adjustment to Currency Appreciation

(Billions of Dollars)

Japanese real trade balance change, 1985-88	- 40
U.S. real trade balance change, 1980-85	- 145
Difference between Japanese and U.S. real trade balance changes	+ 105
Difference due to	
Starting base effect	+ 70
Trade composition effect on import prices and elasticities	+ 20
Net raw material price effect on exports and imports	+ 25
Residual	- 10

Note: These numbers are based on calculations described in the text. The numbers have been rounded to the nearest \$5 billion since it is impossible to estimate them exactly. In particular, the last four numbers listed depend on estimated Japanese trade elasticities. Changes in these elasticities could significantly affect the results. Moreover, the last four numbers depend on a comparison of price indexes across countries. Differences in index composition or method of calculation could affect the results. Japan's real trade balance change is computed by applying export and import volume growth rates to Japan's nominal 1985 trade levels. The U.S. change is computed by applying volume growth rates to nominal 1980 trade levels. Footnote 1 of the text considers the implications of this methodology.

capital goods exports. Nor does it appear that Japan's exports were substantially increased by sales to Japanese subsidiaries abroad.

This reasoning is not meant to imply that world and overseas Japanese investment were unimportant for Japanese exports. Rather, it suggests that these two factors did not play exceptional roles that could explain Japan's strong trade performance. Foreign investment does not appear to have offered Japan a unique export environment in the mid-1980s. Cumulative gross fixed nonresidential investment in industrial countries other than Japan grew about the same between 1985 and 1988 as did cumulative gross fixed nonresidential investment in industrial countries other than the United States between 1980 and 1985. Like Japan, the United States was a major capital goods exporter that benefited from this earlier foreign investment growth. That overseas investment does not emerge as a unique element in Japanese export growth between 1985 and 1988 may be due to the fact that this investment became really large only at the end of this period (Table 6). Consequently, the impact of this investment on Japanese exports is likely to be more fully felt in 1989 and beyond.

Adjustment of the Japanese nominal trade balance

Between 1985 and 1988, the nominal Japanese trade balance rose \$39 billion, from a surplus of \$56 billion to a surplus of \$95 billion. This rise reflects a dollar translation effect, a starting base effect, and price movements applied to the export and import volume growth rates already discussed.

The dollar translation effect is the dollar rise that results when Japan's nominal trade balance measured in yen is converted into depreciated dollars.²⁹ When measured in yen, the Japanese trade surplus did not grow between 1985 and 1988, it actually shrank by ¥974 billion (or \$8 billion converted at the 1988 dollar/yen exchange rate). But because the dollar value of the yen increased by 86 percent, the measured dollar level of Japan's surplus rose despite this fall in yen terms.

The starting base effect for Japan's nominal trade balance is analogous to the starting base effect already examined for Japan's real trade balance. The nominal starting base effect can be measured jointly with the dollar translation effect just discussed. This calculation compares the actual dollar change in

Japan's trade surplus with the change that would have occurred if Japan had started with balanced trade and if the nominal *dollar* levels of exports and imports had grown at their actual nominal *yen* growth rates. The hypothetical starting base used for this procedure is again derived by setting Japanese exports and imports equal to the average of their 1985 actual levels. This exercise suggests that Japan's large trade surplus at the start of its appreciation period, combined with the effect of translating the Japanese surplus into depreciated dollars, raised Japan's nominal 1988 trade balance by \$33 billion above what it otherwise would have been.

These dollar translation and starting base effects are thus clearly very important in explaining Japan's nominal trade strength. Even after these effects are taken into account, however, Japan's nominal trade balance would still have remained very high during the 1985-88 period despite the 47 percent nominal effective appreciation of the yen. To determine what lay behind this underlying nominal trade strength, it is instructive to consider each of the factors already discussed in the real trade balance analysis.

