The U.S.-Japan Bilateral 1993 Automotive Trade Deficit

Michael S. Flynn
Sean P. McAlinden
David J. Andrea

September 1989

Office for the Study of Automotive Transportation
University of Michigan Transportation Research Institute

Executive Summary

The U.S. current account balance—the summary of all export and import transactions—showed relatively small imbalances from 1970 through 1982, reflecting a mixture of surpluses and deficits. In 1983, it turned sharply negative, and large annual increases in this deficit continued, reaching $161 billion in 1987. In 1988, preliminary estimates suggest that the current account deficit fell to $135 billion. Five major components make up the current account deficit, but merchandise trade dwarfs the other four, accounting for two-thirds of the current account's total transactions. In 1988, the merchandise trade deficit receded to about $137 billion, and 94% of that, or $129 billion, was accounted for by manufactures trade. Japan accounted for 40% of the 1988 merchandise trade deficit, and 55% of that year's manufactures trade deficit.

The bilateral automotive deficit with Japan forms a substantial portion of the overall U.S. trade deficit, accounting for some 22% of the net 1987 current account deficit. The overall improvements in the U.S. trade situation from 1987 to 1988—20% in the current account—are remarkably insulated from the automotive trade deficit, where the improvement was 3%. It seems clear that further substantial improvement in the overall U.S. trade position will require a more balanced trade performance in the automotive sector. It is particularly important that the bilateral automotive deficit with Japan improve, since that accounts for about 50% of the total U.S. automotive trade deficit.

But this analysis suggests that the U.S.-Japan bilateral automotive trade deficit will at best marginally increase, or, more probably, substantially increase by 1993. The best plausible automotive case that we can construct suggests that the deficit will increase some 3.4% in constant dollar terms, and that general economic developments favorable to deficit reduction would restrict that increase to some 2.8%. A more likely automotive case forecasts a constant dollar deficit some 37% larger than 1988, restrained to an increase of about 36% by more favorable economic developments. That is grim news indeed for those hoping to see continued reductions in the U.S. trade deficit.

Our best case calls for a decrease in Japanese vehicle imports of some 300,000 passenger cars and 100,000 light trucks. However, this reduces the value of Japanese passenger car and light truck imports by only about $1 billion constant 1988:4 dollars because of the enriched product mix in passenger cars. Increased Japanese production in the United States, combined with the growing stock of Japanese vehicles

in use, draw in an additional $1.73 billion in automotive parts and components, while the residual category, growing at its rate of the past decade, will account for an increase of some $2 billion. U.S. exports to Japan grow some $1.91 billion, primarily reflecting increased vehicle exports from U.S.-sited Japanese plants.

Our most likely case forecasts level imports of passenger vehicles, but a richer mix, and some 100,000 additional trucks, resulting in an increase of some $6 billion constant dollars. Parts imports increase by some $2.75 billion, reflecting a lower, more likely level of domestic sourcing by U.S.-sited Japanese manufacturers but slightly higher production than our best case. This scenario does not differ from our best case in regard to the level of other automotive imports. U.S. exports to Japan increase by about $1.41 billion, reflecting less optimistic expectations of the export of U.S.-produced Japanese vehicles.

Our analysis and projections, then, suggest a continuing serious problem in the U.S. bilateral automotive trade deficit with Japan. How much that deficit grows by 1993 will depend more upon the dynamics of automotive competition than on general economic developments, and our belief is that the 1993 deficit, in constant 1988:4 dollars, might well increase by some 37%.

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I. Introduction

The United States finds itself, at the close of the 1980s, facing a number of serious economic problems. Most economists agree that the "twin deficits"—the federal budget deficit and the balance of trade deficit—are certainly among the most serious, and may well be the most serious. This report focuses on a conceptually narrow aspect of the U.S. trade deficit: the U.S. deficit in one product area with one country. While conceptually narrow, the specific bilateral deficit we examine—the bilateral automotive trade deficit with Japan—accounts for a larger share of the overall U.S. trade deficit than any other bilateral, product-specific category of trade. Moreover, our analysis indicates that this deficit is likely to grow substantially in the coming years, suggesting the critical importance of this trade deficit to overall U.S. trade performance.

The purpose of this report is not to repeat the extensive analyses of the origins of this trade deficit, but rather to build on these analyses to project the likely bilateral automotive balance in 1993.[1] Consequently, much of the forecasting will be based on factors, developments, and events that are important in automotive competition, but may be less so in other trade areas. We may also ignore or treat lightly factors that are quite critical in other trade areas.

II. The U.S. Trade Situation

The developing overall U.S. trade deficit, and the role of its constituent components, is extensively reviewed elsewhere. Here we simply note some major dimensions of the problem, to provide the context for our discussion of the automotive trade balance with Japan.

The U.S. Current Account Balance

The U.S. current account balance—the summary of all export and import transactions—showed relatively small imbalances from 1970 through 1982, reflecting a mixture of surpluses and deficits. In 1983, the current account balance turned sharply negative, and large annual increases in this deficit continued, reaching $161 billion in 1987, and representing over 3.5% of U.S. GNP. In 1988, preliminary

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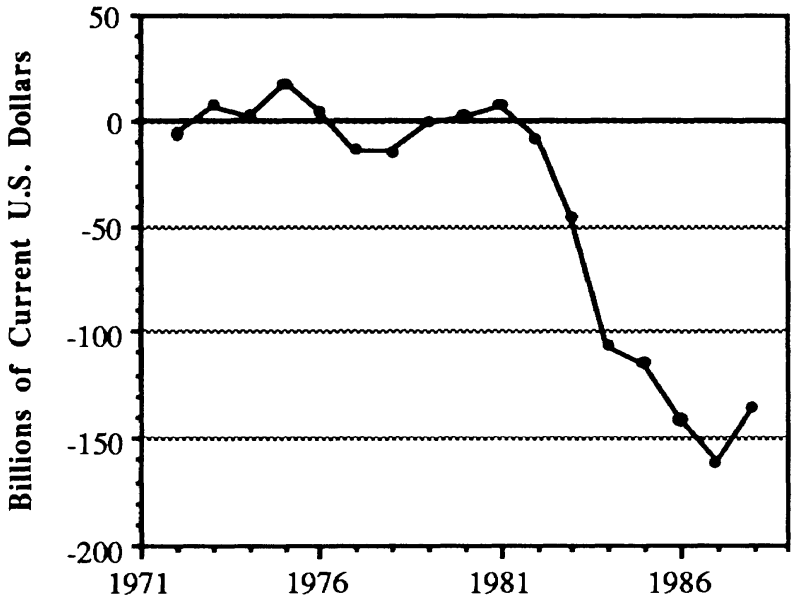
[1] See, for example, Congress of The United States, Office of Technology Assessment, *Paying the Bill: Manufacturing & America's Trade Deficit*, 1989.

Figure 1: U.S. Current Account Balance: 1972 - 1988



estimates suggest that the current account deficit fell to $135 billion, as displayed in Figure 1.[2] The current account deficit is made up of five major components, but merchandise trade dwarfs the other four, accounting for two-thirds of the total transactions composing the current account balance. Substantial U.S. recovery from large current account deficits clearly must come from improvements in the merchandise trade balance.[3]

The U.S. Merchandise Trade Balance

The U.S. merchandise trade balance showed a deficit in the $30-$40 billion range from 1978 through 1982. By 1984, it reached $122 billion, and increased to $170 billion by 1987. In 1988 it receded to about $137 billion, as shown in Figure 2. Throughout the 1980s, the merchandise trade deficit has been larger than the overall current account deficit, showing a deficit even in the years when the current account yielded small surpluses.[4]

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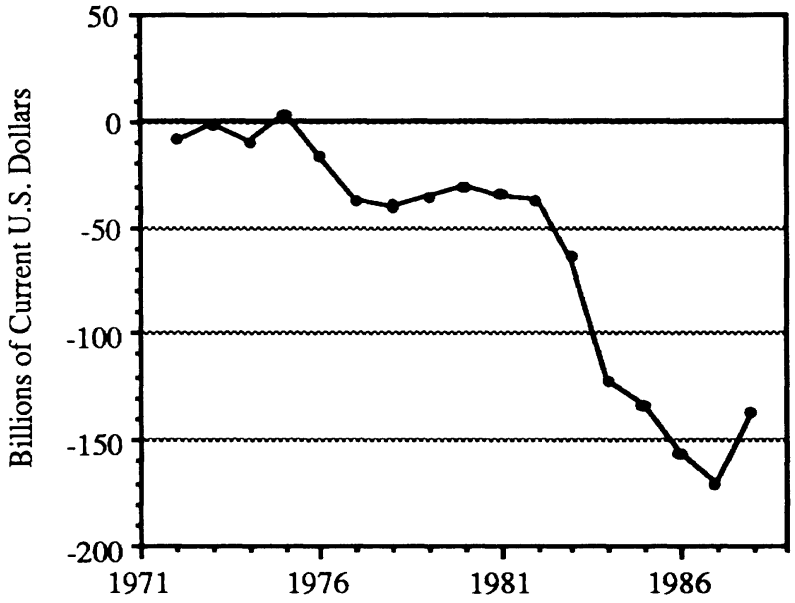
[2] The values depicted in graphic representations are presented in Appendix I. Estimates for broader trade categories through 1988 were typically available when this report was prepared. However, more specific categories were generally available only through 1987.

[3] U.S. Department of Commerce, *United States Trade Performance in 1987,* 1988, pp. 35, 38, and 40.

[4] *ibid.*, p. 13.

Figure 2: U.S. Merchandise Trade Deficit: 1972 - 1988



Two countries—Japan and Canada—account for over one-third of U.S. merchandise trade. Japan was the source of nearly 21% of U.S. merchandise imports in 1987, with Canada accounting for another 17%. Canada absorbed nearly 24% of U.S. 1987 merchandise exports, and Japan took just over 11%. The importance of Canada and Japan as U.S. trading partners in 1987 continued a pattern that has endured for many years.

Figure 3 displays these bilateral merchandise trade deficits: Japan ranks first, showing a net surplus of $59.8 billion in 1987 merchandise trade with the United States, an increase of $1.2 billion over 1986. This relatively small percentage increase from 1986 to 1987 had been characteristic of U.S.-Japan trade from the mid-1970s through the early 1980s but the period from 1983 through 1986 witnessed a nearly 300% growth in the deficit with Japan. Canada, on the other hand, earned a 1987 surplus of $11.7 billion, $1.5 billion lower than in 1986, but still enough for fourth place, behind West Germany, Taiwan, and just ahead of a rapidly closing South Korea.[5] Preliminary estimates suggest that the merchandise trade balance with Japan receded to $55 billion in 1988, while that with Canada fell to $11 billion.

Figure 4 presents the two largest bilateral U.S. merchandise trade deficits each year since 1981 as a percent of the year's total merchandise trade deficit. The largest in each year is with Japan, accounting for two to four times the percent accounted for by any of the three countries that achieved second place at different times during the

[5] *ibid.*, pp. 35-37.

Figure 3: U.S. Merchandise Trade Deficit with Japan and Canada: 1981 - 1988

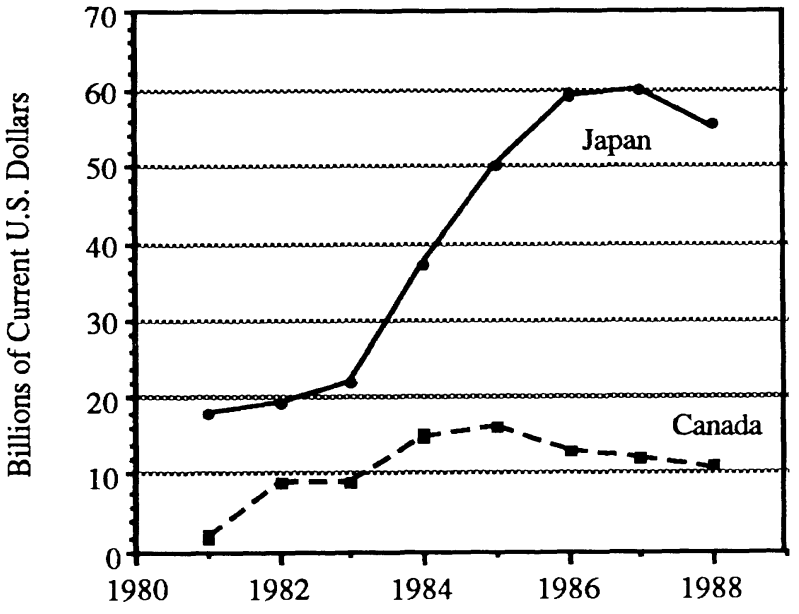


Figure 4: Two Largest Bilateral Deficits as Percent of U.S. Merchandise Trade Deficit: 1981 - 1988

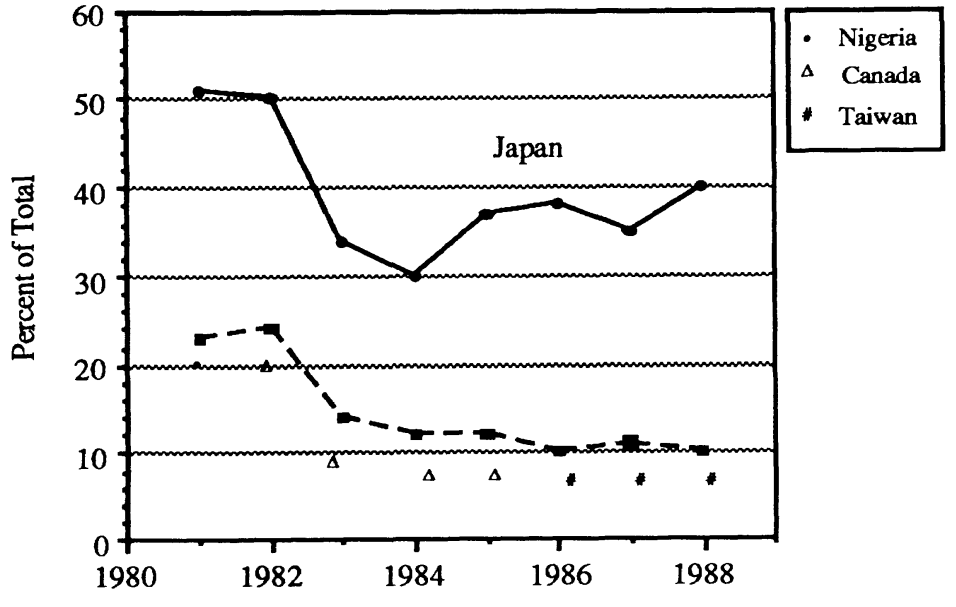
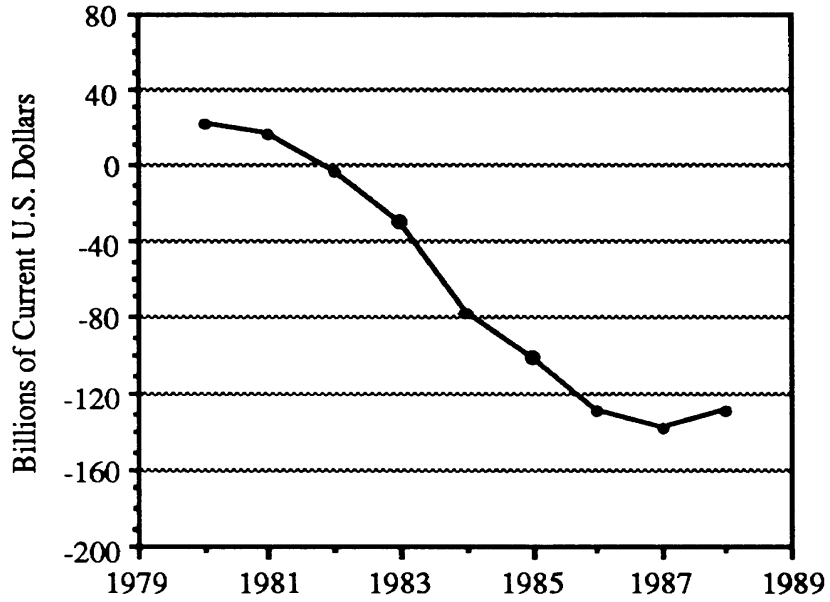


Figure 5: U.S. Manufactures Trade Balance: 1980 - 1988



period. In 1988, the bilateral deficit with Japan made up 40% of the total U.S. merchandise trade deficit, up from 35% in 1987.

