

ECONOMIC COMMENTARY

Does Dollar Depreciation Matter: The Case of Auto Imports from Japan

by Gerald H. Anderson and John B. Carlson

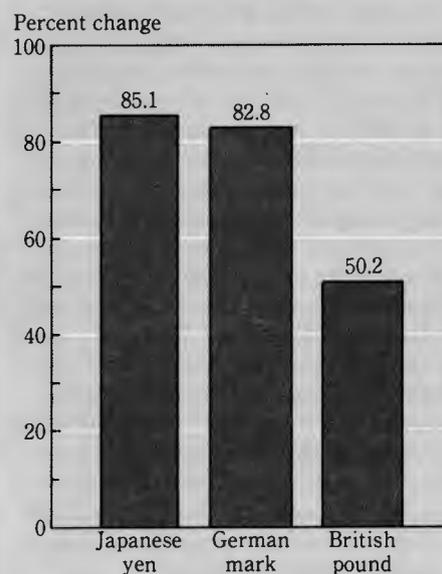
In April 1987, the value of the U.S. dollar fell substantially, continuing a slide that began in February 1985 when the dollar peaked in relation to most currencies. Then worth more than 262 Japanese yen, the dollar is currently trading at about 140 yen. This means that it now takes 85 percent more dollars than it did in February 1985 to buy the same amount of yen. The dollar has demonstrated similar movements relative to currencies of some other major trading partners (see chart 1).

On the surface, it would seem that the dollar price of Japanese exports to the United States would need to rise by 85 percent as the dollar depreciated relative to the yen. More generally, it would seem that prices of most imports should be rising sharply, thus reducing the volume of imports demanded.

In fact, while prices of many U.S. imports have accelerated somewhat, the rate of increase has been relatively moderate—much less than one might expect from observing exchange-rate changes alone (see chart 2). Furthermore, despite these price increases, the volume of imports has not fallen significantly. In fact, until the first quarter of 1987, the volume of nonpetroleum merchandise imports had risen in every quarter since the dollar began to depreciate. In the eight quarters since the dollar's decline began, nonpetroleum merchandise import volume has risen 17 percent.

The effects of exchange-rate changes typically occur with a lag. However, recent studies indicate that pass-through—the extent to which a change in the exchange rate leads to a change

Chart 1 Dollar Value of Foreign Currencies Since February 1985

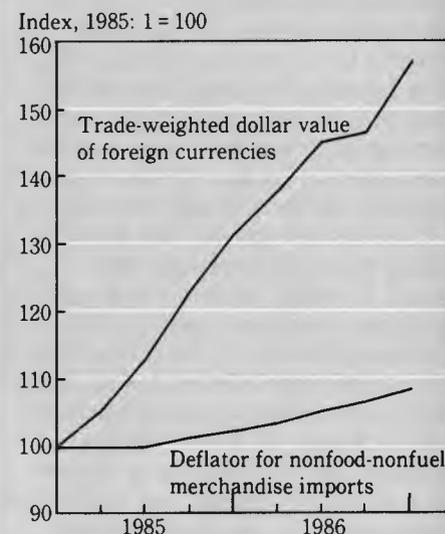


SOURCE: Board of Governors of the Federal Reserve System.

in import prices—may have been altered significantly in the 1980s.¹ Historically, estimates of long-run pass-through typically range between 60 and 80 percent, and most estimates indicate that pass-through is essentially completed in a two-year period. The current experience suggests that import prices are now responding more sluggishly to exchange-rate changes or that less of the exchange-rate changes will ultimately be passed through.

Why haven't the expected effects of dollar depreciation become more manifest? Were profit margins of foreign

Chart 2 The Dollar and Import Prices



SOURCES: Board of Governors of the Federal Reserve System; and U.S. Department of Commerce.

exporting firms so large that they could absorb a larger share of the exchange-rate changes? Or are these firms now losing money? To be sure, profit margins have been reduced. However, firms competing in export markets have developed ways to limit their exposure to exchange-rate changes. Some of these techniques affect only the timing of pass-through, suggesting that much of the impact of dollar depreciation is still in the pipeline. On the other hand, other developments could limit the ultimate impact of exchange-rate changes on prices of imports, suggesting that less

Gerald H. Anderson is an economic adviser and John B. Carlson is an economist at the Federal Reserve Bank of Cleveland. The authors would like to thank E.J. Stevens, Owen F. Humpage, and Michael F. Bryan for helpful comments.

The views stated herein are those of the authors and not necessarily those of the Federal Reserve Bank of Cleveland or of the Board of Governors of the Federal Reserve System.