The first factor is trade composition and its impact on import price and import elasticities. Japan's unusual trade composition has been estimated to have reduced Japanese import volume by about 15 percent. To this volume effect must now be added the composition effect on import price in order to calculate the overall effect of import composition on Japan's nominal trade balance. As already estimated, the composition effect lowered Japanese import prices by about fifteen percentage points from what they would have been if Japan had had a more normal import composition. The combined 30 percent price and volume reduction in imports attributable to Japan's unusual import composition cut Japanese nominal import payments (or raised the Japanese nominal trade balance) by about \$35

Table 6

Japanese Foreign Direct Investment in Manufacturing

(Billions of Dollars)

1985	2
1986	4
1987	8
1988 estimate	15

Source: Bank of Japan, *Balance of Payments Adjustment in Japan: Recent Developments and Prospects*, Special Paper no. 178, May 1989. The estimate for 1988 is based on the number for the first half of 1988 listed in the source. Data are for Japanese fiscal years, which begin in April.

²⁹It is important to distinguish how Japan's nominal trade balance moved in yen terms from how it moved in dollar terms. The yen change reflects a more fundamental adjustment for Japan because Japanese labor must be paid in yen and Japanese profits are gauged domestically in yen terms. Moreover, Japanese savings and investment, and the gap between savings and investment that constitutes Japan's current account deficit, are economically determined in Japan's yen-based economy.

billion³⁰

Profit cutting also had a major impact on Japan's real trade balance, specifically on the export side. Its impact on Japan's nominal trade balance, however, appears to have been significantly smaller. Profit cutting reduced the yen payment received on each export sale. This payment reduction per sales unit offset a significant proportion of the export volume gain attributable to profit cutting. Indeed, the export volume elasticity with respect to relative price changes of -1.1 discussed earlier implies that almost all of the volume gain was offset by the yen price fall attributable to profit cutting, leaving only a small positive impact on Japan's nominal export level.³¹

Unit labor cost developments also boosted Japan's real trade balance. Again, however, the impact on Japan's nominal trade balance was relatively small. On the export side, Japan translated its falling unit labor costs into a reduction in the yen price of its products. While the volume of exports rose because of this price reduction, the yen payment per unit exported fell. This fall in per unit payment offset most of the volume gain, just as it did in the case of profit cutting. The nominal level of Japanese exports increased only modestly. On the import side, in contrast, Japanese unit labor cost developments had no direct impact on Japanese import prices. Therefore, the reduction in import volume resulting from falling Japanese unit labor costs relative to those abroad was not offset by any import price changes. However, the reduction in import volume from falling relative unit labor costs was actually only on the order of \$5 billion. The decrease was small because Japanese import demand is quite unresponsive to relative price changes. (It has only an estimated -0.4 import volume elasticity with respect to these changes.) Consequently, falling Japanese unit labor costs do not appear to explain a substantial part of Japan's strong nominal trade performance.

Falling raw material input prices were the third price factor providing support to Japan's real trade balance performance. The impact of this factor on Japan's nominal trade balance was also substantial. Its significance is in distinct contrast to the small nominal impact of Japanese profit cutting and declining Japanese unit labor costs. Falling raw material prices did lower Japanese export prices, as did profit cutting and declining

labor costs. But falling raw material prices also reflected falling Japanese import prices whereas the other two factors did not. In fact, because the appreciation-induced fall in the yen price of imported raw materials accounted for the overall fall in Japanese raw material costs relative to those of foreign competitors, the negative effect of falling export prices on Japan's nominal trade balance was just about matched by the positive effect of falling import prices. Consequently, with a positive export volume effect and offsetting export and import price effects, Japan's nominal trade balance clearly benefited from falling raw material prices.³² On the basis of the magnitude of the raw material price fall and Japan's trade elasticities, this benefit equaled about \$20 billion in 1988 prices.

Falling raw material prices had one other important effect on Japan's nominal import level aside from the gain in the price competitiveness of Japan's manufactured goods. The sharply falling price of petroleum imports lowered the cost of Japanese home heating oil and gasoline as well as the cost of petroleum used as a manufacturing input. Japanese petroleum import prices declined about forty percentage points more than other Japanese import prices because of the falling world price of petroleum during 1985-88. Japanese petroleum imports not going into manufacturing production were roughly \$35 billion in 1985.³³ A 40 percent savings on this import level would equal about \$15 billion. This import savings from the world petroleum price fall was separate from, but simultaneous with, the adjustment that occurred in Japan's nominal trade balance in response to yen appreciation. Japan's large petroleum savings, therefore, contributed significantly to the strong performance of Japan's nominal trade balance.