The U.S. Manufactures Trade Balance

Merchandise trade itself is composed of four major categories of goods: manufactures, mineral fuels, agricultural products, and other goods. Manufactures constitute the largest category. With the exception of 1978, the United States enjoyed a manufactures trade surplus from 1975 through 1982, and that surplus partially offset deficits in the mineral fuels category of merchandise trade. But the U.S. manufactures trade balance experienced a dramatic reversal, as shown in Figure 5. In 1982/83 the manufactures trade balance turned sharply negative, and is now itself the largest contributor to the merchandise trade deficit, as illustrated in Figure 6.

Manufactures accounted for 79% of U.S. merchandise exports and 80% of U.S. merchandise imports in 1987. Not surprisingly, manufactured goods also currently constitute the largest component of the merchandise trade deficit: $137.7 billion of the $170.3 total merchandise trade deficit in 1987, or 81%.[6] In 1988, the manufactures trade deficit fell to about $129 billion, accounting for 94% of the net merchandise trade deficit.

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[6] Council of Economic Advisors, *Economic Indicators*, 1989, p. 35 and *United States Trade Performance in 1987, op. cit.*, pp. 13 and 15.

Figure 6: Manufactures Trade Deficit as Percentage of Merchandise Trade Deficit: 1978 - 1988

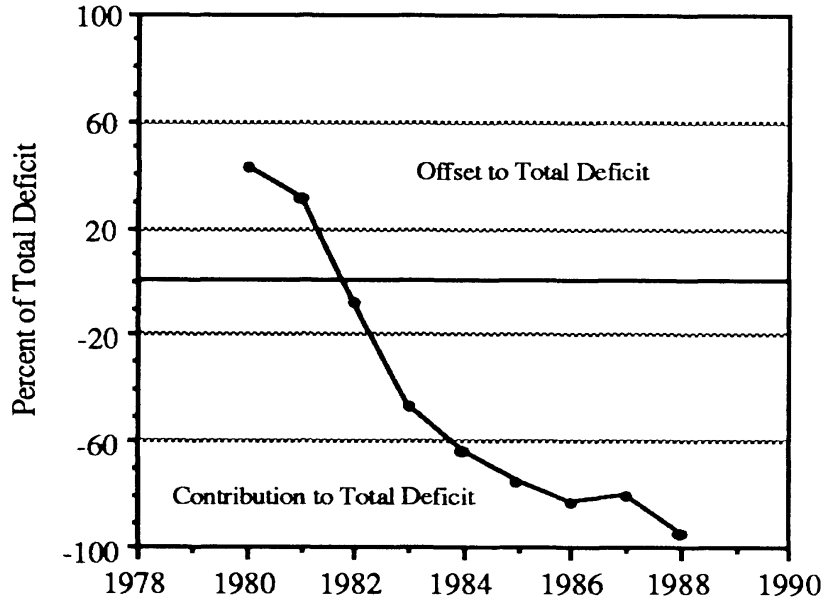
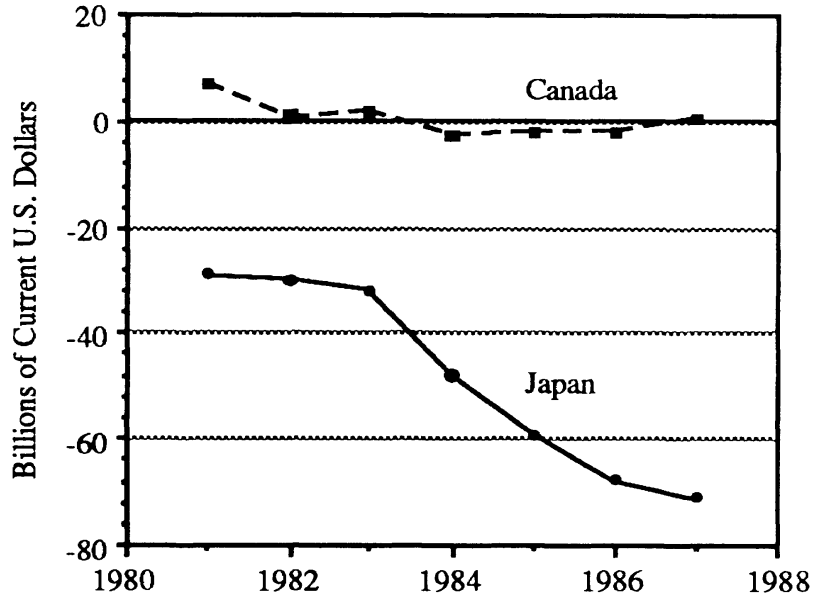
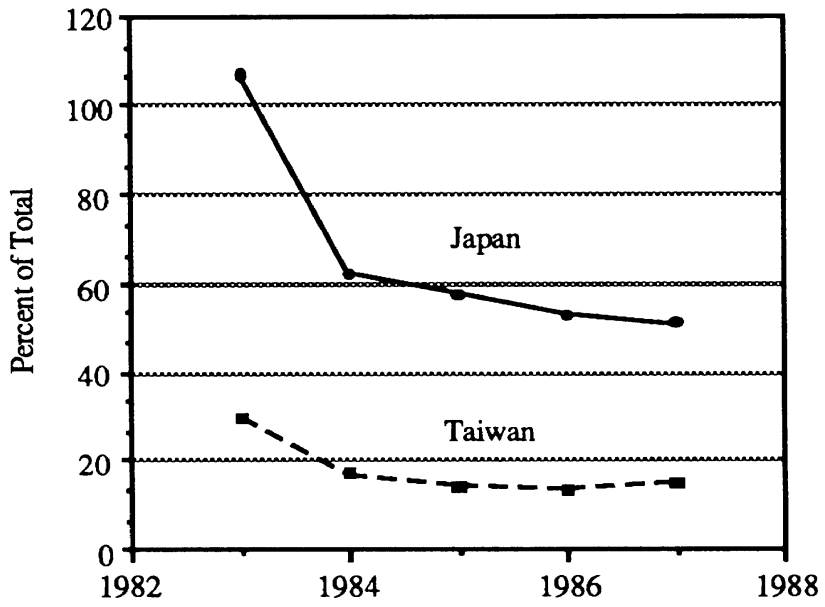


Figure 7: Bilateral Manufactures Trade Balance with Japan and Canada: 1981 - 1987



During the 1980s, both Canada and Japan increased their consumption shares of U.S. manufactured exports, from about 20% to about 27.5% and from roughly 6% to 8%, respectively. However, their manufactured exports to the U.S. market reveal a contrasting pattern. Canada's share fell from about 20% to roughly 16%, while Japan's increased somewhat, moving from just over 25% to just under 26%. Figure 7 displays the resulting bilateral manufactures trade balances from 1981 through

Figure 8: Two Largest Bilateral Deficits as Percent of U.S. Manufacturers Trade Balance: 1983 - 1987



1987. The U.S. bilateral manufactures trade deficit with Japan totaled $71 billion in 1987, an increase of $3.2 billion over 1986. The surge in the bilateral manufactures trade deficit with Japan was somewhat less than it was for the total merchandise trade deficit from 1983 to 1986, slightly more than doubling during that period.[7] The same balance with Canada showed a surplus of $0.2 billion in 1987, after a deficit of $2.0 billion in 1986.[8]

It is important to note that the composition of merchandise trade between the U.S. and Japan is quite different from U.S.-Canada trade. Virtually all—over 99% in both 1986 and 1987—U.S. merchandise imports from Japan are manufactures. Just over three-quarters of merchandise imports from Canada are manufactures. On the merchandise export side, manufactures constitute roughly 60% of U.S. merchandise shipments to Japan, but over 90% of such shipments to Canada.[9]

Figure 8 displays the percent of the 1983-1987 manufactures trade deficit accounted for by the two largest bilateral deficits. The largest bilateral deficits throughout the period have been with Japan, and the second largest with Taiwan. The Japanese bilateral deficit accounts for three to four times the share of the total net deficit ac-

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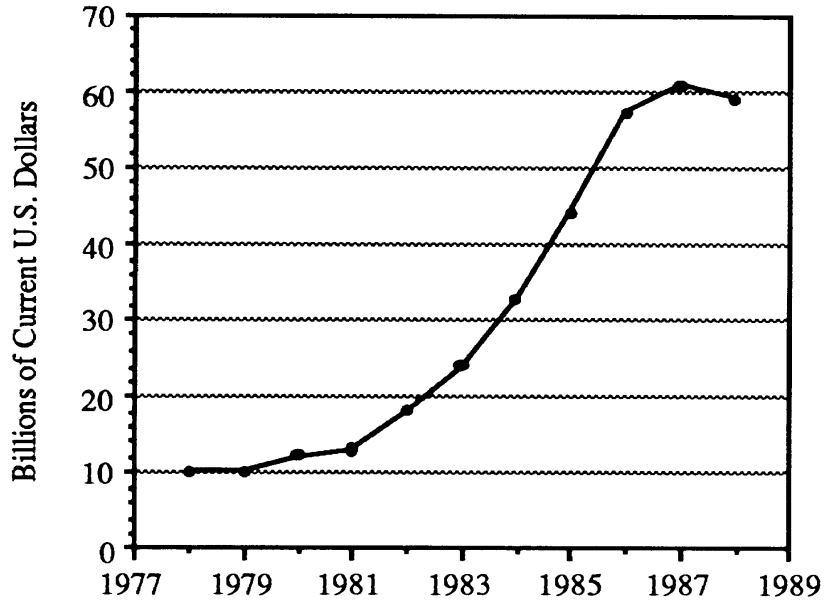
[7] U.S. Department of Commerce, *U.S. Foreign Trade Highlights 1988*, p. A-031.

[8] Exports to Canada include an estimated quantity of undocumented exports, all assigned to the manufactures category. In 1987, undocumented exports totalled about $6 billion.

[9] *United States Trade Performance in 1987, op. cit.*, pp. 35, 38, and 40.

Figure 9: U.S. Automotive Trade Deficit: 1978 - 1988



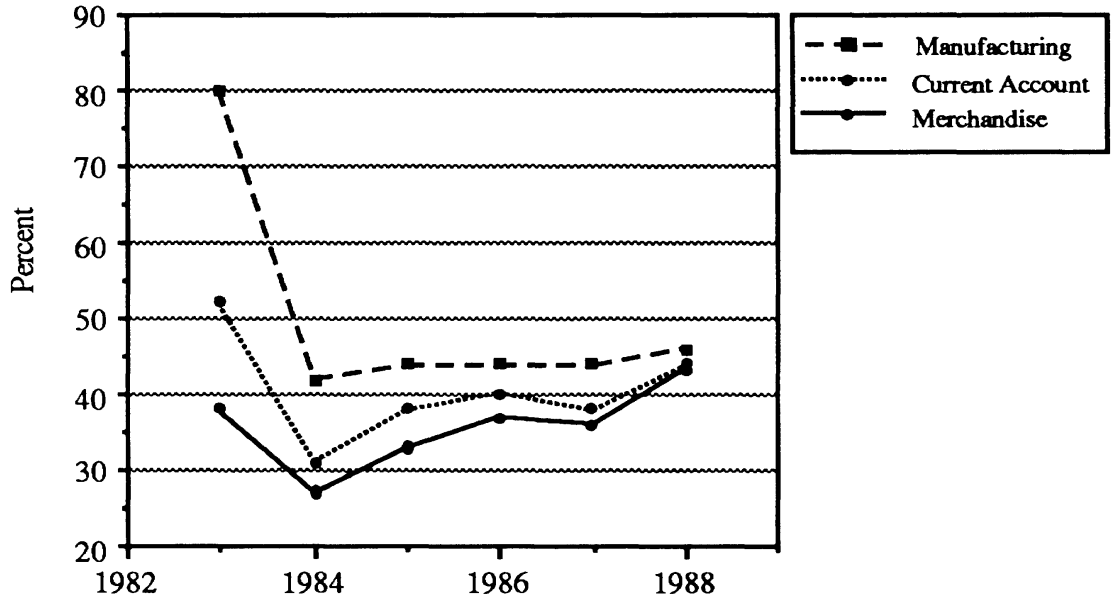
counted for by the deficit with Taiwan. In 1981, the last year that the U.S. achieved a manufacturers trade surplus, the U.S. bilateral deficit with Japan offset 64% of the U.S. surplus elsewhere in the world, while the deficit with Taiwan offset 27% of the non-Taiwan surplus. In 1982, as U.S. manufactures trade fell to a worldwide trade deficit of $3 billion, the bilateral deficit with Japan was $30 billion, and that with Taiwan $6 billion.

The U.S. Automotive Trade Balance

Figure 9 displays the U.S. automotive trade deficit from 1978 through preliminary estimates for 1988. Automotive products generated a deficit of $59 billion in 1988, up from approximately $13 billion in 1981, but slightly down from $61 billion in 1987. Passenger vehicles alone accounted for a deficit of $42.8 billion, reflecting imports of $49.9 billion and exports of $7.1 billion. In 1987, then, the automotive trade deficit accounted for 44% of the total manufactured goods trade deficit and just over 36% of the entire U.S. merchandise trade deficit.

Figure 10 reveals the importance of the automotive trade deficit in relation to the overall trade performance of the United States from 1983 through 1988. For each year, the automotive deficit is shown as a percent of each of the broader trade per-

Figure 10: Automotive Trade Deficit as Percent of Other Trade Deficits: 1983 - 1988



formance measures: the current account balance, the merchandise trade balance, and the manufactures trade balance.[10] **The automotive trade deficit over the past three years constitutes roughly 45% of the manufactures trade deficit, 39% of the merchandise trade deficit, and 41% of the current account deficit.** It may not be appropriate to attach specific causal meaning to the relationship of the automotive deficit to these broader deficits that are composed of thousands of bilateral, specific surpluses and deficits. But it is clear that the automotive trade deficit is an important component of those deficits, and represents a substantial portion of them. Thus the automotive deficit represents a serious impediment to the further reduction of these broader deficits: the efforts required to reduce imports or generate exports in other product areas sufficient to offset the automotive deficit would be enormous, probably far exceeding the efforts required to reduce the automotive deficit itself.

It is important to note that most Japanese manufacturers are establishing production facilities in the United States, and that not all of the trade effect of these facilities will be reflected in the automotive trade statistics. To be sure, parts and components sourced from Japan will be reflected in the appropriate categories. However, the flow of profits and investments associated with these plants will be reflected in the current account balance, but not in the automotive balance. So the automotive trade deficit will, increasingly over time, underestimate the full effect of the automotive sector upon the U.S. bilateral trade deficit with Japan.

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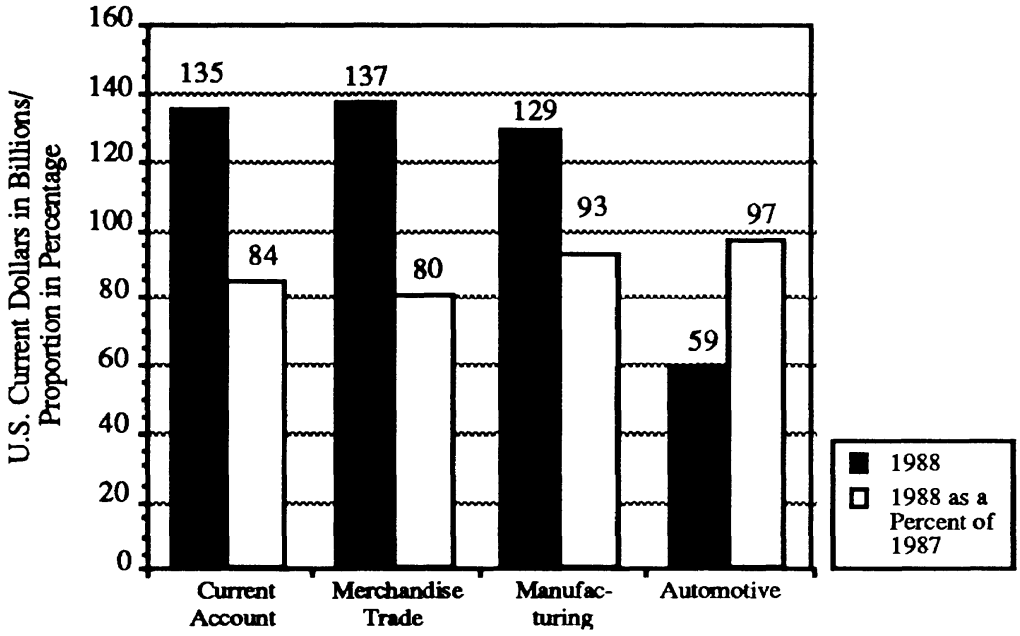
[10] Earlier years are not shown because of the difficulty of graphically displaying a deficit as a proportion of a surplus. There were net surpluses in both the current account balance and the manufactures trade balance in 1980 and 1981.

