

# Macroeconomic Influences on the U.S.-Japan Trade Imbalance

From 1980 to 1985, the U.S. merchandise trade deficit increased by \$100 billion to nearly \$125 billion. Both the size and rapid growth of our trade deficit are unprecedented. While the imbalance is distributed widely across major trading partners, Japan accounts for the largest share, about one-third of the total or \$43 billion in 1985. Not surprisingly, therefore, the deficit with Japan has attracted the most attention. Economists and policy makers generally agree that the large U.S.-Japan trade imbalance is not sustainable over the long run and that it poses a serious threat to trade relations between the two countries, but there seems to be no agreement on causes of the imbalance or potential remedies for it. Indeed, some have questioned whether it can be remedied at all.

One view, shared by many in the U.S. Congress, is that the bulk of the imbalance reflects explicit or implicit protectionist barriers and "unfair" trading practices in Japan. Under this view, the only viable option for the United States is to enact legislation restricting imports from Japan. In contrast, many economists believe that the U.S. trade deficit with Japan is part of a set of broader macroeconomic imbalances, which can be reduced by policies encouraging stronger economic growth in Japan and improved U.S. competitiveness. Still others have argued that Japan's bilateral and global surpluses reflect specific cultural factors—the often-noted high saving rate and a preference for home products—that are immune to legislative action as well as to macroeconomic policy.

This article focuses on the macroeconomic forces underlying the U.S.-Japan trade balance during the 1980s. The

increasing bilateral deficit coincided with significant changes in other economic trends in the two countries, including a slowing of real growth in Japan relative to the United States and a spectacular rise in the dollar against the yen and other major currencies. An assessment of the contributions of these macroeconomic developments to the bilateral trade deficit has important implications for economic policy. More specifically, if a substantial part of the deficit has been generated by changes in exchange rates and real growth, then macroeconomic policy can play an important role in reducing that deficit. On the other hand, if cultural differences or other structural factors account for Japan's trade performance, the medium-term prospects for substantial reductions of the bilateral deficit would seem to be limited.

The analysis in this article, based on a recently estimated model of U.S.-Japan trade, suggests that macroeconomic influences were responsible for most of the rise in the bilateral deficit since 1980. The dollar's marked appreciation from 1980 to early 1985 seems to account for about one-third of the increase in the U.S.-Japan trade deficit over that period. Another 40 percent is attributable to a narrowing of the U.S.-Japan growth differential, reflecting, largely, slower growth in Japan during recent years. Looking to the future, our analysis suggests that the substantial decline of the dollar against the yen and other currencies since early 1985 should reduce the bilateral imbalance over the next several years. However, without a significant pickup in Japan's real growth relative to the United States our trade deficit with Japan will most likely continue to be well above historical levels.

## **Influences on trade**

In several respects, the trade deficit with Japan has followed a pattern set by the overall U.S. trade imbalance. Both defi-

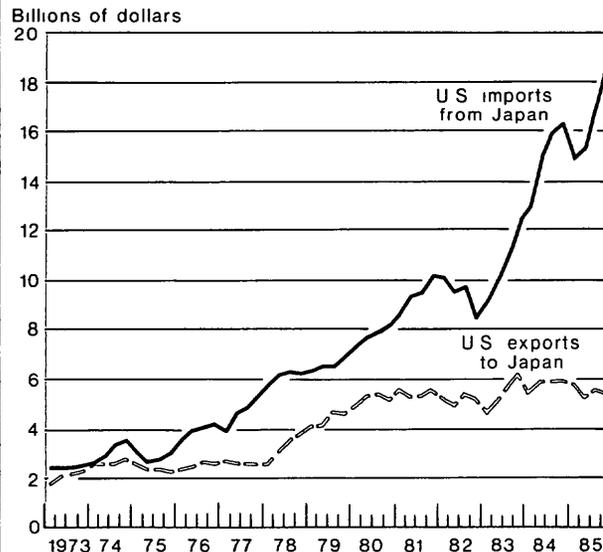
The author would like to thank Lorraine M. Acosta and Sally J. Moran for their research assistance

cits increased moderately between 1980 and 1982 and then much more rapidly over the next three years. Between 1980 and 1985, the \$33 billion increase in the U.S. deficit with Japan was one-third of the total rise in the deficit (Chart 1). Indeed, in dollar terms the U.S. balance with Europe has deteriorated even more.