1. See Catherine L. Mann, "Prices, Profit Margins, and Exchange Rates," *Federal Reserve Bulletin*, Board of Governors of the Federal Reserve System, June 1986, pp. 366-79; and Reuven Glick and Ramon Moreno, "The Pass-Through Effect on U.S. Imports," *FRBSF Weekly Letter*, Federal Reserve Bank of San Francisco, December 12, 1986. The latter paper measures pass-through in

terms of the real trade-weighted value of the dollar in relation to a measure of the relative import price.

of the recent exchange-rate change will be passed through to import prices than experience would lead one to believe.

This *Economic Commentary* examines some of the ways in which firms competing in export markets cope with exchange-rate changes and how these developments affect the timing and extent of the changes' pass-through to the prices of import goods. The Japanese automotive industry is used as an illustrative case in point.

Currency Hedges

One important option available to firms competing in international markets is the currency hedge—a financial tool that can be used to reduce the impact of exchange-rate changes on a firm's revenues and profits. To illustrate, consider a firm manufacturing products in Japan and selling them in the United States, with production costs denominated in yen and sales revenue denominated in dollars. In the absence of hedging, the firm would normally sell its dollar receipts for yen in spot markets when the revenues were received. It would use the yen to pay its production costs and to pay profits to its Japanese owners. If the dollar then were to depreciate relative to the yen, a given number of sales-revenue dollars would exchange for fewer yen than previously, forcing the firm to choose among accepting smaller yen profits, or possibly losses, on its existing sales volume; reducing its yen costs (if it could); or raising the dollar price of its products and probably losing sales.

Financial markets offer an exporting firm opportunities to avoid these difficult choices, at least temporarily, by hedging the yen value of the firm's expected dollar revenues against exchange-rate changes. One way to accomplish this would be to use a forward exchange contract. A forward exchange contract is an agreement, usually between a firm and a bank, to exchange specified amounts of two currencies at a future date. The exchange rate in the contract (the forward exchange rate) will usually differ from the spot rate (the exchange rate in agreements to exchange currencies, usually in two business days), although

often the difference is not very large.²

To make the currency hedge, the Japanese firm would estimate the number of dollars it expects to obtain as sales revenue during some future period, say during the month of October. The firm would make a contract with a bank now to sell that amount to the bank, to be delivered at the end of October, with the bank agreeing to pay the contracted specific price in yen for the dollars.

Then, regardless of the dollar-yen spot exchange rate at the end of October, the firm would be able to sell its dollars at the agreed forward exchange rate. The firm might hedge its expected receipts for additional months in the same manner.

The firm would still have some residual currency risk, unless it had a contract with an importer, because it would need to deliver the agreed quantity of dollars regardless of whether its sales revenue in October were more or less than had been estimated. Of course, it might regret having sold its dollars at the forward rate if, in October, the spot rate turns out to be a higher price for dollars than the previously agreed forward rate. But if the forward rate is one the firm can live with, and if its sales revenue estimate is reasonably accurate, the firm will have avoided the risk of an adverse change in the spot exchange rate. No matter what happens to the spot rate, the firm will not have to choose between raising prices or cutting profit margins.

In retrospect, Japanese automobile companies could have used forward exchange contracts over recent years to lock into much more favorable exchange rates than they would have faced in the spot market. Suppose that on February 25, 1985, when the dollar peaked in value against the yen, a Japanese company had been prescient enough or lucky enough to sell its expected future dollar receipts in the forward exchange market. The firm might have made a separate contract for each of the upcoming months for as far ahead as it could obtain contracts, but we will consider only the contract for the twenty-fourth month ahead—February 1987.

2. The difference between spot and futures prices can be large, depending on the expected change in currency valuation.

On February 25, 1985, the yen-dollar spot rate was 262 yen and the 24-month forward rate was 240 yen. Thus, on that date, the company could have agreed with a bank to sell a certain number of dollars for 240 yen per dollar to be delivered on February 25, 1987. Having done this, the firm could price its cars in February 1987 as if the exchange rate were 240 yen per dollar, even though in February 1987 the spot exchange rate fluctuated between 152 yen and 154 yen.

Because such contracts are confidential, there are no data on the extent to which Japanese automotive firms have used this tool. European automobile companies have reportedly hedged substantial portions of their revenues through the middle of 1987.³ If these reports are accurate, and if this behavior is characteristic of the industry in general, currency hedging could go a long way toward explaining why import car prices have risen proportionately less than the change in currency values and, in part, why the volume of car imports remains high despite dollar depreciation.⁴

A firm can use forward contracts to avoid the impact of exchange-rate change on prices or profit margins only if forward contracts are available, and at favorable terms. Forward exchange rates for the yen (and for a handful of other currencies) are regularly quoted in the foreign exchange market for periods only as far ahead as 24 months. But forward contracts are only one method of hedging.