Figure 11: 1988 Trade Deficits and Change from 1987



1988: A Turnaround Year?

Figure 11 shows the 1988 levels and the reductions from 1987 for each of the four trade performance measures discussed. The U.S. current account deficit (-16%), the merchandise deficit (-20%), and the manufacturing deficit (-7%) showed some improvement in 1988 compared to 1987. The automotive trade deficit also fell in 1988–to $59 billion, a 3% decrease from 1987's $61 billion. The improved trade performance of the United States, then, was unevenly distributed, with manufactures and, especially, automotive trade performance, seriously lagging other sectors. This results in those sectors becoming even more significant portions of the remaining U.S. trade deficit, and only accentuates the importance of improved performance in automotive and manufactures trade.

The U.S.-Japan Automotive Trade Deficit

If we look at the trade deficit in terms of trading partners, Japan is the largest net exporter of manufactured goods to the United States. Automotive products, on the other hand, constitute the largest source of the deficit by product type. It is no surprise, then, that when we examine bilateral, product-specific trade, we find that the automotive deficit with Japan is the major contributor to the U.S. merchandise trade deficit. Published data suggest that in 1987 the United States imported at least $31.1 billion worth of passenger cars, special purpose vehicles, and automotive parts and components from Japan. We estimate U.S. automotive exports to Japan

at $0.8 billion.[11] Bilateral automotive trade with Japan, then, yields a 1987 U.S. deficit of $30.3 billion.[12]

In 1987, the U.S. automotive trade deficit with Japan accounted for nearly 50% of the U.S. worldwide automotive deficit ($61 billion), 22% of the U.S. worldwide manufactures trade deficit ($138 billion), nearly 18% of the U.S. worldwide merchandise trade deficit ($170 billion), and 22% of the summary current account trade deficit ($161 billion). Changes in no other bilateral, specific-product trade have nearly the potential effect on these U.S. trade deficits that this trading relationship does. Developments in U.S.-Japan bilateral automotive trade are therefore critical to the overall level of these deficits.

Importance of the Automotive Trade Deficit

The decade from 1978 through 1987 witnessed a sharp increase in the automotive trade deficit. To be sure, the United States historically had run an automotive trade deficit for some time, but that was offset by surpluses in other manufacturers. The impact of this sharp increase on the U.S. automotive economy has been severe.

In 1978, a record sales year, the traditional American automotive manufacturers (Chrysler, Ford, General Motors, and, at that time, American Motors), manufactured 82% of the passenger cars and 91% of the light-duty trucks sold in the U. S. market. By 1986, the next peak sales year, their shares fell to 62% in passenger cars and 81% in light-duty trucks. Employment loss in the domestic automotive industry (the manufacturers plus many, but not all, of their part and component suppliers) is estimated at nearly 300,000 direct jobs between 1979 and the end of 1988, and perhaps as many as 600,000 additional jobs dependent on those direct jobs.

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[11] Data for U.S. automotive exports to Japan are available only for automotive bodies and chassis, worth $0.2 billion in 1987. Published lists report only products with an export value of at least $0.2 billion, so if we assume that the other three categories of automotive products were about $0.2 billion, and just missed being listed, we estimate total U.S. automotive exports to Japan at $0.8 billion for 1987. This assumption is consistent with the International Trade Administration (ITA) data we rely upon for our own analysis.

[12] These estimates were drawn from a number of published sources. Subsequent analyses in this report rely upon an alternative data source (ITA) that is described below. These data put the 1987 U.S.-Japan automotive trade deficit somewhat lower than published estimates, $29.3 billion and the 1988 bilateral automotive deficit at $27.7 billion, a decrease of about 5.5% from 1987. For our analysis, we deleted some non-automotive components, such as marine diesel engines, and converted values to constant 1988:4 dollars.

The strong financial performance of all the domestic manufacturers over the past few years should not obscure how grim the early 1980s really were: Chrysler went to the edge of bankruptcy, Ford faced extremely serious problems, and even General Motors lost money. Only the increased light-duty truck share of the light vehicle market (from the low 20% to the low 30%) prevented even more serious job and financial losses, because the traditional domestic manufacturers are especially strong in this product segment. Much of the economic loss caused by the increased import share has been concentrated in the midwest generally, and the Great Lakes states specifically. For example, Michigan is estimated to have lost 225,000 jobs dependent on the automotive industry by 1987. This has added an internal U.S. political dimension to the economic trade issue.

The losses incurred by the domestic industry and its former employees are the direct result of competition from imports, and might well have been more severe if Japanese imports had not been limited by the series of Voluntary Restraint Agreements (VRA) that began in April of 1981.[13] But there have been some beneficiaries from the import success in the U.S. market: few doubt that the typical light vehicle available to the U.S. consumer today is better value because of import competition. The point is often made that many Americans now hold jobs that are linked to the sales and service of import vehicles, and many manufacturing jobs depend on imported parts and components. However, these jobs would exist in the U.S. economy if the vehicles, parts, and components they depend upon were produced here rather than abroad; it is no more accurate to say they depend on imports than it is to say that vehicle service and use jobs depend on a domestic vehicle production industry.

Currency Exchange Rates and the Bilateral Automotive Deficit

The data discussed above suggests that all the trade deficits are shrinking, and one might ask whether they will simply shrink their way back to the "more normal" levels of the late 1970s and early 1980s. If this happens, will not the bilateral automotive deficit with Japan similarly recede? Perhaps the soundest economic grounds for this expectation is the dramatic weakening of the dollar, especially against the Japanese yen. In September of 1985 the dollar bought 240 yen; by June of 1986, it bought 170 yen; and now, at the end of September 1989, it buys about 141. The yen today is 70% more expensive in dollars than it was three and one-half years ago.

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[13] Some question whether the VRA really constrained Japanese sales in the first few years, when shrunken markets and annual increases may simply have permitted the Japanese to increase their market share and reap higher than average profits.

Since it now takes more dollars to buy yen-denominated goods, such as Japanese passenger cars, do we not expect U.S. consumers to buy fewer of these goods? In the economist's "long run" of course U.S. consumers will decrease these purchases. But there are a number of reasons why it is uncertain when those purchases will decrease, and by how much. First, although consumers will make fewer purchases, the purchases they continue to make will cost more dollars. So the change in the yen-dollar exchange rate will likely affect the trade deficit more in unit than in value terms. Second, it takes time for consumers to adjust their purchasing preferences and habits to the new price realities. Third, the price elasticity of demand for Japanese automotive products in the U.S. market is unknown; it is possible that they are relatively price inelastic, as some suggested during the early years of the Voluntary Restraint Agreement. If demand for Japanese automotive products is relatively price inelastic, then the weakened dollar will result in a larger automotive trade deficit in terms of value, not a smaller one.

Moreover, not all of the increased dollar price of yen-denominated goods will necessarily be reflected in their dollar price. The Japanese manufacturers are not totally at the mercy of exchange rate fluctuation because there are actions that they can, and undoubtedly will, take to ameliorate its effects. They are holding down wage increases, increasing productivity, and using the yen's increased purchasing power to source less expensive production goods from offshore. All these efficiencies lower their costs in yen, and thus in dollars. They may choose to accept lower profit levels to maintain market share, and that would restrict the yen price of Japanese imports to the United States. They may differentiate the price of their vehicles, underwriting low profits on some models with high profits on others. In other words, the entire increase in the dollar price for yen need not be "passed through" on each and every product offering from Japan.

The bilateral trade deficit with Japan has proved itself to be remarkably robust in the face of the weakened dollar. To be sure, the bilateral automotive trade deficit fell roughly 3% from 1987 to 1988, but this is somewhat less than the decrease in the merchandise trade deficit, which fell about 7% from 1987 to 1988, from $59.8 billion to $55 billion. And the merchandise trade deficit with the rest of the world fell far more than the bilateral deficit with Japan: almost 26%, receding from $110.5 billion to $82 billion. This difference is startling for two reasons. First, the dollar weakened more against the yen than any other currency. Yet, for example, West Germany's merchandise trade surplus with the United States fell 20% from 1987 to 1988, decreasing from $16.3 billion to $13 billion. Second, the "rest of the world" includes countries like Taiwan and South Korea, whose currencies have moved relatively little in relation to the dollar, and countries like Mexico whose currency weakened against the dollar. But the U.S. merchandise trade deficit with Taiwan fell 26% in 1988, from $19 billion to $14 billion, while South Korea's stayed at about $10 billion, and Mexico's fell just about 50%, to some $3 billion.

At this time, then, there is little reason to expect the weakened dollar to correct fully the serious U.S. deficit in its bilateral automotive trade with Japan.

III. Preliminary Analysis

Automotive trade between the United States and Japan is composed of two primary categories of goods: finished, or fully-built-up (FBU) vehicle units; and parts and components. Both of these goods are important to the overall bilateral balance, but exhibit different patterns and reflect somewhat different dynamics.

Types of Automotive Imports

Japanese import vehicles fall into two distinctive categories that we call "true" and "captive" imports. The Japanese manufacturers market true imports in the United States through their own dealer networks, while the domestic manufacturers source captive imports from the Japanese manufacturers, but market them through their own dealerships, often under a U.S. nameplate. These imported vehicles, then, have differing implications for the U.S. economy, although they are both imports.

However, there are two reasons that require distinguishing them, to the extent possible, in projecting the future bilateral automotive deficit. First, their declared customs value may differ. Assuming that identical vehicles cost the same to manufacture and deliver, and command the same price in the U.S. market, the decisions about how to structure transaction prices may be quite different. Japanese manufacturers can take profits before or after customs for true imports, but only before customs for captives. Second, the corporate decisions that influence the number and mix of vehicles differ. For true imports, only the decisions of the Japanese manufacturers are relevant. For captives, the strategies and decisions of both the Japanese and the Big Three partners are relevant.

There are three distinctive types or categories of Japanese automotive parts and components entering the U.S. market, each reflecting somewhat different demand. First, there are repair or service parts required for vehicles imported at earlier points in time. For example, brake parts may be imported in 1988 to permit repairs on vehicles that were themselves imported from 1982 through 1987. Second, there are parts and components sourced from Japan by the Big Three for installation in their own domestically produced vehicles. Chrysler, Ford, and GM, for example, have all used some Japanese engines in domestically produced vehicles during the 1980s. Third, there are parts and components sourced from Japan by Japanese manufacturers for installation in the vehicles they produce in the United States (some would call these "Knock-Down", or KD kits). Many of these "transplant" or "New American

Manufacturers" (NAMs) assembly plants source high levels of content from Japan. Of course, there are also many products imported from Japan for eventual use in vehicles that are not included in the automotive deficit; semiconductors are an example of these.

The level of service and repair parts imported from Japan reflects the size and repair requirements of the fleet of Japanese vehicles in the United States. A complex series of corporate strategic and purchasing decisions determines the value of Big Three sourcing of Japanese parts and components. The strategic sourcing decisions of the Japanese manufacturers determines the level of Japanese content in their NAM vehicles.

Unfortunately, available data do not permit the complete and accurate allocation of Japanese imports into these distinct categories. However, in view of the different decisional dynamics and demand factors that govern each type of import, any reasonable projection of the bilateral automotive deficit must take them into account. Fortunately, extant data do allow us to make some estimates of the role of each type in the past, and thus permit us to tie our analysis of future decisions and demand to a composite import level.

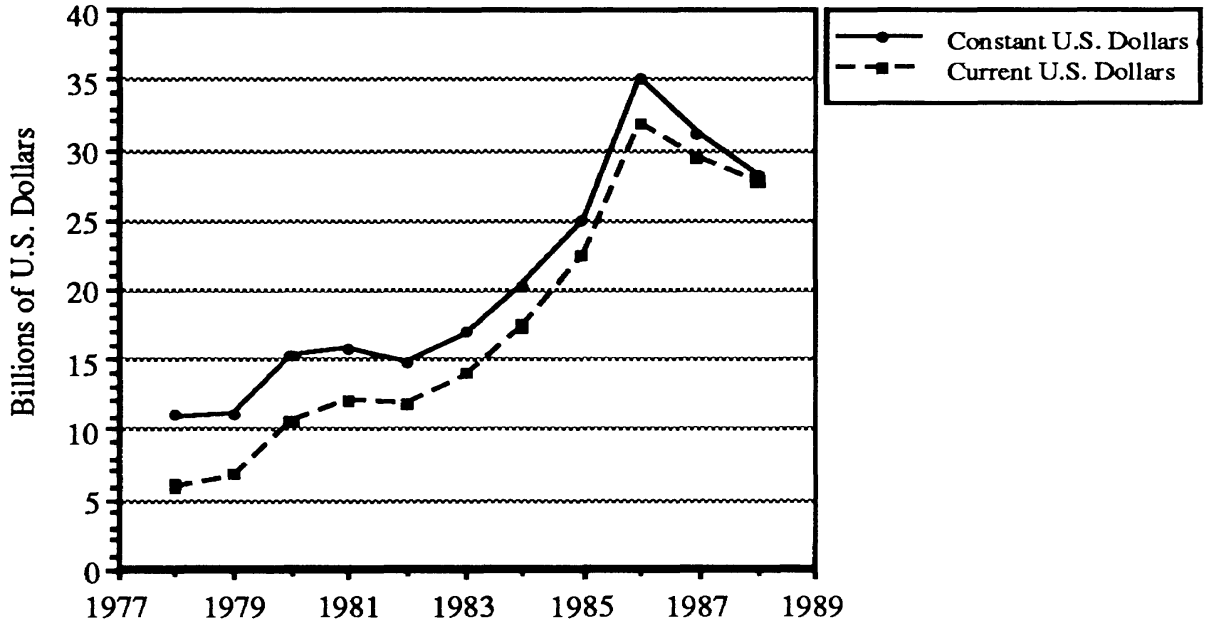
Data and Method

The analysis rests on five different data sets, reflecting different sources and data structures. The U.S. International Trade Administration provided data on U.S. automotive exports to and imports from Japan, including cars, trucks, parts, and components. These data cover the calendar years 1978, the peak year prior to 1986, through 1988, or 44 quarters, and include dollar values for both vehicles and parts, and units for vehicles and some parts. This quarterly data set provides the finest detail on the import and export values and quantities underlying the bilateral automotive deficit, although the exact values it provides are often discrepant with published data.

Available data permitted the creation of an annual price change index for 17 years, from 1972 through 1988 vehicle model years. The model year typically runs from fourth quarter to fourth quarter of the calendar year, since the traditional introduction of new models occurs in the late September to early October period. Six companies are included in this series: GM, Ford, and Chrysler, the U.S. Big Three; and Toyota, Nissan, and Honda, the Japanese "Big Three."

The third data set combines the first two into an annual data set covering the 11 years from 1978 through 1988. This permits the limited analysis of the relationship of price changes to sales, import totals, and so forth.

Figure 12: U.S. - Japan Automotive Trade Deficit in Constant and Current U.S. Dollars: 1978 - 1988



Citibase, a data base containing many variables of general economic interest, provided standard economic factors, such as the Gross National Product, the Consumer Price Index for Wage Earners, and currency exchange rates. These factors are used to index dollar values and to calculate yen values. Wharton Econometrics provide the future projections for these basic economic factors that are used to forecast developments through 1993. These projections, displayed in Appendix II, are discussed later in the report, and form the economic basis for two scenarios modelled in our projections.

We applied standard multiple regression techniques to the analyses of these data, permitting the introduction of appropriate controls and corrections for measured quantities. We then applied the automotive and economic scenarios to these regression estimates to arrive at our forecasts. Appendix III details these methods and analyses.

Bilateral trade in Autos and Parts: 1978-1988

The U.S. bilateral automotive deficit with Japan, displayed in Figure 12, was less than $7 billion current dollars in 1978-1979, then ratcheted up to the $10-$12 billion range in 1980 through 1982. The deficit, measured in current dollars, soared from about $14 billion in 1983 to just under $32 billion in 1986. The deficits for 1987 and 1988 were just above $29 billion and somewhat above $27 billion, respectively.