These deficits also reflect an unprecedented growth in U.S. imports accompanied by near stagnation of exports (Chart 2). From 1980 to 1985, U.S. imports from Japan more than doubled, increasing \$34 billion. The volume increase was nearly as great since the average price of these imports changed little. In the same period, U.S. exports to Japan posted only a \$1.3 billion increase.

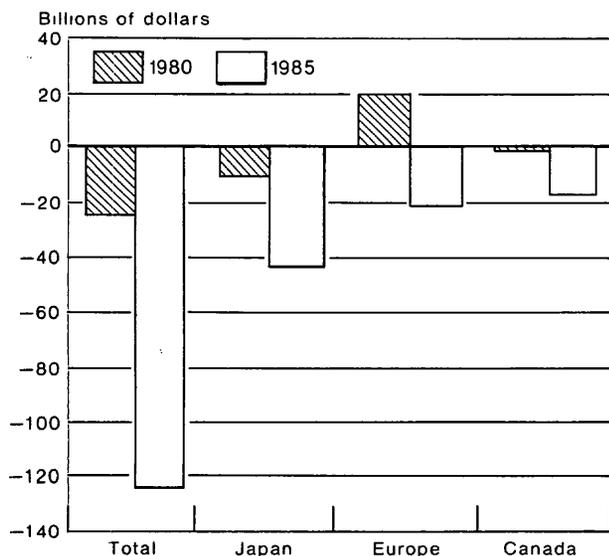
Trade developments went hand-in-hand with two other major shifts in economic trends. First, the U.S.-Japan growth differential narrowed as the rate of increase in Japanese GNP slowed to barely above that of the United States from 1980 to 1985. This represents a marked departure from the 1970s when the average annual increase in U.S. real GNP was 3.7 percent compared with 8.7 percent for Japan. The growth in Japanese domestic demand slowed even more, so that the U.S. market was expanding faster than the Japanese market. Since a part of any increase in aggregate demand is spent on foreign products, this recent shift in growth patterns would be expected to slow U.S. exports to Japan relative to imports.

Chart 2  
**United States-Japan Trade Flows**  
Quarterly rates



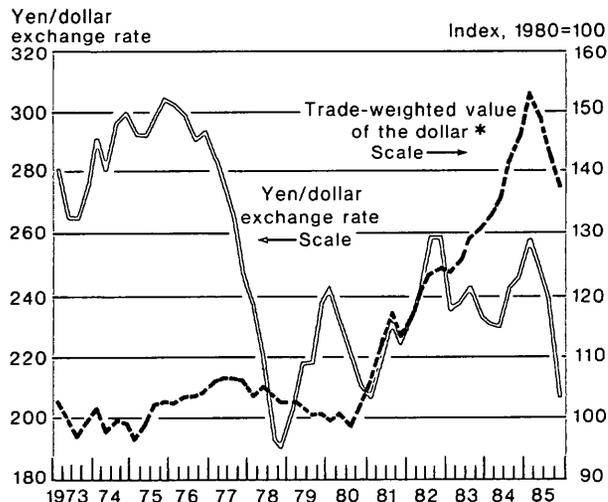
Source United States Department of Commerce

Chart 1  
**United States Trade Balance by Region**  
Annual rates



Source United States Department of Commerce

Chart 3  
**The Exchange Value of the Dollar**



\*Trade-weighted exchange value of the dollar vis-à-vis 11 industrial countries, excluding Japan  
Source International Monetary Fund, International Financial Statistics

Second, the dollar appreciated dramatically from the end of 1980 to the beginning of 1985, with increases of 22 percent against the yen and an average of 50 percent against other currencies (Chart 3). This appreciation, by raising the costs of U.S.-produced goods relative to foreign-

produced goods, stimulated U.S. imports from Japan and depressed our exports. Since the dollar appreciated more against other currencies than it did against the yen, the cost of U.S. goods rose relative to Japanese goods and rose even more relative to the other foreign goods that compete