New techniques are being developed that allow hedging at reduced costs. Many of these techniques involve futures and options—financial instruments sold in the open market. In fact, the share of futures and options in foreign exchange business transacted in the United States increased about sevenfold between 1983 and 1986.⁵ Moreover, other techniques involving a set of forward contracts (swaps) allow hedging for periods of more than two years. Still, the greatest volume of hedging appears to be for horizons of less than a year. This suggests that the protection provided by hedging has been dissipating and that a greater

3. See "Executive Cars 5: Success in the U.S.," *Financial Times*, June 19, 1986, p. 5. Moreover, a recent survey of 123 banking institutions in the United States by the Federal Reserve Bank of New York indicates that the volume of yen-dollar transactions in outright forward and swap contracts with nonfinancial institutions averaged more than \$5.19 billion per month. Other data indicate an average monthly import volume of \$1.35 billion per month of new Japanese pas-

share of exchange-rate changes will be passed through to import prices in the near future.

There are, however, ways in which firms can reduce their ultimate exposure to the effects of exchange-rate changes. These practices essentially "hedge" exposure through diversification of costs, and thereby reduce pass-through to prices.

Diversification of Costs

Firms can limit their exposure to exchange-rate changes by purchasing supplies from markets that price such goods and resources in the same currency as that used in the market in which the final products are sold. The greater the percentage of inputs priced in dollar terms, the less impact that dollar depreciation will have on dollar prices in the U.S. market for the final product. Thus, by purchasing supplies in global markets, firms can hedge against exchange-rate risk.

In some resource markets, firms may have little choice in this matter. For example, Japanese auto producers need oil to produce cars, and oil is priced worldwide in terms of the dollar. Many raw materials used in steel production are also priced in dollar terms. Thus, even though Japanese automakers may buy steel from their own domestic steelmakers that is priced in yen, in competitive markets yen steel prices would tend to move in a direction that would partially offset the exchange-rate effects on dollar prices of exports to the United States.

Japanese automakers also protect themselves by purchasing a significant percentage of intermediate components from independent suppliers. This practice, called outsourcing, gives them the flexibility to shift purchases of intermediate inputs toward suppliers with costs least affected by exchange-rate changes. Some of these inputs come from Korea and Taiwan, countries whose currencies have been closely linked to the U.S. dollar. Thus, even if such intermediate goods were not

priced in dollars, their costs would tend to depreciate with the dollar. If these goods are sold in reasonably competitive markets, or if the buyers have some power to dictate prices to their suppliers, their yen-equivalent prices would decline and thereby lessen the impact of a falling dollar on the cost of Japanese cars sold in U.S. markets.

Japanese input-output tables indicate that approximately 15 percent of inputs used in auto production are imported.⁶ Moreover, according to Japan's Ministry of International Trade and Industry, about 97 percent of all imports to Japan are priced in dollars.⁷

Outsourcing in countries whose currencies are linked to the currency of the export market also creates competitive pressures on domestic suppliers of the same intermediate goods. To cope in such an environment, domestic suppliers must themselves have flexible arrangements with their own inputs. In many cases, these smaller firms can survive because they have greater ability to recontract their costs than do the larger firms specializing in assembly and distribution. When the suppliers are faced with the reality of an exchange-rate change that reduces the competitive price of their outputs, they are able to recontract with their own inputs (typically by reducing wages) to reduce costs sufficiently, if not proportionally, to remain economically viable.

Again, the Japanese automotive industry provides an excellent example. Many intermediate goods are produced in cottage industries in which costs are almost completely flexible. That Japanese automotive suppliers are in such a highly competitive situation is demonstrated by the fact that they are typically forced to assume the risks of holding inventories, making possible the automobile assembling companies' practice of just-in-time receipt of inputs.

Finally, industry sources estimate that when the dollar peaked, costs at the factory accounted for only 60 percent of the U.S. retail price of a Japanese car. The balance, comprising duties, freight and insurance costs, sales and marketing expenses, and profits, was almost all denominated in

dollars. In sum, less than half of the retail price of a Japanese-produced car was actually based on costs denominated in yen!

Profit Margins

In addition to the protection afforded by currency hedging, dollar-priced inputs, and leverage to reduce supplier costs, Japanese automobile producers had attained large profit margins on their U.S. exports by early 1985. This allowed them to avoid price increases when the dollar started to fall.