Converting these values to constant 1988 fourth quarter (1988:4) dollars eliminates the effect of dollar inflation from these comparisons.[14] But even in these indexed dollars, the deficit grew from about $11 billion in 1978-1979 to about $35 billion in 1986, then falling to roughly $28 billion in 1988. **The constant dollar U.S. automotive deficit with Japan in 1988, then, was about 2.56 times the constant dollar deficit in 1978 and 1979.**

The bilateral deficit, measured in constant 1988:4 yen, moved from about ¥1,600 billion in 1978 to about ¥5,280 billion in 1985 and 1986, then receded to about ¥3,600 billion for 1988, although showing a large increase in the fourth quarter of 1988. **The constant yen U.S. automotive deficit with Japan in 1988, then, was about 2.28 times the constant yen deficit in 1978 and 1979.**

It is, of course, legitimate to measure the deficit in both dollars and yen. Unfortunately, the currency exchange rate between the dollar and yen had altered significantly between 1985-1986 and 1988. The yen traded for the dollar at about 240 yen per dollar in the first three quarters of 1985, and at about 128 yen to the dollar in 1988. Thus while the deficit shows a decline from its 1986 high in both currencies, the decrease is much sharper in yen terms than in dollar terms. Measured in current dollar terms, the deficit declined about 13%. To be sure, this is significant; but it does not suggest that the deficit is well on its way to levels that will eliminate it as a source of U.S. concern. However, when the deficit is measured in yen terms, as displayed in Figure 13, it decreased 32%, a substantially larger decline, and one that might well suggest that the deficit is naturally receding. The immediate economic problem of the automotive trade deficit is an American one, so the dollar is the more useful measure of its seriousness. And the dollar measure suggests that the bilateral automotive trade deficit remains serious, and shows little evidence of a secular trend that will result in its near-term correction.

The pattern underlying the bilateral automotive deficit is somewhat unusual, because it represents virtually a one-way flow of goods. Average annual U.S. automotive exports to Japan were less than $1 billion throughout the 1978-1988 period, while U.S. imports from Japan rose and currently are just over $28 billion. U.S. passenger car sales to Japan decreased sharply in 1980, and began to recover in 1986, as shown in Figure 14. In a very real sense, then, the U.S.-Japan bilateral trade deficit, shown in Figure 12, is virtually indistinguishable from Japanese imports to the United States, shown in Figure 15.

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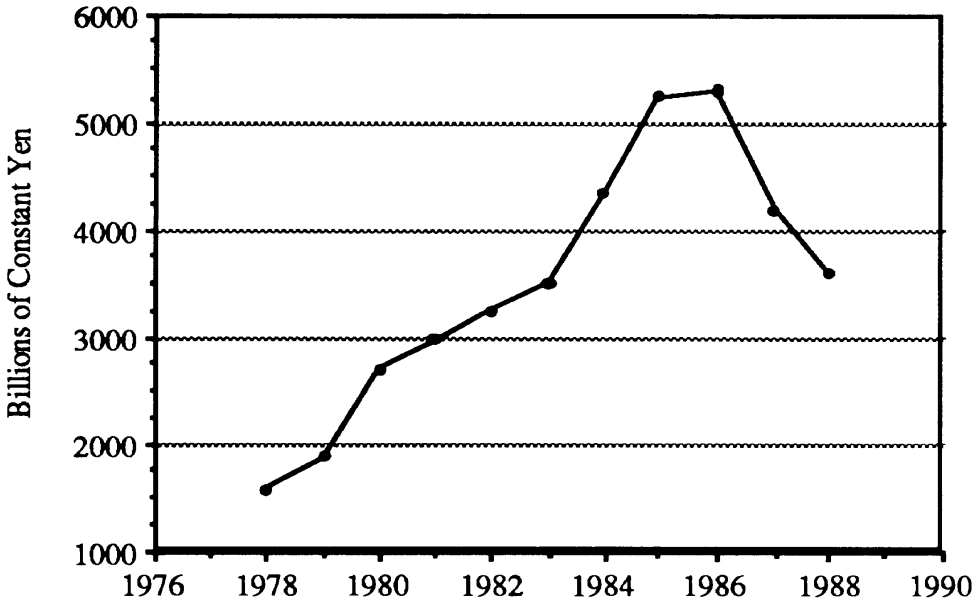
[14] We index our constant dollar and yen comparisons throughout this paper to 1988:4 because our data set is structured by quarters.

Figure 13: U.S. - Japan Automotive Trade Deficit in Constant Yen (88:4): 1978 - 1988



The composition of Japanese automotive imports into the United States has shifted over time. Figure 16 shows the percent of the total value of these imports that is accounted for by vehicles. During the last two years of the 1970s, vehicles accounted for just over 95% of total automotive imports from Japan. By 1988, the

Figure 14: U.S. Passenger Car Exports to Japan in Current U.S. Dollars: 1977 - 1988

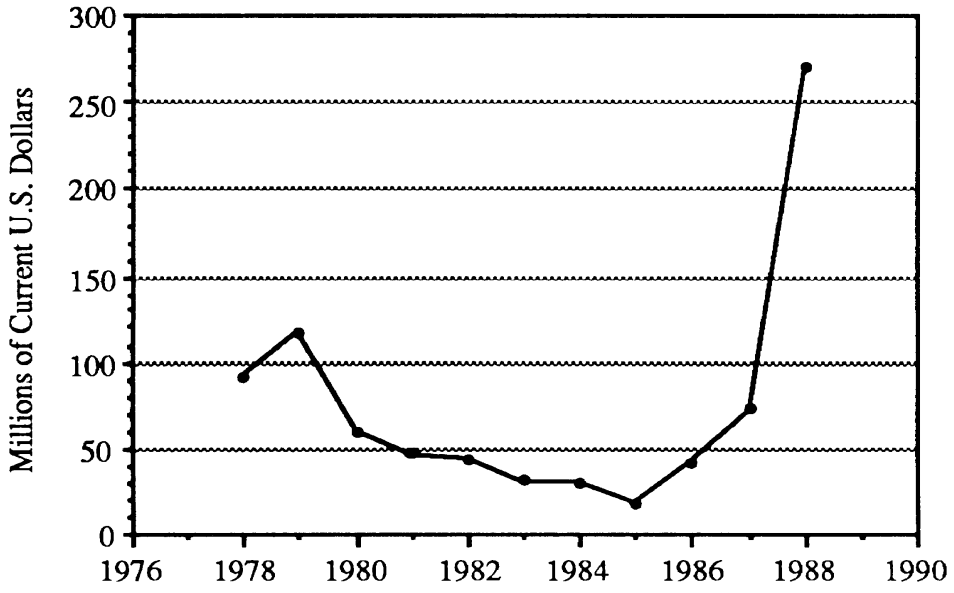
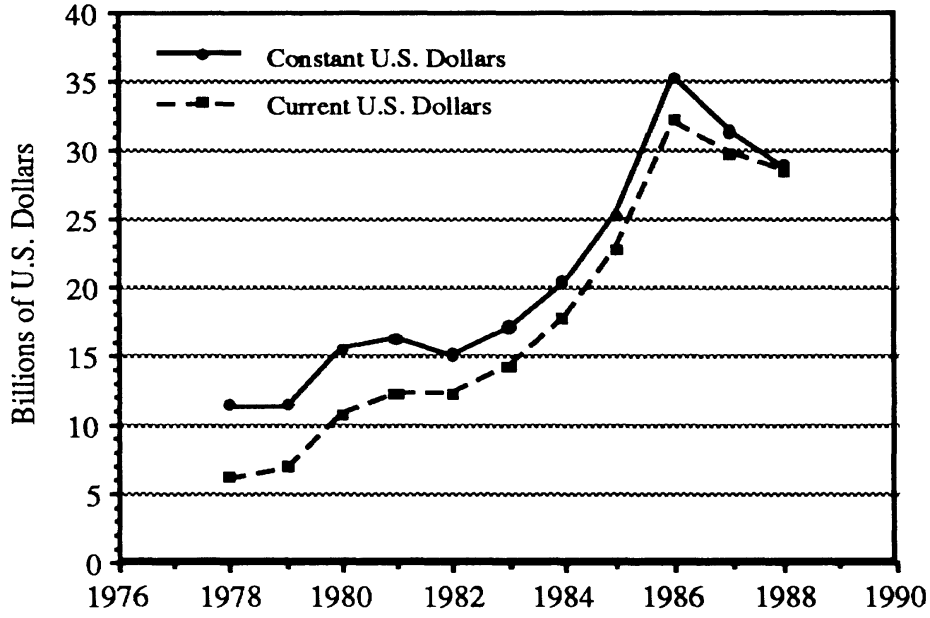


Figure 15: Total U.S. Automotive Goods Imports from Japan in Constant and Current U.S. Dollars: 1978-1988



vehicle share of the increased total value had fallen to about 84%. This reflects the increasing stock of Japanese vehicles in the United States requiring service and repair parts, the demand for Japanese parts and components to serve the U.S. manufacturing operations of the Japanese assemblers, and some increased sourcing of

Figure 16: Vehicles as a Percent of Total Value of Japanese Automotive Imports

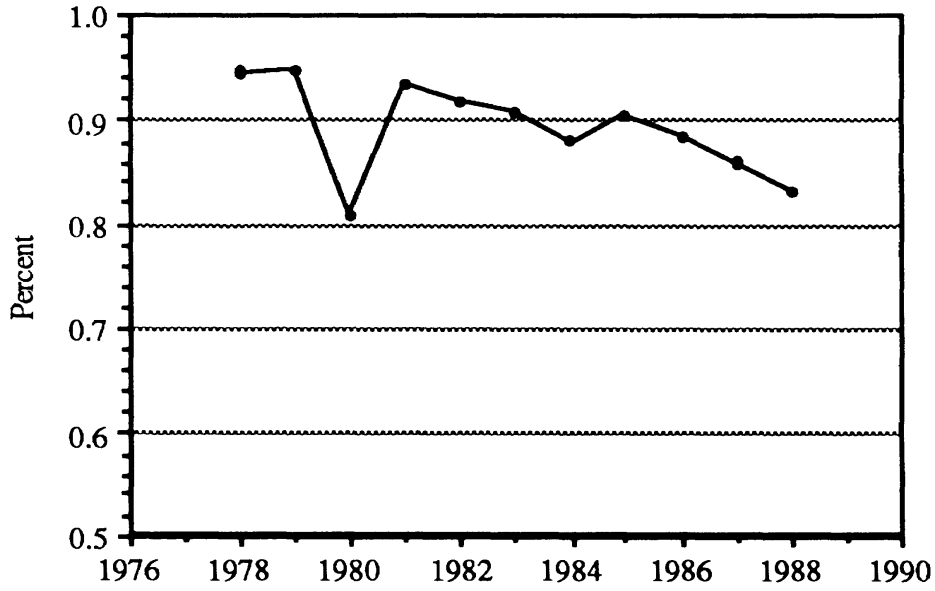
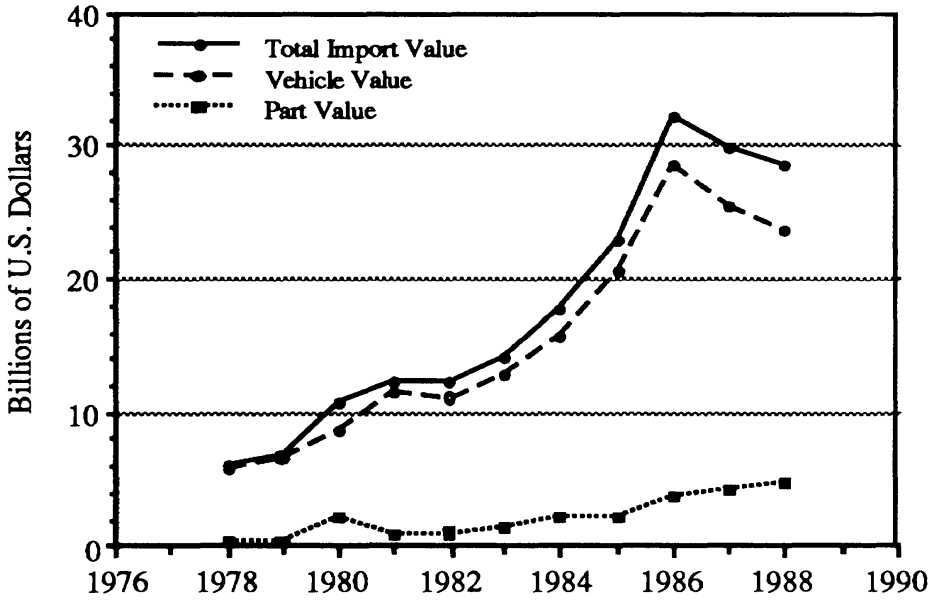


Figure 17: Value of Vehicle and Part Imports in Constant U.S. Dollars: 1978 - 1988



Japanese production parts and components by the traditional U.S. vehicle manufacturers. Figure 17 displays the level of vehicle and part imports from Japan. The cause of the temporary upsurge in part imports and the associated decrease in vehicles as a percent of import valued (Figure 16) during 1980 is unclear, and may simply be a reporting anomaly.

In summary, the automotive trade deficit with Japan has increased significantly since 1978, and represents a substantial problem in its own right, as well as constituting a major component of the U.S. deficit pattern in broader measures of trade. Further, the automotive bilateral deficit reflects almost exclusively U.S. imports from Japan, and a virtual lack of U.S. exports to Japan.

IV. Factors in Trade Flows

Numerous factors can influence trade flows between nations. Some of these are macroeconomic in nature, some are political, and some reflect the behavior of firms and consumers in the market place. This section discusses a few of the factors that are most likely to affect the bilateral automotive deficit.

U.S. and Japanese Economies

The base scenario for the development of the U.S. and Japanese economies is displayed in Appendix II. The U.S. economy is expected to exhibit the pattern of

somewhat weak growth characteristic of the past few years, with inflation, measured by the CPI, somewhat exceeding the real rate of GDP growth. Japan, on the other hand, will enjoy somewhat higher growth, and lower inflation. This suggests that the dollar will continue to weaken against the yen, reaching an exchange rate of 105 yen to the dollar by 1993. This scenario calls for a reduction of about 20% in the overall U.S. trade balance with Japan, brought about by a more than doubling of U.S. exports to Japan between 1988 and 1993.

An alternative scenario, also presented in Appendix II, suggests that U.S. economic growth will be somewhat lower in 1989 through 1992, but stronger in 1993. Japan, on the other hand, experiences stronger growth in 1989 through 1991, but somewhat reduced growth in 1992 and 1993, compared to the base scenario. The dollar weakens somewhat less, trading at 110 yen. The net effect of this is to somewhat restrain Japanese exports to the United States, and a reduction in the 1993 trade deficit by 45% compared to 1988.

The alternative scenario would likely bring about a sharp drop in automotive sales in 1990, hitting the automotive sector harder than the overall U.S. economy. However, the automotive market should recover from this slump by 1993, if it develops in line with past cycles. In the past two market downturns of any note, the Japanese increased their share of the U.S. market, and the bilateral automotive trade deficit increased. Japanese vehicles have been more resistant to downturns, perhaps reflecting the demographic characteristics of their customer base. However, we think that this may be less likely in the future, because of the closer match between underlying demand and supply with less restrictive agreements. The purchasing power of the dollar, in yen terms, varies by less than 5%, so there will be little impact on U.S. parts sourcing from Japan. Consequently, we do not vary our assumptions of Japanese share or part exports as a function of these economic scenarios.

Trade Restraints and Barriers

The Japanese government is currently enforcing a Voluntary Export Restraint (VER) agreement limiting the Japanese assemblers to 2.3 million annual passenger car exports to the United States, a quota they failed to reach in each of the past two years. This unilateral export quota succeeded the Voluntary Restraint Agreement (VRA) enacted at the behest of the U.S. government in 1981, and it is an open question how long it will remain in force. Some call for its extension, at lower levels, as a means of reducing the bilateral automotive deficit, while others argue that since Japanese exports are not reaching the VER ceiling, it is essentially non-binding and irrelevant.

The industry VER quota must be allocated among companies, and that appears likely to become even more of a problem in the future than it has been in the past.

The Japanese industry fell short of its quota in both 1987 and 1988, but some manufacturers feel that they were constrained by the quota. Nissan, for example, fell far short of its quota, and companies such as Mitsubishi are almost certain to pressure the Ministry of International Trade and Industry (MITI) to reassign a portion of the Nissan quota. Mitsubishi, because of its contracts to supply vehicles to Chrysler, finds itself with only about 70,000 import vehicles a year to market under its own nameplate in the United States, and that makes it more costly and difficult to establish a dealer network than would be the case at higher volumes.

Most analysts assumed that VER would not be renewed for 1989 in view of the Japanese industry's failure to meet the quotas for the past two years. While we are less confident than many that Japanese vehicle imports will continue to fall short of the quota, it does seem likely that VER will end by 1993, if only because of the domestic political problems the current situation creates for MITI.

Some Japanese light trucks are subject to a 25% customs value tariff when entering the United States. This tariff is likely to be reduced or eliminated as the United States continues to press for free trade, and because the strengthening of the yen and the competitive strength of the traditional U.S. industry in this segment render its rationale less than compelling.