### The Estimated Trade Model

The U.S.-Japan model is an empirical representation of simple supply and demand frameworks for two markets: U.S. trade in imports from Japan and Japanese trade in exports from the United States. We estimated the sensitivities of the volumes and prices of traded goods to incomes, prices, and exchange rates with regressions using quarterly data from 1972 to 1982. The independent variables in the export volume equation (XV) were the level of Japanese domestic demand (Y) and the price of U.S. exports to Japan relative to Japanese prices (XP/JPP). All prices were converted into dollars.

Import volume was estimated as a function of U.S. GNP (Y), import prices from Japan relative to U.S. home prices (MP/USP), and a lagged dependent variable. The import volume equation was corrected for serial correlation (u).

Estimates are reported in Table B-1 and provide support for the proposition in the text: U.S. imports are much more sensitive to income than are U.S. exports. Equal permanent increases in income of one percentage point in the United States and Japan would raise the volume of U.S. imports from Japan by 3.2 percent but would only raise the volume of

exports to Japan by 1.2 percent in the long run (Table B-2). Balanced growth in the United States and Japan results in imbalanced bilateral trade. Further, both the export and import volume equations reveal important own-price effects. In the long run a 1 percent increase in import prices will lower the volume of imports from Japan by 1.7 percent. A 1 percent increase in export prices will lower the volume of exports to Japan by 1.0 percent. It is perhaps important to point out that the differences in the estimated income and price elasticities for the two countries depend on, among other things, institutional and cultural factors. In other words, changes in those factors can alter the role of macroeconomic influences. For example, the estimated income elasticity of imports for Japan might be significantly higher if Japanese domestic markets were more open to foreign goods. This subject is, however, beyond the scope of the present study.

The dollar prices of exports (XP) and imports (MP) were related to measures of production cost, competitors' price (FORP), and domestic goods prices. The pricing equations estimated indicated that there are varieties of "pass-through" depending on the pattern of the change in exchange rates and domestic demand conditions. Since competition from other foreign countries must be considered, both the dollar's value against the yen as well as all other currencies will affect prices and volume of trade goods. The historical relationships from the 1970s used in the model suggest that a permanent 10 percent increase in the yen/dollar rate would lower the dollar price of imports by about 3 percent and raise the yen price of exports by about 3 percent in the long run. This incomplete pass-through limits the ability of exchange rates to influence trade flows. If the dollar were to appreciate 10 percent against all currencies, dollar import prices would decrease about 9 percent and yen export prices would increase about 8 percent.

\* The bilateral export and import price indexes were constructed using geometrically weighted averages of U.S. export and import deflators by major end-use group. The weights were the shares of each commodity group in U.S. exports to and imports from Japan.

Table B-1

#### Estimation Results

Export volume			
$XV = -0.24 + 0.31Y - 0.26(XP/JPP) + 0.74XV_{-1}$	$R^2 = 0.91$		
(0.12) (1.92) (2.34) (8.94)	DW = 2.26		
Export price			
$XP = 0.03 + 0.07JPPFORP + 0.05JPP + 1.46XP_{-1} - 0.61XP_{-2}$	$R^2 = 1.00$		
(0.05) (1.13) (1.08) (13.46) (6.63)	DW = 2.02		
Import volume			
$MV = -8.13 + 1.55Y - 0.83(MP/USP) + 0.51MV_{-1} + 0.32u$	$R^2 = 0.94$		
(3.29) (3.81) (2.13) (4.52) (1.92)	DW = 1.84		
Import price			
$MP = 1.62 + 0.06USP + 0.22USFORP + 0.11JPP + 0.61MP_{-1}$	$R^2 = 1.00$		
(6.46) (0.94) (3.04) (3.12) (8.79)	DW = 1.93		

Table B-2

#### Long-Run Bilateral Trade Elasticities

The impact of a permanent 1 percent change in	U.S. exports to Japan		U.S. imports from Japan	
	Volume	Price	Volume	Price
Home country income	1.2	*	3.2	*
Traded goods price	-1.0	*	-1.7	*
Foreign competitors' price	0	0.5	0	0.6
Producers' cost	*	0	*	0.3
Domestic goods' price	*	0.3	*	0.2