Demand growth, a world investment boom, and Japanese overseas direct investment did not have an unusual effect on Japan's real trade balance. This conclusion holds for Japan's nominal trade balance as well, and the reasons are the same as those cited in the real balance analysis. To determine if Japanese business acumen played a role, the factors underlying Japanese nominal trade adjustment can be compared with those underlying U.S. nominal trade adjustment, just as the factors determining the real trade performances of the two countries were compared. The results

³⁰This calculation and those that follow in this section abstract from the dollar translation impact to avoid double counting. In other words, the \$35 billion estimate measures the magnitude of the trade composition impact in the absence of any dollar translation effect.

³¹Japanese export volume elasticities with respect to relative price estimated in the 1960s and 1970s averaged -1.4 . These elasticities would suggest that the negative price effect of profit cutting offset about 70 percent of the positive volume effect of profit cutting.

³²This argument is a more general version of the case in which an entrepot economy imports products solely for the purpose of re-exporting them. The entrepot economy's trade balance is relatively immune to changes in its exchange rate.

³³Bank of Japan, *Economics Statistical Annual 1988*, Japanese input/output table. Because Japanese petroleum import volume is very unresponsive to changes in price, the \$15 billion savings calculated above did not show up in the earlier real trade balance analysis.

of the nominal comparison are shown in Table 7. For this table, the dollar translation and starting base effect are calculated by computing how the nominal Japanese and U.S. trade balances would have adjusted if they had both started with identical balanced export and import levels and each country had followed its actual domestic currency nominal export and import growth rates. The difference between the actual trade balance results and these hypothetical results accounts for \$75 billion of the difference in Japanese and U.S. nominal trade balance adjustment. The trade composition effect is calculated as described above. The raw material price effect is based on the difference that would have occurred in Japan's nominal trade balance if Japanese relative raw material prices had moved the same as U.S. relative raw material prices. The heating oil and gasoline price effect equals \$10 billion rather than the \$15 billion Japanese savings calculated above because U.S. petroleum import prices also fell somewhat during 1980-85.³⁴ The negative residual in this table suggests that the factors listed more than account for the difference in Japanese and U.S. nominal trade balance adjustment to currency appreciation. Consequently, as the analysis of the real trade balance suggested earlier, differences in business ability or business strate-

³⁴There is some double accounting of the oil price effect with the trade composition effect. The trade composition effect includes the impact of oil's large import share. If the oil share were not so large, the falling oil price effect would be less.

Table 7

Comparison of Japanese and U.S. Nominal Trade Balance Adjustment to Currency Appreciation

(Billions of Dollars)

Japanese nominal trade balance change, 1985-88	+ 39
U.S. nominal trade balance change, 1980-85	- 96
Difference between Japanese and U.S. nominal trade balance changes	+ 135
Difference due to	
Dollar translation and starting base effects	+ 75
Trade composition effect on	
import prices and elasticities	+ 35
Net raw material price effect on exports and imports	+ 20
Decline in price of heating oil and gasoline	+ 10
Residual	- 5

Note: These numbers are based on calculations described in the text. The numbers have been rounded to the nearest \$5 billion since it is impossible to estimate them exactly. In particular, several of the numbers listed depend on estimated Japanese trade elasticities. Changes in these elasticities could significantly affect the results. Similarly, some numbers depend on a comparison of price indexes across countries. Differences in index composition or method of calculation could affect the results.

gies do not explain Japan's nominal trade balance strength.

Recent Japanese trade behavior

Japan's trade surplus fell significantly in the middle of 1989 after rising sharply early in the year. Japan's second-quarter and third-quarter 1989 annualized surpluses, averaging \$72 billion, were substantially lower than its 1988 trade surplus of \$95 billion. Exchange rate changes, raw materials prices, and relative demand growth explain these recent developments in Japan's trade balance fairly well.