If VER and the truck tariff impede the flow of Japanese exports to the United States, U.S. manufacturers see a host of informal trade barriers facing any plans they might develop to export to Japan. These barriers are well-documented, and only a few major ones need be mentioned here. Manufacturers in Japan own, or have substantial equity investment in many of their dealerships. Thus, they are permitted far more direct control over the activities of their retail dealerships than is the case in the United States. In Japan, the manufacturer can insist that the dealership carry only its nameplate, thus preventing importing manufacturers from gaining access to existing dealerships. Because of the lower manufacturer control of dealers in the United States, Japanese manufacturers have been able to establish their U.S. dealership networks by convincing established dealers to carry a Japanese nameplate in addition to their U.S. and/or European marques. While the U.S. manufacturers opposed this, they had no legal means to prevent it and no effective means to deter it. The key point is that it is much less expensive and entails lower levels of risk to assemble a dealer network composed of existing retail outlets than it is to establish one by creating new outlets.

The Japanese government is most vigilant in protecting its citizens from imports that do not meet the requirements of Japanese consumers. This vigilance involves elaborate testing and evaluation procedures, often applied separately to each unit, rather than on a sample basis. These procedures make it very cumbersome and costly to import into Japan, both because of the costs and time delays inherent in

the slow approval process and because of the costs and delays incurred in bringing products up to Japanese "market" standards.

We hasten to note that not all Japanese practices that make importing costly and/or difficult are unreasonable. And, to be sure, the cost levels of meeting import requirements in Japan are frequently exacerbated by the American exporters preference for *converting*, rather than *building* products for Japan. Moreover, Japan does seem to be gradually eliminating many of these trade barriers, although there is some dissatisfaction in the United States over both the rate and breadth of these improvements. There is also a fundamental question of how much we can expect a country to change its current economic arrangements to facilitate imports from the United States. **But until U.S. manufacturers feel that they have a fair chance to export to Japan, and until the American people perceive that this is the case, Japan will face mounting criticism about these informal barriers.** And such criticism can, given the proper circumstances, convert rather rapidly to political action aimed at redressing the situation.

Currency Exchange Rates

The currency exchange rate between the dollar and the yen has varied widely during 1978 through 1988, with only 45% as many constant 1972 yen required to purchase a dollar in 1988 as were required in 1978. This strengthening of the yen, or weakening of the dollar, has been a global phenomenon since 1985, as the yen has appreciated against most of the world's currencies, while the dollar has weakened against many. When the yen trades at 128 to the dollar, its 1988 average, a yen-denominated good costs 88% more in dollars than the same yen-priced good costs at 240 yen to the dollar, in current currencies.

Economic theory predicts that as yen-denominated goods become more expensive in dollars, holders of dollars will buy fewer such goods, albeit at a higher dollar price per unit. The initial impact on a trade deficit, then, may well be to increase it, as consumers continue their established habits and pay more dollars for valued imports. But over the long run, fewer such goods should be purchased, and the trade deficit should decrease. It is in this way that currency exchange rates are expected to provide long-term corrections for severe trade deficits. But the theory assumes that the imported good is price elastic, and that consumers view other goods as substitutes. It also assumes that much of the change in currency exchange rates will be "passed through" to the purchase price in dollars, thus raising them. The results of analyses performed for this report raise questions about each of these assumptions.

First, it is not clear that Japanese vehicles have reached a point of price elasticity, even though the choice of major durable goods typically is highly relative price elastic. But our data do not reveal any evidence of price elasticity for Japanese vehi-

cles to date, although at some higher level of sales they may well be. To be sure, there are reports that dealers are eliminating the premiums they have often charged, Japanese inventory levels are rising, and passenger car and truck sales have declined the past two years. But dealer premiums do not directly affect the trade deficit, and Japanese inventory levels are generally still well below traditional U.S. levels. Many trucks are subject to a 25% tariff, and that perhaps boosts their price above their free-trading level into a zone of elasticity. Each manufacturer's passenger car sales are restricted by VER, and Toyota or Honda might well have been able to sell more than their allocations permitted. On balance, perhaps the most persuasive evidence that Japanese vehicles may be approaching a point of price elasticity is that the manufacturers are offering incentives on some models. These function as price decreases, and suggest that this may be necessary to achieve the manufacturers' sales targets. **But to date, it appears Japanese vehicles may not yet have reached the point that price restricts demand. In any case, the Japanese manufacturers appear to price to the market. So increases in the dollar value of the yen cannot be expected to lower their sales volumes substantially, nor necessarily lower the custom value of their imports.**

Second, our data indicate that the Japanese manufacturers have not passed through to their U.S. prices the total effect of the increased value of the yen against the dollar. Announced model year price increases between 1985, when the yen began to strengthen, and 1988 total 27.7% on a constant dollar basis. In 1988, roughly 93% more dollars were required to purchase constant yen than in 1985. So 29.9% (27.7/92.69) of the yen's increased dollar value was "passed through" to U.S. consumers. It is clear that firms need not pass through all of the impact of changes in currency values, at least in the near-term.

The strengthening of the yen, then, has not made Japanese vehicles less successful in the U.S. market. To the extent that the strengthened yen since 1985 has shown itself in vehicle prices (roughly 30%), Japanese vehicle sales appear to have been price inelastic.

Manufacturer Strategies

We discuss the automotive trade balance throughout this report as though the relevant actors are the Japanese and U.S. automotive industries. However, both these industries are made up of companies that are extremely competitive with other companies, both those within their national industry and those from other nations. Ultimately, it is the aggregate behavior of these companies that defines the action of each national industry.

Company strategies are often organized around different markets, and in the increasingly international automotive industry, those markets are often defined by nations. Tying those markets to production sources is another key element of strategy, and that also applies to the automotive industry. Here we consider how the strategies of both U.S. and Japanese automotive manufacturers will likely influence the size of the bilateral automotive deficit, focusing on Japanese firm strategies for the U.S. and European markets and U.S. firm strategies for the Japanese and U.S. markets. These are the strategic decisions that will influence the size of the U.S. bilateral automotive deficit with Japan.

United States. The traditional American manufacturers have relied on vehicles sourced from manufacturers abroad to provide coverage in some market segments, particularly subcompacts. Many of these vehicles have come from Japan over the past decade, as both Chrysler and GM have sold vehicles manufactured by their Japanese affiliated companies. Such vehicles, called captive imports, provide American companies some share in the profits they generate, but contribute directly to the bilateral automotive trade deficit. Japanese captive imports accounted for some 225,000 sales in 1988, or about 11% of Japanese passenger car imports that year. The domestic manufacturers are likely to decrease somewhat their sourcing of captive vehicles from Japan. We suspect that some of their needs will be met by Japanese NAM manufacturers, some by Japanese production in third countries such as Mexico, and some by other producers in third countries.[15]

The most significant action of Japanese companies in reference to the U.S. market has been the substantial investment in U.S.-sited production.[16] These U.S. plants will have the capacity to supply just under 2.3 million passenger cars and light duty trucks by 1993. These NAMs, or New American Manufacturers, raise a series of questions that are particularly important in forecasting the automotive trade deficit with Japan. First, will these vehicles replace Japanese imports, thus significantly reducing the level of the bilateral trade deficit? Second, will these vehicles themselves be exported to Japan, increasing the level of U.S. exports, and thus reducing the trade deficit? Third, will these vehicles generate demand for production parts and components from Japan, thus increasing the parts and components portion of the automotive trade deficit?

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[15] The Ford Probe from Mazda's Flat Rock, Michigan plant is an example of the first category; the Mercury Tracer, from Mazda facilities in Mexico, of the second; and the Pontiac LeMans from Korea, of the third. The Probe, with high Japanese content, will influence the bilateral automotive deficit with Japan. The other vehicles will affect the size of the U.S. worldwide automotive deficit, but not the bilateral deficit.

[16] Honda in Ohio; Mazda in Michigan; Chrysler-Mitsubishi joint venture in Illinois; Nissan in Tennessee; Fuji-Isuzu in Indiana; Toyota in Kentucky; and a Toyota-GM joint venture in California. Honda, Toyota, and Suzuki will also have facilities in Canada readily available to serve the U.S. market.

The 1993 U.S.-sited production capacity of Japanese manufacturers could meet roughly 62% of the 1993 demand for Japanese vehicles, assuming they achieve their 1988 market share, including both imports and NAMs. If these NAM vehicles substituted for imports on a one-to-one basis, then the balance of the demand would require approximately 1.3 million car and 150,000 light duty truck imports. This would result in an import reduction of about 38% in cars, and about 74% in trucks, compared to 1988. These would constitute significant unit reductions indeed.

However, this one-to-one substitution is unlikely to happen. NAMs will not provide the full range of vehicle offerings, and NAM capacity cannot easily be shifted from a company that is less successful in the 1993 market to one that is more successful. Moreover, some NAM production is sold to, and marketed by, the traditional domestic manufacturers.[17] These "captive transplants" do not count towards the *retail* market share of their producers, and will likely total some 420,000 vehicles by 1993. We also believe that many Japanese manufacturers will seek larger shares of the market, rather than seeking stable shares. For example, Toyota has announced a goal of 10% share of the world market by 1995, and it is difficult to formulate a credible strategy for achieving this that does not include a substantial increase in its share of the U.S. market. At least some NAM production will be exported to Japan by 1993. Honda is already exporting some of its Ohio production and some Mazda production for Ford is also being exported. These vehicles will decrease the deficit to the extent that they are replaced by imports from Japan at less than a one-to-one rate, on a value-basis.

There is no question that increased NAM production will bring with it a surge in Japanese exports of parts and components to the United States. The Japanese will source substantial production componentry from Japan, for a variety of business and traditional reasons. The effect of this will be to increase the bilateral trade deficit in parts.

Japan. We expect the Japanese manufacturers to export some U.S. production to Japan. This will reflect probable product offering requirements in some cases, and, in others, symbolically, and politically, important steps. These exports will give evidence that U.S.-built vehicles can be successfully exported to Japan, and may orient the trade debate more to the U.S. failure to export, and rather less to the Japanese reliance on exports. Of course, the Japanese manufacturers will have ready distribution channels for any vehicle they export from the United States. We expect these exports to total 90,000 to 130,000 by 1993. The major exporter will, in all probability, be Honda: we expect them to achieve their announced target of 50,000.

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[17] By 1993, we expect GM to market 100,000 to 150,000 vehicles from the Toyota-GM venture; Ford to market 150,000 to 200,000 of Mazda's U.S. production; and Chrysler to retail roughly 120,000 of the Chrysler-Mitsubishi Diamond-Star vehicles.

We think that Mazda, Mitsubishi, Nissan, and Toyota will each export about 10,000 vehicles. The major uncertainty here is Toyota. Toyota may feel pressured to equal Honda's exports, viewing that as appropriate to its leadership position in the Japanese industry. If that develops, then these NAM exports might total about 130,000 by 1993.

The domestic U.S. manufacturers' plans in regard to Japan are less clear. They view exports to Japan as very high cost and high risk: high cost because of the extremely high level of market entry costs anywhere, but especially in Japan; and high risk because it is indeed unclear how well their products are suited to the Japanese market, and thus how well Japanese consumers would receive them. We still feel it is likely that some symbolic level of exports will be reached by 1993. After all, if the Big Three are to continue to argue that they are effectively closed out of the Japanese automotive market, the second largest in the world, they will require more good faith attempts, rather than their own evaluations and decisions, to support that charge. All three companies are already exporting limited numbers of vehicles to Japan, and we expect these to be on the order of 10,000 apiece by 1993, yielding a total of about 30,000 vehicles.

If vehicle imports to Japan grow at an annual rate of 26%, the average of the last four years, the import market would be 360,000 by 1993. The domestic Big Three held about 4.5% of the 1987 import market in Japan, but the successful export and sale of 30,000 vehicles in 1993 would require them to capture just over 8% of that market by 1993. For the NAMs to export and sell 90,000 units, they would need to capture 25% of the import market, for a total U.S. share of 33%. On the other hand, if the NAMs ship 130,000 units, they would need a 36% share, or a total U.S. share of about 44%. Such share gains will be hard to come by, although we expect that the NAMs will not face the barriers, either informal or consumer, that the Big Three will. The task of increasing U.S. automotive exports to Japan will be formidable, although not impossible. In any case, even significant success in U.S. efforts to export to Japan will do little to reduce the bilateral automotive trade deficit by 1993.

Third Countries. Both the Japanese and U.S. manufacturers have major, worldwide strategic plans and decisions facing them over the next five years. To be sure, many of these will have no direct effect on the bilateral automotive trade balance. But some of them will.

First, the U.S. manufacturers are likely to decrease their reliance upon Japan for captive imports to fill out their product lines. This reflects the increasing number of potential sources for such vehicles and the economics of such decisions: Japan is no longer the low-cost acceptable source for automotive components and vehicles. Further, we suspect that the Big Three are increasingly apprehensive about their growing dependence since the mid-1970s upon their major national competitor.

While sourcing from other foreign industries will shrink the U.S. bilateral deficit with Japan, it will not shrink the overall U.S. automotive deficit. Nor will it necessarily have marked effect on Japan's worldwide automotive surplus, since many such vehicles will have high Japanese content. Ford's Mercury Tracer from Mexico and most South Korean vehicles, for example, have high Japanese content.

Japan is concerned that the European Community may be closed to them in 1992. The Japanese fear that a European Community with lowered internal trade barriers might well erect trade barriers between itself and other areas and countries. Japanese motor vehicles face severe restriction in both France, where they are effectively limited to about 3% of the market, and Italy, where their numeric limit is under 3,000 vehicles a year. The West German market is open, and the Japanese enjoy high market shares in countries of the European Community that do not produce automobiles, but Japan is apprehensive that French and Italian policy may become the practice of the new European trading area.

A logical strategic response for Japanese automotive manufacturers is to seek exports to Europe from their U.S. production facilities. The U.S. origin of these vehicles confers three benefits. First, it might somewhat mute the Japan vs. Europe aspect of the conflict. Second, it somewhat insulates the automotive trade issue from broader trade conflicts that might develop between Europe and Japan. Third, the Japanese companies probably would secure U.S. government support and backing for exporting the vehicles, and that could politically influence the European reaction.

We think that the Japanese will likely ship at least 100,000 U.S.-assembled vehicles to Europe by 1993, as each company seeks to establish the American credentials of its U.S. production. We think that this will occur even if Japan appears to face no immediate threat to its European exports by 1992, as the Japanese automotive manufacturers will wish to establish a precedent should the situation alter. If, on the other hand, the Europeans do act to restrict seriously Japanese imports, then the Japanese may seek to export as many as 300,000 vehicles from their U.S. facilities by 1993. Assuming that the Japanese would replace these NAM exports to Europe with some level of imports from Japan, this would generate additional Japanese imports to the United States in 1993. These vehicles would all be fully accounted in the bilateral deficit, even though they are somewhat offset by the European exports in the total U.S. automotive trade balance by NAM exports to Europe.

U.S. Market

There is no question that changes in the U.S. automotive trade deficit with Japan over the next five years will be driven by Japanese exports to the United States. To

be sure, U.S. exports to Japan might accelerate more rapidly than we expect. But their extremely small current base, in terms of the deficit, suggests that even Herculean effort and massive success will have little impact on the deficit. A number of factors and decisions, as discussed to this point, will determine Japanese export levels to the United States over the coming half-decade. But the most immediate set of factors will be those shaping the U.S. automotive market and Japanese success in it.

Two points guide our analysis of the likely 1993 U.S. automotive market. First, while changes in the *size* of the market can and do occur swiftly, changes in the *composition* of the market typically occur more gradually. Thus shifts in the share of a particular manufacturer, or in the share of a particular type of vehicle, usually occur in small, incremental stages, perhaps on the order of one to two percent per year. When these types of changes occur swiftly, they typically are the consequences of unforeseen circumstances. The sudden shift to smaller cars, and the accompanying increased Japanese share, in the 1970's resulted from the oil shocks. Had these oil shocks been foreseen, it is doubtful that the Big Three would have been unable, as they were, to meet their traditional customers' sudden demand for small cars.

Second, the larger the market analyzed, the less critical are specific errors, because they are more likely to be compensated for by other errors, and because their net impact is proportionately smaller. A specific market projection for Chrysler that errs by estimating 100,000 more Chrysler passenger car sales than actually develop could be catastrophic for Chrysler, because that is about 10% of its 1988 total sales. If the projection is for the U.S. share of sales, it represents about 1.5% of 1988 sales, while for the total market, it represents about 1% of sales. Moreover, it may not matter to Chrysler whether those sales are lost to GM, Ford, or a Japanese manufacturer. But if the projection is the U.S. share, to the extent those sales go to Ford or GM, the original error is compensated.