\* Not applicable

in the Japanese market. Thus, U.S. exports to Japan were hurt by increased competition both from Japanese goods and from other foreign goods in the Japanese market

The potential importance of these changes for the bilateral deficit is strongly suggested by economic theory as well as past experience (Table 1).<sup>2</sup> When Japan's real GNP grew faster than that of the United States, our bilateral exports and imports increased at roughly the same rate, and the bilateral imbalance remained within moderate bounds. When Japanese growth slowed toward the U.S. rate over 1978-79, U.S. imports from Japan accelerated and the deficit grew. These observations indicate that trade between these two countries is affected by their GNP growth rates and that Japanese imports are substantially less responsive to Japanese GNP than U.S. imports are to our GNP. Other studies of U.S.-Japan trade support these observations.<sup>3</sup>

Less obvious from past experience is the impact of the rising dollar on the deficit. However, the fact that growth in U.S. imports from Japan has been extraordinarily rapid since 1980 would seem to imply that the dollar has been a major influence.

This historical perspective suggests that shifts in two basic macroeconomic forces—relative growth rates and exchange rate changes—played a major role in the widening U.S.-Japan trade deficit since 1980; it still does not reveal anything about the extent to which the increased deficit can be attributed to those forces individually or collectively. To examine this issue more closely, we estimated a standard model explaining trade flows in terms of real growth rates, inflation, and exchange rate changes over the 1972-82 period. The volumes of U.S. exports to and imports from Japan are assumed to depend on the countries' incomes and prices of traded goods relative to domestic goods. The prices of U.S. and Japanese producers as well as those of other countries are included because Japanese goods compete in the U.S. home market not only with American goods but also with the products of other countries. The prices of traded goods are themselves determined by exchange rates combined with the general level of costs within the exporting country and demand conditions within the importing country. Thus the value of the dollar against the yen as well as other currencies influences U.S.-Japan trade through its impact on relative prices. (Further details of the model and estimates are given in the box.)

Table 2 presents the model's prediction of changes in the bilateral balance between 1980 and 1985 and the relative

contributions of income growth, exchange rate change, and inflation.<sup>4</sup> The main point that emerges from Table 2 is that developments in macroeconomic factors are, in large part, responsible for the deterioration of the bilateral trade position, accounting for \$27 billion of the \$33 billion recorded increase in the deficit. The unexplained portion is therefore small, though obviously not insignificant. The dollar value of both bilateral exports and imports increased more than would be predicted from past relationships, but increases in U.S. exports to Japan exceed predicted values by a considerably smaller margin. This relative success in explaining exports indicates that the widening of the deficit over and above what macroeconomic variables predict is not the result of special Japanese import practices.<sup>5</sup>

Of those macroeconomic forces, the rise in the dollar accounted for a significant portion of the increases in the bilateral imbalances. If the dollar exchange rate had remained unchanged from its 1980 level against the yen and other currencies, the 1985 deficit would have been about \$12 billion lower; that is, about one-third of the increase in the deficit is attributable to exchange rate movements. This calculation takes into account only the direct effect of the exchange rate on prices of traded goods, and assumes away any indirect effect on trade through changes in incomes or other macroeconomic variables. Moreover, with the dollar exchange rate fixed, macroeconomic developments, including real growth rates, would probably have been different from what actually occurred, and as a result, trade flows and even the balance might have evolved along different lines. Abstracting from these difficulties, our results suggest that even if the dollar had not appreciated since 1980, other macroeconomic forces would likely have driven the bilateral deficit to over \$25 billion by 1985.