There were some notable exchange rate and oil price changes in the spring of 1989. The yen depreciated 3 percent in the second quarter from its 1988 average level and 5 percent from its first-quarter 1989 level. It fell another 3 percent in the third quarter. Although the gain in price competitiveness from depreciation should raise Japan's trade surplus over time, the initial impact of the 1989 depreciation was to lower the dollar value of Japan's trade surplus through the dollar translation effect (which in this case worked in reverse). Dollar petroleum prices also rose about 15 percent in the spring of 1989 from their average 1988 and first-quarter 1989 levels, further lowering Japan's 1989 trade surplus.

Another important factor behind the recent turndown in Japan's trade surplus was Japan's relatively rapid demand growth during 1989. Japanese demand grew at an average annual rate of over 5 percent in the first half of 1989 (growth was concentrated in the first quarter but demand growth had some lagged effect on imports) while demand in other industrial countries grew at only about half that rate. Japan's export and import trade volume elasticities with respect to demand growth suggest that this divergent demand growth performance by itself led to Japanese import growth about 50 percent faster than Japanese export growth. Since Japanese imports were 64 percent of Japanese exports in 1988, a 50 percent growth differential was necessary to keep the Japanese trade surplus from rising. Demand growth that was much more rapid in Japan than in other countries achieved this result and thereby allowed the 1989 price changes to actually push the Japanese trade balance down.

Conclusion

This analysis of Japan's trade balance adjustment to yen appreciation suggests that the rise in Japan's trade surplus from 1985 to 1988, measured in either real or nominal dollar terms, can be explained in a relatively straightforward manner. A substantial starting base trade surplus in 1985 accounts for a significant part of the rise in Japan's trade balance. In addition, the com-

modity structure of Japan's trade, with imports dominated by raw materials and exports consisting almost exclusively of manufactured goods, had a substantial favorable effect on Japan's trade balance. Japan's real trade balance was further supported by the profit cutting measures of Japan's export industries, although profit cutting had a much smaller effect on Japan's nominal trade balance. The statistical effect from translating a yen balance into depreciated dollars, combined with substantial import savings from the falling world price of petroleum during 1985-88, boosted Japan's nominal trade balance but had little effect on Japan's real trade balance. Apart from these factors, Japanese exports and imports appear to have responded fairly conventionally to changes in relative price and demand growth at home and abroad.

A corollary of these findings is that the impressive strength of Japan's trade surplus in the mid-1980s does not appear to stem from any unique Japanese business strategy or ability to compete. Nor does it appear to be directly related to temporary factors such as a world investment boom or Japanese sales to overseas subsidiaries. Consequently, measures taken to address these other factors, although they may influence Japan's trade balance, are not likely to affect the macroeconomic conditions behind Japan's trade strength.

Looking to the future, although longer term factors such as shifting international supply conditions, changes in trade policies, and shifts in demand prefer-

ences may affect Japan's trade position, they probably will not by themselves be enough to offset the trade gains Japan realized from declining imported raw material prices over the past few years. Consequently, if its trade surplus is to decline substantially, Japan will likely have to continue to grow much more rapidly than its trade partners, or relative prices may have to change further to reduce the competitiveness of Japanese goods.

One encouraging development is that Japan's trade balance will probably respond more strongly now to both Japanese demand growth and changes in the value of the yen than was the case in 1985. After the sharp profit cutting of the last two years, Japanese manufacturers currently have considerably less room to cut profit margins on export sales. Even more important perhaps, Japanese imports are a higher percentage of exports in 1989 than they were on average between 1985 and 1988. Therefore, every percentage point increase in the growth rate of imports relative to exports will have a larger effect on Japan's trade balance now than it did over the past few years. Moreover, manufactured goods imports are a higher percentage of total imports than was the case in the past. Consequently, import growth should now be more responsive to changes in demand and relative prices.

Susan Hickok