Our market analyses, then, are targeted to national industry performance, and even when our underlying logic at the company level errs, may benefit from compensating errors. Further, we do not base our analysis on any dramatic shifts in market performance or composition, but rather see a "normally" developing market, characterized by gradual, if any, change.

The U.S. light vehicle market has witnessed a gradual shift in consumer preference for light duty trucks over passenger cars during the past decade. Since the late 1970s, the truck share of the light vehicle market has gradually increased from its historic levels in the low 20%s to a level in the low 30% for the past few years. This has restrained the bilateral trade deficit, because Japanese import share (12.2% in 1988) and NAM share (2.4% in 1988) in trucks has been lower than it has been in passenger cars (19.9% and 7.6%, respectively, in 1988).

We think that light truck share is likely to remain in the low 30% for the next five years. But will Japanese share increase? After all, we expect to see the tariff reduced or eliminated, and NAM production increase. We think Japanese share will increase, but only to about 22%, still considerably below the current Japanese manufacturing share in passenger cars. Most of this increase we believe will be from NAM production, somewhat softening the impact of the share change on the dollar value of the deficit. To be sure, reduction or elimination of the tariff will remove a significant Japanese cost disadvantage. But that disadvantage has not been passed through to prices to any large extent, and its elimination will not provide the Japanese a cost advantage that can be converted to a sudden price advantage. We also feel that Big Three trucks will be more competitively successful against Japanese trucks than may be the case in some passenger car segments.

Shifts in passenger car market share are difficult to predict. Some argue that the traditional U.S. industry is becoming more competitive, noting the enhanced relative quality rankings and pricing levels of domestic vehicles. Others argue that the Japanese are likely to increase share, as NAM production and the offshore sourcing of captives by the Big Three blur the consumer's sense of the national origins of vehicles, and as the Japanese manufacturers provide products across the full range of vehicle types. Proponents of increased U.S. share note that the Japanese success among younger, more affluent buyers will erode as the current cohort ages and its vehicle needs shift, and that the young, affluent buyers replacing them constitute a smaller share of consumers. But some see these ageing consumers remaining loyal to the Japanese nameplates they currently favor, thus supporting higher levels of Japanese sales.

Our view is that the Japanese are likely to increase their market share as they expand their vehicle offerings and meet the new needs of the consumer groups where they enjoy their highest level of current success. To be sure, Big Three vehicles are improving, and currently appear to enjoy some price advantage. But we believe that the Japanese have not yet reached a point where consumer evaluation of their value to price ratio will make them price sensitive, and we think it will take time for consumers to recognize and react to the changed competitive calculus. We see at least a gradual increase in Japanese production-based car market share, on the order of two percent per year, reaching the low to mid-30% by 1993, up from its combined NAM and import share of 27.5% in 1988. Since the majority of this increased share will come from expanded NAM production, the deficit will increase less than if Japanese imports accounted for the increase. But increase it will.

The Japanese producers are offering a wider range of vehicle offerings, especially in the growing luxury portion of the automotive market. We feel that the Japanese product plans clearly call for an aggressive emphasis on the large/luxury segment. This segment is important to all manufacturers because it generates the highest per-

unit profits by a considerable margin. These "upscale" units, of course, also contribute more to the trade deficit than do units in lower market segments, so their substitution for smaller vehicles can substantially increase the automotive deficit, even if import units remain the same, or, in fact, decline. We expect to see Japanese vehicles substantially increase their share of this critical segment, moving from about 5% segment share in 1988 to as high as 25% in 1993.

NAM Production Sourcing

We see a NAM capacity of some 2.3 million light vehicles in the United States by 1993. To the extent that they replace Japanese imports, they will reduce the bilateral automotive trade deficit in vehicles. But to the extent that they rely on parts and components sourced from Japan, they will contribute to the bilateral deficit in parts. To some extent, then, the NAMs will likely account for a reduction in the overall deficit, but how much of a reduction they provide will depend on how they allocate their production sourcing between Japan and the United States. Their U.S. sourcing will be split between traditional domestic suppliers and transplant Japanese suppliers. Since these transplant suppliers will themselves have substantial levels of Japanese sourced parts and production goods, the ratio of NAM sourcing between traditional and transplant suppliers in the United States will also affect the bilateral trade deficit.

The issue of U.S. sourcing by the NAMs is a sensitive one, with both traditional American suppliers and the UAW arguing that the level of "domestic content" should be high. That would have clear benefit in reducing the bilateral automotive trade deficit. But how high will it be? There are two types of factors that will limit the level of domestic content achieved by the NAMs through 1993. These are business and policy considerations.

Any decision to source parts and components reflects the manufacturers own concerns, considerations, traditions, and evaluations of the available options. We believe that for the NAMs, these factors would generally tilt to sourcing from Japan, with transplant suppliers representing a close second choice. But Japanese concern over the bilateral trade deficit will provide some pressure to source within the United States, and perhaps even from traditional domestic suppliers.

Interestingly enough, U.S. policy in the area of energy utilization may provide a ceiling to U.S. content in the NAMs. The Corporate Average Fuel Economy (CAFE) standards require manufacturers to achieve a specific miles-per-gallon average in the vehicles they sell (not manufacture) within a given year. The penalties for failure to achieve this standard involve sizable fines per vehicle sold, and represent a serious deterrent to all manufacturers but those whose fleets are tilted to high-priced vehicles that can absorb the penalty. To be sure, CAFE standards have been

variably applied for the past few years, as waivers and prior year credits have softened the impact upon the manufacturers of U.S. consumers' shift back to larger, more powerful, less fuel efficient vehicles. But it now appears that CAFE standards will be rigorously applied in the immediate future, and that target levels will be increased.

For purposes of determining fleet CAFE, vehicles that are 75% or more domestic content constitute a domestic fleet, while those that fall below 75% domestic content comprise an import fleet. Manufacturers cannot blend the two fleets, but must meet the CAFE standard within each, or be subject to penalties. This poses problems for manufacturers in North America. Ford, for example, is expected to lower the domestic content of some of its larger, less fuel efficient, vehicles so that they can be offset by Ford's fuel efficient captive imports and not suppress the CAFE of the rest of the domestic fleet.[18]

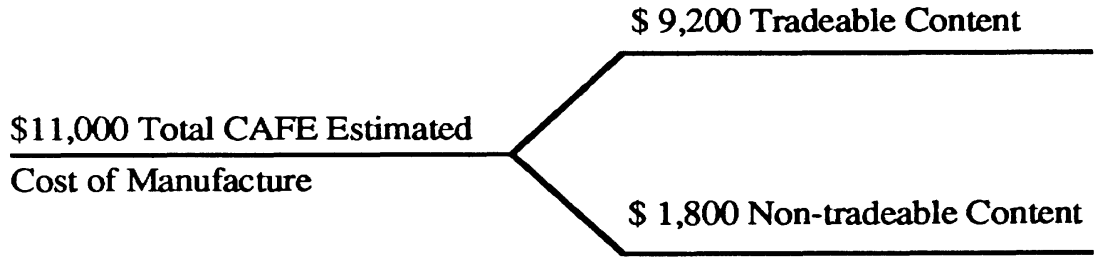
The Japanese manufacturers are moving "upscale" into larger, more powerful, and less fuel efficient vehicles, and most of those vehicles are likely to be imports. We think it is likely that they will try to keep NAM domestic content below the 75% level, so that the compacts and, especially, subcompacts they produce will offset the less fuel efficient imports from Japan. Companies such as Honda and Mazda have announced aggressive campaigns to increase domestic content in their NAMs, and 75% is often mentioned as the appropriate target. We think that 75% represents an absolute ceiling rather than an approximate target.

Under CAFE rules, purchases of production parts and components that have received final processing within the United States, regardless of the percentage of their value that originates abroad, are treated as domestic content. So even if a level just under 75% domestic content in CAFE measurement is achieved, that does not indicate that only 25% of the value is imported, and therefore accounted in the bilateral trade deficit. This is because there is a separate accounting of the trade component of the production goods provided by suppliers. They will be "domestic" for CAFE purposes, but will have import content in trade terms.

The CAFE calculation of domestic content includes some items, such as marketing expenses and manufacturing profit, that will be 100% domestic. Figure 18 illustrates this for a typical NAM compact. That means that the balance of the manufacturing cost, including the portion of it that is "traded", must be below 75% domestic content if the vehicle is to total 75% domestic content. But the trade deficit reflects some portion of domestic content as defined by CAFE procedures. Exactly how much is a function of two factors: first, transplant supplier levels of domestic

[18] Ironically, the cars that are most likely to have lower domestic content are those cars, like the Town Car, that most consumers see as quintessentially "domestic."

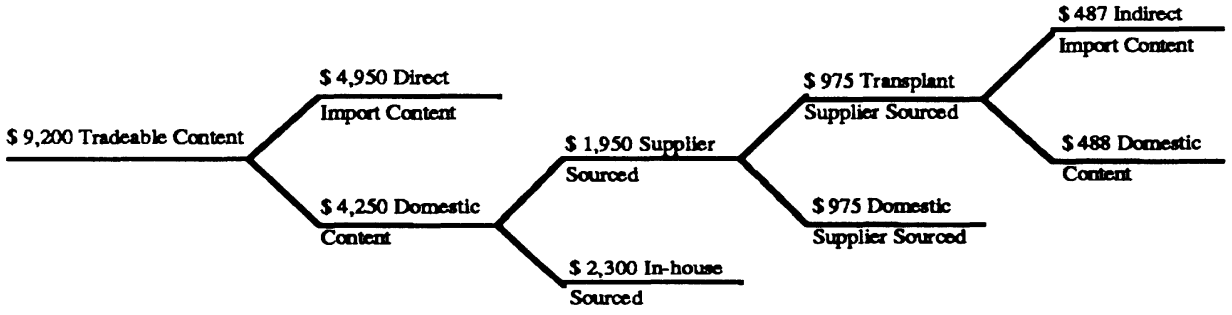
Figure 18
Allocation of CAFE Total Cost into
Tradeable and Non-Tradeable Content



production content; and second, the patterns of NAM sourcing to traditional domestic suppliers and to transplant suppliers.

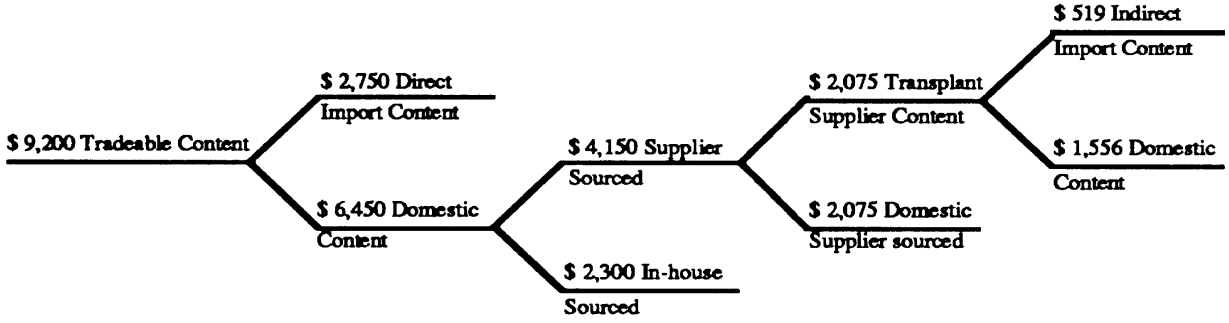
Most NAMs currently report domestic content levels in the 50% to 60% range, with the GM-Toyota joint venture and Honda probably at the high end, and the Chrysler-Mitsubishi joint venture and Nissan at the lower end. If we take 55% as a working average and subtract out the 16% or so of CAFE content that is necessarily entirely domestic, we arrive at $9,200 "tradeable content" for a typical $11,000 manufactured cost vehicle. If the overall CAFE content is 55%, then the domestic content in the tradeable portion must be about 46%. We assume that the NAMs are incurring about 25% of their costs in their own operations, and that their domestic sourcing is (or will be) about 50% from transplant suppliers, who themselves are sourcing about 50% of their content from Japan. Those assumptions suggest a vehicle whose "trade content" is about 41% domestic and about 59% import. Figure 19 illustrates this calculation.

Figure 19
55% CAFE Domestic Content Implies That
59% Of Tradeable Content Is Import,
At 50% Domestic Sourcing By Transplant Supplier



Memo: Import content is $4,950 Direct plus $487 Indirect, or $5,437 Total.

Figure 20
75% CAFE Domestic Content Implies That
36% Of Tradeable Content Is Import,
At 75% Domestic Sourcing By Transplant Suppliers

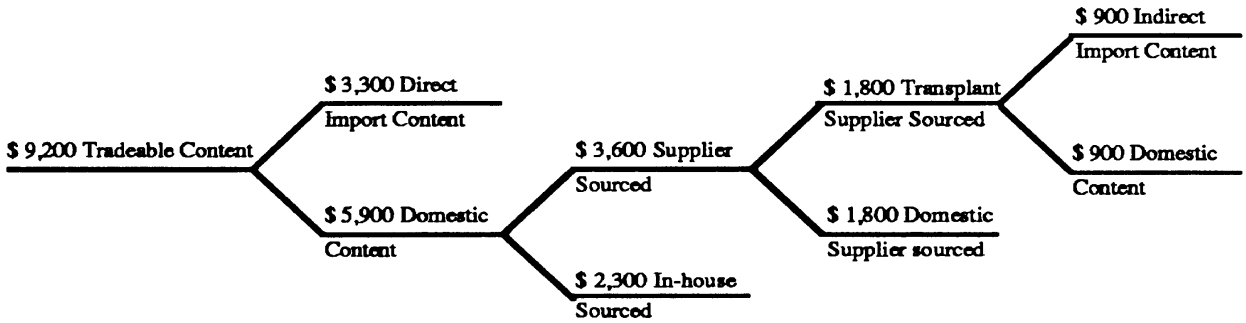


Memo: Import content is $ 2,750 Direct plus $519 Indirect, or $ 3,269 Total.

If the NAMs reach just under 75% CAFE domestic content, and their transplant suppliers reach 75% domestic manufacturing content by 1993, the import share of trade content will fall to 35.5%, as illustrated in Figure 20. That would involve a reduction of about 40% in the import content compared to the current estimate at 55% CAFE content, assuming prices remain constant (1-.355/.59). However, if NAMs reach 70% CAFE content, and their suppliers reach or stay at about 50% import content, then in 1993 the typical NAM will be about 46% import in trade terms, and the reduction in import content will be on the order of 22% from today's evel (1-.46/.59). Figure 21 displays this situation. **Domestic content in trade terms will be 10% to 15% lower than CAFE domestic content, depending on the level of CAFE domestic content achieved.**

The Japanese move into the more expensive segments of the U.S. market, then, will strongly affect the dollar value of the bilateral vehicle deficit, and may more

Figure 21
70% CAFE Domestic Content Implies That
46% of Tradeable Content Is Import,
At 50% Domestic Sourcing By Transplant Suppliers



Memo: Import content is $ 3,300 Direct plus $ 900 Indirect, or $ 4,200 Total.

than compensate for some reduction in unit imports to the United States. The domestic content level of the NAMs and their transplant suppliers, and the NAMs' supplier selection practices will have major impact on the dollar value of the parts and component deficit, and the portion of the overall bilateral automotive deficit it comprises.

V. Two 1993 Automotive Scenarios

If all these factors develop in ways that served to minimize the bilateral automotive trade deficit, what would the that deficit be in 1993? The answer to this requires development of a scenario of Japanese vehicles in the U.S. market, then tying that scenario to the U.S. deficit. The scenario is implicit in the discussion above, but we will here make it explicit, and ground it in a description of the U.S. market in 1988. The linkage of the scenario to the deficit is based on the analysis of the 44 quarters from 1978-1988. The coefficients characteristic of that period are applied to the 1993 scenario to yield the prediction of the 1993 bilateral automotive deficit.

The "1988 Case"

We begin with the 1988 trade year. Table 1 displays some statistics on the 1988 vehicle market, which totaled 10.6 million passenger vehicles and 4.9 million light trucks, including vans, trucks, and sports/utility vehicles. This market comprised four broad segments: small cars or subcompacts at 26% of the total, compacts at 32%, intermediates at 23%, and large/luxury cars at 19%.[19] Japanese imports, including captives, accounted for roughly 2,097,000 sales, and Japanese facilities in the United States for another 791,000 (including the captive vehicles sold through the U.S. manufacturers), for total "Japanese" sales of about 2.9 million, or 27% of the passenger car market. Combined Japanese shares in each segment were 62% in small cars, 28% in compacts, and 5% in each of the intermediate and large/luxury segments. Of Japanese imports, 57% were small, 32% compacts, 6% intermediates, and 5% large/luxury. All U.S. production by Japanese manufacturers falls into the small (62%) and compact (38%) segments.