The bilateral deficit would have widened due to the pattern of U.S.-Japan real growth. The increases in the two countries' GNPs would have led to a nearly \$14 billion worsening in the deficit due exclusively to the effects of income on the volumes of trade. These effects are concentrated on the import side. Income growth influences the demand for foreign goods directly: when income grows, so does the demand for foreign goods. In contrast, exchange rate changes affect trade volumes more indirectly through first altering the prices of traded goods. On the basis of the estimated model, U.S. imports from Japan are almost three times as sensitive to income as U.S. exports to Japan. This differential sensitivity to income implies that Japan's real income must grow at nearly three times the U.S. rate to maintain balanced increases in export and import volume (absent any changes

<sup>2</sup> For a review of the theoretical issues, see Morris Goldstein and Mohsin Khan, "Income and Price Effects in Foreign Trade," in Ronald Jones and Peter Kenen, eds., *Handbook of International Economics*, Volume 2 (1985).

<sup>3</sup> There have been many studies on the sensitivity of total imports to income (usually GNP). The average of estimates in the recent literature suggests that our imports, in volume terms, increase by 2 percent for every 1 percent rise in our real GNP. In contrast, an increase in Japan's income of 1 percent raises that country's import volume by about 1 percent. The divergence between the estimated bilateral elasticities reported later in the text is even greater.

<sup>4</sup> This was a dynamic simulation of the model. Wherever lagged endogenous values were called for the model's own forecasts were used.

<sup>5</sup> On the other hand, as shown in the next article by Nolle and Pigott (p. 12), nonmacroeconomic forces have influenced U.S. imports from Japan in recent years. This may account for the relatively large prediction error in our import estimates over 1980-85.

Table 1

**United States and Japan Growth and Price Trends**

Average four quarter percent change over period indicated

	1975-IV- 1973-I	1978-IV- 1975-IV	1982-IV- 1978-IV	1985-IV- 1982-IV
Japan				
Real GNP	1.5	5.0	3.9	4.5
Domestic demand	0.6	5.3	2.4	3.5
United States				
Real GNP	0.2	4.9	-0.2	4.4
Domestic demand	-0.5	5.3	-0.4	5.8
U.S. export volume				
to Japan	-8.8	13.3	3.3	5.2
U.S. import volume				
from Japan	-7.5	18.4	2.4	30.5
Relative price of Japanese goods in the U.S. market	2.2	2.2	-3.1	-1.3
Relative price of U.S. goods in the Japanese market	5.5	-10.8	5.4	-6.3

Table 2

**The Change in the United States-Japan Trade Balance, 1980-85**

In billions of dollars, annual rates

Change	Nominal exports	Nominal imports	Nominal balance
Actual	1.3	34.3	-33.0
Predicted	-1.2	26.3	-27.5
Of which attributed to			
Income growth	2.7	16.2	-13.5
Exchange rate change	-4.1	8.2	-12.3
Other*	0.2	1.9	-1.7
Unexplained	2.5	8.0	-5.5

\* Includes the influences of inflation in the United States, Japan, and other foreign countries

Table 3

**The Change in the United States-Japan Trade Balance, 1980-85**

In billions of 1980 dollars, annual rates

	Volume of exports	Volume of imports	Real balance
Actual	2.0	31.4	-29.4
Predicted	-1.9	24.7	-26.6
Of which attributed to			
Income growth	3.0	15.4	-12.4
Exchange rate change	-2.1	17.6	-19.7
Other*	-2.8	-8.3	5.5
Unexplained	3.9	6.7	-2.8

\* Includes the influences of inflation in the United States, Japan, and other foreign countries

in relative prices) These changes in income directly affect the volumes of exports and imports but not the prices of traded goods

By contrast, the exchange rate influences both the volumes and prices of traded goods. For example, if the dollar appreciates, the dollar cost of foreign goods declines. Typically, some fraction of these lower costs will be passed-through to lower prices, which then stimulates import demand. The exchange rate effect on price works in the opposite direction of the price effect on volume, so the impact of a change in the dollar on the nominal value of imports is less than on the volume of imports.<sup>5</sup> On the export side, the effect of an appreciating dollar is to lower the dollar price of exports, but not enough to prevent them from becoming more expensive relative to Japanese home goods.<sup>6</sup> Export volume declines and the price effect reinforces the volume effect. Exchange rates, therefore, have a bigger impact on nominal exports than on real exports. As Table 3 shows, about 80 percent of the predicted change in the real balance can be accounted for by dollar movements, making them even more important in explaining real trade flows than nominal trade flows.