Japanese auto firms were able to obtain wide profit margins partly because of the relatively small number of automobile producers competing in the U.S. market and because of differences among their products. These conditions, aspects of what economists call imperfect competition, make it possible for firms to earn, at least temporarily, higher-than-normal profits. The image of high quality and fuel economy enjoyed by Japanese cars—especially as gasoline prices rose sharply—also created strong demand for the cars in the U.S. market, further enhancing profit margins. Moreover, quotas that limit the number of Japanese cars that can be imported into the United States annually (1.85 million in the year ending March 31, 1985) have also served to raise profit margins on the cars.

The quotas are called Voluntary Export Restraints (VERs) because they are imposed voluntarily by the Japanese government instead of being legislated by the U.S. Congress.⁸ Because the restraints limit the number of cars each Japanese firm can export to the United States, the firms tend to raise their prices to the level at which they can just sell their allotted quota. They are not permitted to sell a higher number, so they have no incentive to price below this level. One study found that, after removing the effects of inflation and quality changes, VERs raised the retail transaction price of a Japanese car by \$1,114 in the year ending March 31, 1984.⁹

senger cars in 1985, or about 22 percent of the financial transactions volume, after subtracting the 15 percent of import costs that are dollar-denominated. Thus, the volume of the surveyed banking institutions' transactions is ample to cover Japanese auto imports. Furthermore, foreign financial markets provide additional opportunities for hedging.

4. Import prices of new passenger automobiles rose approximately 20.7 percent between March 1985 and March 1987. The yen appreciated against the dollar by about 85 percent in the same period. Unit car imports from Japan rose approximately 1 percent from the first quarter of 1985 to the first quarter of 1987.

5. See "Market Survey," *International Financing Review*, August 23, 1986, pp. 2523-25.

6. See "Total Requirement Tables," *1975 Japanese Input-Output Table: 1979 English Summary Volume*, pp. 386-7. Reported data were adjusted to account for changes in oil prices.

7. Some import contracts may provide for changing prices if exchange rates change.

Profit margins were also enhanced by the 27 percent appreciation of the dollar against the yen from December 1980 to February 1985, because the VERs made it impossible to sell additional cars even if prices were lowered.

As the dollar depreciated after February 1985, Japanese auto producers and their U.S. dealers were willing to reduce their wide profit margins to limit their price increases. The producers sought to avoid both a reduction in their share of the large U.S. market and deterioration in their marketing network. This action would be sensible, particularly if the producers expected the dollar's decline to be temporary. Dealers could reduce their markup to offset part of the increases in the wholesale price they pay to producers. Dealers would thus seek to adjust their retail transaction price to what they consider the profit-maximizing level.

The Japanese automotive industry was apparently not the only foreign producer to acquire super-normal profits in the U.S. market during the most

recent dollar appreciation. A recent study indicates that profit margins in several U.S. import industries have been substantial enough over the past decade to absorb a considerable amount of exchange-rate change.¹⁰ It would appear that such a pattern is recurring, as dollar import prices are rising more slowly in response to dollar depreciation than might be expected considering the historical record.

Conclusions

We have seen that how Japanese automobile producers cope with fluctuating exchange rates affects both the timing and ultimate degree of pass-through to prices of automobile imports. Currency hedging tends to delay the response on prices, while diversification of costs can reduce long-run pass-through. Also, wide profit margins attained with dollar depreciation and VERs provided these firms and their retail dealers with an especially thick cushion against dollar depreciation.

Currency hedging and outsourcing in global markets are not unique to Japanese automobile producers. The rapidly increasing volume of financial transactions associated with currency hedging by nonfinancial businesses would suggest that increasing numbers of exporters are finding the currency hedge a useful device for coping with the vagaries of fluctuating exchange rates. Moreover, the trend of U.S. and foreign multinational corporations toward buying worldwide is pervasive across industries.

Without more specific data on financial transactions and production processes, however, it is difficult to assess the precise effect of these growing practices on pass-through. Nevertheless, the trends toward increased hedging and worldwide buying are consistent with more sluggish response in import prices and smaller long-run pass-through.¹¹

8. Most analysts agree that the Japanese government imposed VERs to avoid having the U.S. Congress impose even stricter restraints. In this sense, the export restraints were not voluntary.

9. See Michael F. Bryan and Owen F. Humpage, "Voluntary Export Restraints: The Cost of Building Walls," *Economic Review*, Federal Reserve Bank of Cleveland, Summer 1984, pp. 17-37.

10. See Mann, "Prices, Profit Margins, and Exchange Rates."

11. For a discussion of how changing profit margins might affect the changing relationship between exchange rates and import prices, see Mann, "Prices, Profit Margins, and Exchange Rates."

Federal Reserve Bank of Cleveland
Research Department
P.O. Box 6387
Cleveland, OH 44101

BULK RATE
U.S. Postage Paid
Cleveland, OH
Permit No. 385