Trucks registered just under 4.9 million sales, or about 32% of the total light duty vehicle market of 15.5 million. These included 604,000 (12.3%) Japanese imports,

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[19] *1989 U.S. Industrial Outlook*, U.S. Department of Commerce. Segments are based on weight, wheelbase, interior space, value, engine size, etc. and combinations thereof. This scheme appears to emphasize value and size. Examples would be Ford Escort (small), Ford Tempo (compact), Ford Taurus (intermediate), and Lincoln Continental (large/luxury).

Table 1
Japanese Vehicles in the 1988 Market
Including Big Three "Captives"
(Vehicles in 1000s)

Passenger Car Segment	Segment Share of Market	Japanese Import	Japanese NAMs	Total Japanese Sales
Subcompact	26%	1,196	528	1,724
Compact	32%	677	263	940
Intermediate	23%	120	0	120
Large/Luxury	19%	104	0	104
Total	100%	2,097	791	2,888

Passenger Car Segment	Segmentation of Japanese Sales	Japanese Share of Segment Sales	Segmentation of Japanese Imports
Subcompact	60%	62%	57%
Compact	33%	28%	32%
Intermediate	4%	5%	6%
Large/Luxury	4%	5%	5%
Total	101%	---	100%

Source: 1988 Estimates from U.S. Dept. of Commerce *U.S. Industrial Outlook 1989.* Reconciled to data on 1988 market as reported in Ward's Automotive Reports, January 9, 1989.

Memo: Total Japanese market share: 27.2%.

Japanese Light Truck Market
(Vehicles in 1000s)

U.S. Light Truck Japanese Imports	Japanese NAMs	Total Japanese Sales	Japanese Percent of Truck Market
604	117	721	15%

Source: Ward's Automotive Report, January 9, 1989

and 117,000 (2.4%) domestically produced Japanese nameplates, for a total Japanese share of just under 15%.

The analytic model used to forecast 1993 values relies on a combination of regression and accounting models. For example, the model predicts the "other vehicle" category of imports through a direct extrapolation to 1993 of the exponential trend for 1978 through 1988, but projects passenger car and light truck values by associ-

ating unit values, determined by the regression results, with the numbers of vehicles predicted by the automotive scenarios. When these combined techniques are applied to "forecast" the 1988 trade deficit, the results are quite close to the actual figures for 1988. The total predicted deficit is $26.91 billion, about 1.3% below the actual deficit of $27.27 billion. The most serious departure is in the parts category, where the prediction is $4.3 billion, just under 7% below the actual $4.61 billion. These results provide some confidence in the usefulness of the overall method.

"Best Case 1993" Scenario

We see the 1993 market as likely consisting of roughly 11 million passenger car sales and 5.2 million light trucks. This market preserves current truck share at about 32%, and reflects the growth we would expect under the base economic scenario. This market is consistent with other available projections.

The key issues for the vehicle trade deficit is how much of this market will go to Japanese imports, how many U.S. vehicle exports there will be to Japan, and what kinds of vehicles will be traded. The key issue for the parts and components deficit is how much of the market will go to Japanese NAMs produced here, and the domestic/offshore sourcing patterns of these manufacturers.

The level of Japanese vehicle imports into the U.S. is clearly critical to the bilateral automotive trade deficit, and the lowest plausible estimates seem to be in the range of 1.8 million, or about 16% of the market. This forecast appears to rest on the assumption that the Japanese manufacturers will sell all the capacity of their U.S. production operations in the U.S. market. Even though that assumption is open to challenge because the Japanese manufacturers might well export some of that production, and replace it with additional imports, we shall retain it for this scenario. In terms of the 1993 trade deficit, it is a conservative assumption.

The Japanese manufacturers are aggressively pursuing an "upmarket" strategy. That is, they are enriching the mix of passenger vehicles they offer their customers, especially by adding new product offerings in the growing luxury portion of the automotive market. We think the 1993 market will reflect some slight shifts in vehicle segments, but a more substantial shift in the segment shares of Japanese imports. Small cars fall sharply from 57% of Japanese imports to roughly 36%, compacts increase slightly from 32% to 34%, while both intermediates and large/luxury cars about triple, to 15% and 16% respectively.

These upscale units, of course, contribute more to the trade deficit than do units in lower market segments, so their substitution for smaller vehicles increases the au-

Table 2
1993 New American Manufacturer U.S. Capacity Estimates (units)

Company	Passenger Car	Light Truck	Total Units
Diamond-Star	240,000	0	240,000
Ford-Nissan	0	100,000	100,000
Fuji-Isuzu	60,000	60,000	120,000
Honda	510,000	0	510,000
Mazda	300,000	0	300,000
Nissan	250,000	150,000	400,000
NUMMI	150,000	100,000	250,000
Toyota	200,000	200,000	400,000
Total	1,710,000	610,000	2,320,000

tomotive deficit, if the units remain the same, or even modestly decrease. However, we estimate the custom's value of these upscale units at about $19,000, compared to roughly $8,000 for small cars, based on current data. These current values reflect a less rich mix of upscale vehicle imports than is likely in the near future, as more Japanese manufacturers add luxury vehicles and imports to their offerings. For example, both Toyota (Lexus) and Nissan (Infiniti) are introducing their first luxury segment vehicles this year, both priced in the mid-$30,000 range. Thus our estimates of the impact of increased Japanese luxury sales on the trade deficit may well be conservative.

We do not assume that the Japanese manufacturers will sell all of their 1993 U.S. production in the U.S. market. Rather, we assume that NAM production will generate some exports to Japan and to Europe. Table 2 displays estimated capacity for Japanese NAM operations by 1993. We assume that Toyota will likely open a second assembly plant by 1993, and that the Fuji-Isuzu venture will not reach its ultimate capacity by then. If both these assumptions are wrong, they will cancel each other. If only the Toyota assumption is wrong, then we overestimate transplant capacity and sales. But if Toyota does not build another plant, it would import more cars from Japan to build its market share, and thus, again, our assumption is conservative in regard to the trade deficit.

The best trade case we can argue is that the NAMs' U.S. sales will be about 90% of their rated capacity in subcompacts, and about 95% in compacts. Recall that these vehicles have a loyal customer base, and, to some extent, compete against each other. We believe that any NAM that falls short of these sales estimates will be compensated by another that sells above these estimates. These estimates suggest that NAMs will sell a total of 1,570,000 vehicles in the U.S. market in 1993,

about 14% of the market. Japanese passenger car sales, then, will total about 3.4 million, or just under 31% of the market.

But the NAMs will build more cars than their U.S. sales, because they are likely to export vehicles to both Japan and Europe. Building those cars will draw in part and component imports from Japan, thus contributing to the bilateral automotive trade deficit. We think it is plausible that the NAMs will export 100,000 vehicles to Europe in 1993 in order to establish the "American" character of these cars. We also think that they may export as many as 130,000 to Japan by then, both for political reasons and for their own competitive motives. Most of these cars going to Japan will be compacts, while 80% of those for Europe will be subcompact. With higher value vehicles going to Japan than to Europe, the higher export value will contribute to reducing the bilateral deficit with Japan. NAM build, then, will total 1,800,000 vehicles.

What levels of domestic and import sourcing will characterize these vehicles? We discuss above why we think that just below 75% CAFE domestic content is likely to be a ceiling for these vehicles. If the transplant suppliers that are replacing some suppliers from Japan also reach 75% domestic content, then import content will fall to $3,269 per $11,000 vehicle. That is 60% of our estimate of their current import content, based upon the assumption that the NAMs are currently achieving 55% domestic content, and their transplant suppliers are at 50%. If these current estimates are in fact too low, then the proportional reduction in import content would be less, and we would overestimate the reduction in import content and thus underestimate the trade deficit.

The increased production of Japanese nameplate vehicles in the United States, then, will bring with it an increased demand for production parts and components, and we see that component of the automotive trade deficit emerging as a far more important factor by 1993 than it is today. The demand for Japanese parts and components by the traditional domestic Big Three will ease, as they resource to traditional domestic suppliers and to Japanese transplant suppliers. While these transplant suppliers will themselves spur demand for Japanese parts and components, we do not expect that demand to exceed the current demand by the Big Three and the transplant assemblers that it will replace. Finally, the growing stock of Japanese vehicles will itself fuel further demand for Japanese imported parts and components.

Most forecasts see Japanese truck imports remaining at about the 600,000 level through 1993. While we later argue against this assumption, it is plausible; but, in our judgment, the best plausible case for minimizing the trade deficit sees a decrease in Japanese light truck imports to 500,000. The traditional domestic manufacturers have been quite competitive in these vehicles. Japanese light truck capacity in the United States will be about 610,000 by 1993, and we think they may sell

Table 3
1993 Market Best Plausible Case Passenger Car Trade Scenario
(Vehicles in 1000s)

Passenger Car Segment	Segment Share of Market	Japanese Import	Japanese NAMs	Total Japanese Sales
Subcompact	24%	653	994	1,647
Compact	33%	603	576	1,179
Intermediate	23%	261	0	261
Large/Luxury	20%	281	0	281
Total	100%	1,798	1,570	3,368

Passenger Car Segment	Japanese Share of Segment Sales	Segmentation of Japanese Imports	Segmentation of Japanese Sales
Subcompact	62%	36%	49%
Compact	32%	34%	35%
Intermediate	10%	15%	8%
Large/Luxury	13%	16%	8%
Total	—	100%	101%

Memo: Total Japanese market share: 30.6% of an 11 million unit market.

New American Manufacturer Build for Various Markets
(Vehicles in 1000s)

Segment	United States	Europe	Japan
Subcompact	994	80	25
Compact	576	20	105
Intermediate	0	0	0
Large/Luxury	0	0	0
Total	1,570	100	130

1993 Best Plausible Case Truck Trade Scenario
(Vehicles in 1000s)

U.S. Light Truck Japanese Imports	Japanese NAMs	Total Japanese Sales	Japanese Percent of Truck Market
500	408	908	17%

Memo: 5.2 million unit market.

only some 67% of that capacity, or 408,000 NAM trucks. So we see total "Japanese" light truck sales rising to 908,000 units, representing a 17% share of our projected 5,200,000 market.

Table 3 displays the 1993 U.S. market, reflecting our assumptions about Japanese import and NAM sales in the passenger car and light truck segments.

In terms of U.S. exports, we see little change. It is plausible that the Big Three will undertake to export roughly 30,000 vehicles to Japan by 1993. It is difficult to seriously expect higher levels. Japan has numerous informal trade barriers that make it extremely expensive, by international standards, to penetrate its market. Factory control over dealers is much stronger in Japan than in the United States, so the Big Three do not have the option of persuading existing Japanese dealerships to add their products. Establishing an independent dealer network is extremely expensive, and it is doubtful that U.S. sales in Japan would provide sufficient returns to justify it by 1993. It is possible too that the U.S. manufacturers will be able to negotiate access to the Japanese market through their affiliations with Japanese manufacturers, but we see this as a long-term and still expensive proposition. We see a level of "symbolic" exports by the Big Three through their existing marketing relationships.

If the transplant manufacturers export 130,000 vehicles to Japan, the combined traditional and NAM exports would reach 160,000. This is plausible, but would be difficult to achieve, since it would require U.S. exports to capture about 44% of Japan's likely 1993 import market.

We see little development of parts and component exports to Japan. The Japanese manufacturers are not likely to alter significantly their traditional relationships with their own suppliers to encourage exports from the United States, nor is there a significantly growing stock of U.S. vehicles demanding service and repair parts. Exports in the light truck area are likely to remain small and scattered.

What does this best case suggest about the likely bilateral automotive trade deficit in 1993? Our analysis of 1978-1988 data provides an empirical basis for associating dollar values with unit sales of imported cars and trucks, NAM vehicles, and changing stock. The dollar values for passenger cars can be determined for two segments, large and small, based on engine size. When we apply these dollar values to the passenger car and light truck units displayed in Table 3, we arrive at a dollar projection for 1993. Our analysis of the "parts" category reflects the assumption that the import content of NAM vehicles is 60% of today's level; we extrapolate the balance of parts demand and the "other" category to 1993 based on our coefficients.

Table 4
Best Case
1993 U.S.-Japan Automotive Trade Balance
Basic Economic Scenario
(Billions of U.S. Dollars)

	1988	1993	
	Constant U.S. Dollar	Current U.S. Dollars	Constant U.S. Dollars
U.S. Imports from Japan			
Large	4.40	12.04	9.52
Small	14.88	11.68	9.23
Total Cars	19.28	23.72	18.75
Light Trucks	3.13	3.26	2.58
Parts	4.61	8.02	6.34
Other Vehicles	0.99	4.04	3.19
Total Imports	28.01	39.04	30.86
U.S. Exports to Japan			
Light Vehicles	0.27	2.53	2.00
Other	0.47	0.83	0.65
Total Exports	0.74	3.36	2.65
U.S. TRADE BALANCE	**-27.27**	**-35.68**	**-28.21**

Table 4 displays the U.S. dollar values, both current and constant (1988:4), for our best case scenario from Table 3, reflecting the assumptions of our basic economic forecast. We find a projected bilateral automotive trade deficit with Japan of just over $28 billion in constant dollars, up from just over $27 billion in 1988, an increase of some 3.4%. In 1993 dollars, this scenario suggests a deficit that is likely to reach $35.68 billion.

The total constant dollar value of Japanese imported passenger cars falls roughly 3%, although Japanese import units fall some 14%. This reflects the higher unit values associated with the enriched segment mix of Japanese imports. Light truck imports fall some $550 million 1988:4 dollars, reflecting a volume decrease of over 100,000 units. Parts imports increase by 37.5%, moving from $4.6 billion in 1988 to $6.3 billion constant dollars in 1993, reaching about 67% of the dollar value of either category of passenger cars. This reflects the expansion of NAM production, albeit at lower Japanese content, and the stock of Japanese vehicles requir

Table 5
Best Case
1993 U.S. - Japan Automotive Trade Balance
Alternative Economic Scenario
(Billions of U.S. Dollars)

	1988	1993	
	Constant U.S. Dollars	Current U.S. Dollars	Constant U.S. Dollars
U.S. Imports from Japan			
Large	4.40	11.74	9.46
Small	14.88	11.40	9.19
Total Cars	19.28	23.14	18.65
Light Trucks	3.13	3.19	2.57
Parts	4.61	7.79	6.28
Other Vehicles	0.99	3.94	3.17
TOTAL Imports	28.01	38.06	30.67
U.S. Exports to Japan			
Light Vehicles	0.27	2.48	2.00
Other	0.47	0.81	0.65
TOTAL Exports	0.74	3.29	2.65
U.S. TRADE BALANCE	**-27.27**	**-34.77**	**-28.02**

ing service parts. The "other vehicle" category (consisting of unspecified motor vehicles and other cargo and utility vehicles as detailed in Appendix IV) grows some 220%, reflecting a direct projection of the trend of the past 10 years. On the other hand, U.S. vehicle exports increase from about 22,000 to some 160,000, reaching just under $2 billion constant dollars. The "other" category, including a variety of parts, off-road vehicles, etc., increases some 38%, reflecting the trend of the past decade.

Table 5 displays these results when we apply the basic assumptions of the alternative economic scenario. The overall bilateral automotive deficit increases some 2.8% in constant dollars, reaching $28.02 billion. This deficit will be $34.77 billion in current dollars. This best automotive case, then, is only marginally influenced by the choice of basic economic assumptions. In either case, the automotive bilateral deficit marginally increases, either by 3.4% or by 2.8%; the constant dollar value of that deficit differs by less than $200 million between the sets of economic assumptions.

"Most Likely Case" Scenario

Table 3 provides our "best case" scenario, but this reflects some assumptions that we consider neither the most plausible nor the most probable. If the market develops as we think most likely, what would the bilateral automotive trade deficit be?