**Medium-term prospects for the trade balance**

We can use this historical perspective on the relationship between the deficit and its key macroeconomic determinants to suggest how the balance will evolve over the next few years. Since one of the trends that greatly influenced the deterioration of the balance from 1980 to 1985 has substantially reversed itself in 1985 and into 1986, we will explore whether the depreciation of the dollar during the last year will be sufficient to restrain any further deterioration in the deficit.

In the first quarter of 1986 the yen/dollar rate was 27 percent below its year-earlier level. There were similar, if smaller, declines against the other major currencies. Our historical perspective suggests that such a large movement in U.S. relative to Japanese costs should have a significant impact on trade flows. Whether the trade balance actually improves will depend not only on the exchange rate effects but also on developments in other variables, especially the pattern of income growth in the two countries.

The direct effect of income on the bilateral balance would likely, by itself, lead to a widening deficit for two reasons. First, since U.S. imports from Japan are more income-sensitive than U.S. exports to Japan, equal rates of growth

<sup>5</sup> Indeed, the initial impact of an exchange rate depreciation may be to increase prices by proportionally more than volume declines, consequently, imports in nominal terms increase. Over time, the volume declines dominate and the nominal imports decline. This reversal in the path of imports is known as the "J-curve."

<sup>6</sup> Put another way, an appreciating dollar raises the yen costs of exports. If the pass-through to a higher yen price is less than complete (which is likely), then the dollar price of exports will decline.

in export and import volumes require that Japanese income growth be almost three times that of the United States. Second, given the present deficit, U.S. exports to Japan must grow at a proportionately faster rate than imports simply to prevent further deterioration.<sup>7</sup>

The model can be used to assess the relative contributions of exchange rate change and income growth to the future course of the deficit. Assuming that income in both countries grows close to long range trend (3.0 and 4.5 percent for the United States and Japan, respectively), the behavioral relationships embedded in the trade model suggest that a fall in the yen/dollar rate to 180 (along with the dollar's general decline against all other currencies) is enough to lower the 1988 bilateral balance by \$12 billion from what it would have been without any exchange rate change. This only considers the direct effects of alternative exchange rate paths on trade flows. If the exchange rate were different that would obviously influence the paths of domestic income and prices. These macroeconomic linkages are not taken into account in our comparison. More favorable assumptions about the pass-through and the price sensitivity of trade volume would, at most, mean another \$3 to \$5 billion reduction of the deficit from what it would have been in 1988. For the bilateral balance to improve substantially, the

<sup>7</sup> In 1984 import volume was 2.2 times export volume. If the volume of imports were to remain fixed at the 1984 level forever and export volume were to grow at its 15 year historical average of 5.4 percent per year, volumes of trade would not balance until the year 2004.

growth in real domestic demand in Japan would have to accelerate or relative prices would have to undergo further changes.

### Conclusion

The sharp rise in our trade deficit with Japan during 1980-85 seems to have resulted largely from shifts in key macroeconomic factors. The analysis in this article indicates that about four-fifths of the increase in the deficit can be attributed to changes in exchange rates and in the relative patterns of real growth and prices in the two countries. The rise of the dollar played a major role in aggravating the bilateral trade imbalance, but the deficit would have widened substantially even if exchange rates had remained at their end-1980 levels. Slower income growth in Japan led to a narrowing of the growth differential and accounted for about 40 percent of the widening of the trade balance.

Since macroeconomic variables can explain most of the deterioration in our trade position with Japan from 1980 to 1985, the perception that "unfair" trading practices or protectionism in that country has contributed substantially to the increase in the deficit appears to be unfounded. Even granting that the initial bilateral trade gap in 1980 may have been due, largely, to the relatively closed nature of Japanese markets or other structural forces, our analysis suggests that the bulk of the present U.S.-Japan trade imbalance reflects macroeconomic factors. It would seem more appropriate, therefore, to look for macroeconomic solutions to narrow the trade imbalance between the two countries.

Vincent Reinhart