We are less confident that many analysts that the Japanese manufacturers will readily lower their import levels because of increased NAM production. They have stressed the independence of their American operations, and have resisted analyses that treat these facilities as "Japanese," or that call for transplant production substituting for exports from Japan. We assume that 2.3 million vehicles, the current VER limit, represents a minimal acceptable level of exports to the U.S. market in terms of the competitive targets of the Japanese manufacturers. This reflects both their quest for market share and their preferences for production volumes in Japan. We simply do not see the world market developing in ways that permit these manufacturers to surrender significant sales in the United States while compensating for them elsewhere. Toyota, for example, has announced its intention to manufacturer 10% of the world's motor vehicles by 1995, and no credible strategy exists for achieving that without substantial increase in its share of the U.S. market.

We believe, on the other hand, that the U.S. manufacturers are becoming more competitive, so increases in Japanese share, including NAMs and imports, will not come as readily as they have in the past. We think that holding Japanese imports to their current volume level, and, thus, lowering their 1993 share by about 1%, is a realistic possibility. We see this as more attainable than the best trade case scenario's call for a reduction in Japanese import share of over 3%. We thus see a stronger Japanese performance than many, calling for sales of about 2.1 million Japanese imports in the 1993 U.S. market, about 19% of that 11 million vehicle market.

We think that the Japanese will more aggressively move upscale than the best trade case scenario suggests, seeking larger shares of the intermediate and large/luxury segments. We also believe that they will emphasize the large/luxury segment over the intermediate segment, seeking higher profit-per-unit sales. Some analysts expect a smoother move up the segment value scale, with each segment constituting a smaller share of Japanese imports than the segment below it. But we feel that the Japanese product plans clearly call for more intense emphasis on the large/luxury segment than on the intermediate segment. We also expect them to be successful, as Honda has been with its Acura Legend. Since the NAMs will be producing subcompacts and compacts, this suggests a rather drastic shift in the segmentation of Japanese imports. We see 1993 Japanese imports at 20% subcompact, 34% compact, 18% intermediate, and 28% luxury/large. This represents a much richer value mix than that called for by the best case scenario.

We think that the NAMs are likely to sell 95% of their rated capacity in small cars as well as compacts. That raises NAM small car sales to about one million vehicles. At the same time, we think that the NAM entrants in the compact segment, the Honda Accord, Mazda 626, and Toyota Camry, will sell well, and, with overtime, sell above their rated capacity, at about 626,000 vehicles. Total U.S. NAM sales, then, will be 1,675,000 in 1993, about 15% of the U.S. market. Total Japanese passenger car sales, then, will be about 3.8 million, for a combined market share of just over 34%.

We expect the NAMs to export about 100,000 vehicles to Europe in any case, so this scenario does not differ from the best trade scenario in that regard. But we do think it is more likely that the NAMs will ship about 90,000 vehicles to Japan than the 130,000 called for in the best case scenario. This is speculative, because it essentially reflects our doubts that Toyota will try to match Honda's level of NAM exports to Japan. We think they are more likely to export 10,000 or so, selling the other 40,000 vehicles in the U.S. market. This scenario, then sees a total NAM build of 1,865,000 vehicles.

We do not doubt the seriousness of the Japanese manufacturers' attempts to achieve high levels of domestic content in their vehicles. But we do think it will be difficult for them to move as rapidly as they might like. To be sure, trade friction and the strengthened yen give them ample motive to increase U.S. content at the expense of Japanese content. But locating and approving appropriate suppliers will take time. They will do well to reach 70% domestic content by 1993. We also feel that transplant suppliers are unlikely to achieve 75% domestic content by 1993. Granted, the strong yen will push these companies to increase U.S. content, but they are less directly affected by trade friction. Locating qualified U.S. suppliers also places a strain on their more limited resources. These transplant suppliers will do well to achieve 50% domestic content by 1993.

If the NAMs reach 70% CAFE domestic content, and their transplant suppliers reach 50% domestic content, then the import content of a NAM vehicle will fall to 77% of today's import content.

A number of the Japanese manufacturers, most notably Nissan and Toyota, are committed to being "full-line" manufacturers, and that means that they will compete aggressively in the light truck market. This is probably especially true of Toyota, whose long-term strategic plans call for impressive growth through 1995. We feel that Japanese light truck imports could well increase rather than decrease, and that 1993 imports might total 700,000, a 16% increase over 1988, and an increase to about 14% of the market. Given a more competitive orientation in this market, the NAMs are more likely to sell 90% of their light truck capacity, and that would yield another 459,000 sales, or another 9% of the market. Total Japanese

light truck sales and share, under this scenario, would be somewhat under 1.2 million light trucks, or 22% of the market.

This scenario maintains the level of Big Three exports to Japan at 30,000 vehicles. So total U.S. exports to Japan, including Big Three and NAMs will be on the order of 120,000 vehicles by 1993. That would be 33% of the expected import market in Japan, and may in fact still be somewhat optimistic.

This most likely scenario market is portrayed in Table 6. Compared to our best case, this scenario calls for higher vehicle imports, a richer mix of car imports, and increased NAM production at a higher proportion (77% vs. 60%) of today's Japanese content level.

Table 7 reflects our basic economic assumptions, and portrays a U.S. 1993 automotive import bill of about $39.5 billion from Japan in constant dollars, composed of $25 billion in cars, $3.6 billion in trucks, $7 billion in parts, and about $3 billion in other categories. U.S. exports to Japan increase to about $2.2 billion, up some 290% over their 1988 levels. This results in an increase of some 37% in the total deficit, to just over $37 billion constant dollars. This deficit will be $47.19 billion current U.S. dollars. The somewhat more favorable alternative economic assumptions of Table 8 yield a constant dollar deficit of $37.05 billion, or some 36% higher than 1988's deficit. The economic assumptions again have little effect on the 1993 deficit.

Our best and most likely scenarios portray 1993 automotive imports from Japan that differ by some $8.6 billion constant dollars, given our basic economic assumptions. The major source of this difference is in the car category. The higher volumes and richer mix of the most likely scenario predict $6.57 billion constant dollars more than does our best case, or 76% of the total difference between the scenarios. Parts, at $1.04 billion higher, account for some 12% of the difference, reflecting the higher volumes and Japanese content of the NAMs assumed in our most likely case. Trucks, at a difference of $0.99 billion, account for the balance. Our scenarios do not differentiate the "other" categories of either imports or exports. Our best case calls for constant dollar levels of exports to Japan that are some 23% higher, all due to the vehicle category, than does our most likely scenario.

These scenarios reflect specific assumptions and beliefs about developments in the automotive industry, in both its production and market aspects. Of course, readers may disagree with some or all of these. Appendix V provides the interested reader some approximate guides as to how changes in these assumptions would alter the dollar value of the expected deficits.

Table 6
1993 Market Most Likely
Passenger Car Trade Scenario
(Vehicles in 1000s)

Passenger Car Segment	Segment Share of Market	Japanese Import	Japanese NAMs	Total Japanese Sales
Subcompact	24%	423	1,049	1,472
Compact	33%	710	626	1,336
Intermediate	23%	387	0	387
Large/Luxury	20%	581	0	581
Total	100%	2,101	1,675	3,776

Passenger Car Segment	Japanese Share of Segment Sales	Segmentation of Japanese Imports	Segmentation of Japanese Sales
Subcompact	56%	20%	39%
Compact	37%	34%	35%
Intermediate	15%	18%	10%
Large/Luxury	26%	28%	15%
Total	—	100%	100%

Memo: Total Japanese marketshare: 34.3% of an 11 million unit market.

New American Manufacturer Build for Various Markets
(Vehicles in 1000s)

Segment	United States	Europe	Japan
Subcompact	1,049	80	25
Compact	626	20	65
Intermediate	0	0	0
Large/Luxury	0	0	0
Total	1,675	100	90

1993 Best Plausible Case Truck Trade Scenario
(Vehicles in 1000s)

U.S. Light Truck Japanese Imports	Japanese NAMs	Total Japanese Sales	Japanese Percent of Truck Market
700	459	1,159	22%

Memo: 5.2 million unit market.

Table 7
Most Likely Case
1993 U.S. - Japan Automotive Trade Balance
Basic Economic Scenario
(Billions of U.S. Dollars)

	1988	1993	
	Constant U.S. Dollars	Current U.S. Dollars	Constant U.S. Dollars
U.S. Imports from Japan			
Large	4.40	21.51	17.00
Small	14.88	10.52	8.32
Total Cars	19.28	32.03	25.32
Light Trucks	3.13	4.51	3.57
Parts	4.61	9.33	7.38
Other Vehicles	0.99	4.04	3.19
Total Imports	28.01	49.91	39.46
U.S. Exports to Japan			
Light Vehicles	0.27	1.89	1.50
Other	0.47	0.83	0.65
Total Exports	0.74	2.72	2.15
U.S. TRADE BALANCE	**-27.27**	**-47.19**	**-37.31**

VI. Discussion

The bilateral automotive deficit with Japan forms a substantial portion of the overall U.S. trade deficit, accounting for some 22% of the net 1987 current account deficit. The overall improvements in the U.S. trade situation from 1987 to 1988—20% in the current account—are remarkably insulated from the automotive trade deficit, where the improvement was 3%. It seems clear that further substantial improvement in the overall U.S. trade position will require a more balanced trade performance in the automotive sector. It is particularly important that the bilateral automotive deficit with Japan improve, since that accounts for about 50% of the U.S. automotive trade deficit.

Table 8
Most Likely Case
1993 U.S. - Japan Automotive Trade Balance
Alternative Economic Scenario
(Billions of U.S. Dollars)

	1988	1993	
	Constant U.S. Dollars	Current U.S. Dollars	Constant U.S. Dollars
U.S. Imports from Japan			
Large	4.40	20.97	16.90
Small	14.88	10.26	8.27
Total Cars	19.28	31.23	25.17
Light Trucks	3.13	4.40	3.55
Parts	4.61	9.07	7.31
Other Vehicles	0.99	3.94	3.17
Total Imports	28.01	48.64	39.20
U.S. Exports to Japan			
Light Vehicles	0.27	1.86	1.50
Other	0.47	0.81	0.65
Total Exports	0.74	2.67	2.15
U.S. TRADE BALANCE	**-27.27**	**-45.97**	**-37.05**

But this analysis suggests that the U.S.-Japan bilateral automotive trade deficit will at best marginally increase by 1993. The best plausible automotive case that we can construct suggests that the deficit will increase some 3.4% in constant dollar terms, and that general economic developments favorable to deficit reduction would reduce that increase to some 3%. A more likely automotive case forecasts a constant dollar deficit just under 37% larger than 1988, restrained to an increase of about 36% by more favorable economic developments. That is grim news indeed for those hoping to see continued reductions in the U.S. trade deficit.

Projections for any bilateral, product-specific trade balance are subject to a number of failings, including their failure to reflect the bilateral partners' activities involving third countries that might exacerbate or ameliorate the overall U.S. trade balance. There are three important possibilities of this kind that this bilateral analysis ignores. First, the overall U.S. automotive trade balance might be worsened by the domestic manufacturers' imports of vehicles from third countries as substitutes for vehicles they currently source from Japan. Thus we see the U.S. manufacturers de-

creasing their reliance on captive vehicles from Japan, but securing replacement vehicles from other nondomestic sources. We think the Japanese manufacturers might well continue to import the same number of vehicles, reassigning these current captives to their own dealer networks. This domestic strategy, then, would itself neither increase nor decrease the Japanese bilateral balance, but the U.S. worldwide balance would deteriorate. Second, the Japanese manufacturers might bring vehicles into the United States from their Canadian facilities. This would increase the U.S.-Canada, but not the U.S.-Japan, bilateral automotive deficit. Third, if the NAMs export vehicles to Europe, as we think likely, that will ameliorate the U.S.-European deficit. But it might well accelerate the U.S.-Japan deficit, as it draws in imported parts for increased production.

This focus on the bilateral automotive trade balance also ignores some purely financial flows that are directly tied to automotive trade, but are accounted elsewhere in trade statistics. For example, the NAMs have required investment flows from Japan to the United States, and will provide profit flows from the United States to Japan. These transactions are recorded in the overall current account, but are not reflected in the bilateral automotive trade statistics. The increasing importance of these NAMs in the evolving bilateral U.S.-Japan automotive trade suggests that these product-specific trade data will increasingly underestimate the true importance of automotive trade in the overall U.S. bilateral trade deficit with Japan.

This analysis, then, does not, and cannot, provide a complete and comprehensive picture of the total effects of U.S.-Japan automotive trade upon either the U.S.-Japan bilateral trade balance, or the worldwide U.S. trade balance. Nevertheless, it does provide important information about the single largest element of that bilateral trade, and offers insights into its role in broader trade issues.

What developments might make these automotive scenarios substantially different, and permit significant reductions in the bilateral automotive deficit? We are aware of three possibilities. The first possibility relies on a substantial shift in the U.S. automotive market, with the traditional Big Three becoming much more successful in competing with the Japanese. Since we see no reason to expect a substantial increase in domestic share in light of the product and capacity plans currently in place for 1993, this is at best a low probability development.

The second possibility relies on a strategic decision by the Japanese manufacturers to adopt a high substitution rate of NAMs for imports, and/or to restrict their future product offerings to the lower-value vehicles that now dominate their import mix. We think that is unlikely in light of their strategic goals and the business conditions they face, including pressures to maintain high levels of production in Japan. These individual companies, pursuing their best outcomes, are no more likely to adopt such decisions than are the domestic manufacturers likely to abandon the sourcing of captive imports by 1993.

The third possibility is government action. The Japanese and/or U.S. government might act to restrain Japanese exports to the United States, or take actions to encourage U.S. exports to Japan. We see no developments to date that suggest increased restraints on Japanese exports to the United States, so we see that as a low probability solution. This analysis suggests that increased U.S. exports to Japan is a remedy with, at best, little potential impact within the next five years. The realistic constraints of the U.S. manufacturers' limited experience in Japan, and the current size of the Japanese import vehicle market both suggest that even outstanding success will generate relatively low dollar-value U.S. exports to offset the high dollar-value Japanese imports into the United States.

Our analysis and projections, then, suggest a continuing serious problem in the U.S. bilateral automotive trade deficit with Japan. How much that deficit grows by 1993 will depend more upon the dynamics of automotive competition than on general economic developments, and our belief is that the 1993 bilateral deficit, in 1988:4 dollars, might well increase by some 37%.

APPENDIX I

Table and Graph Numerical Data

Table 1:
U.S. Current Account Balance

Year	Amount (Billions)
1988	-135
1987	-161
1986	-141
1985	-115
1984	-107
1983	-46
1982	-9
1981	7
1980	2

Table 2:
U.S. Merchandise Trade Deficit

Year	Amount (Billions)
1988	-137
1987	-171
1986	-156
1985	-134
1984	-122
1983	-64
1982	-38
1981	-35
1980	-31

Table 3:
U.S. Bilateral Merchandise Trade Deficit
with Canada and Japan
($ Billions)

Year	Japan	Canada
1988	55	11
1987	60	12
1986	59	13
1985	50	16
1984	37	15
1983	22	9
1982	19	9
1981	18	2

Table 4:
Two Largest Bilateral Deficits
as a Percent of U.S. Merchandise Deficit

Year	Japan	2nd Partner	Country
1988	40%	10%	Taiwan
1987	35%	11%	Taiwan
1986	38%	10%	Taiwan
1985	37%	12%	Canada
1984	30%	12%	Canada
1983	34%	14%	Canada
1982	50%	24%	Canada
1981	51%	23%	Nigeria

Table 5: U.S. Manufacturer Trade Balance

Year	Amount (Billions)
1988	-129
1987	-138
1986	-129
1985	-101
1984	-78
1983	-30
1982	-3
1981	16
1980	22

Table 6:
Manufacturer Deficit as a Percent of Merchandise Trade Deficit

Year	Percentage
1988	-94
1987	-81
1986	-83
1985	-75
1984	-64
1983	-47
1982	-8
1981	31
1980	43

Table 7:
U.S. Bilateral Manufacturers Trade Balance with Japan and Canada ($ Billions)

Year	Japan	Canada
1988	-71	0.2
1987	-68	-2.0
1986	-59	-2.0
1985	-48	-3.0
1984	-32	2.0
1983	-30	0.7
1982	-29	7.0

Table 8:
Two Largest Bilateral Deficits as a Percent of U.S. Manufacturer Trade Balance

Year	Japan	Taiwan
1988	0.51	0.15
1987	0.53	0.13
1986	0.58	0.14
1985	0.62	0.17
1984	1.07	0.30

Table 9:
U.S. Automotive Trade Deficit

Year	Amount ($ Billions)
1988	-59
1987	-61
1986	-57
1985	-44
1984	-33
1983	-24
1982	-18
1981	-13
1980	-12
1979	-10
1978	-10

Table 10:
Automotive Trade Deficit as a Percent of Other Trade Deficits

Year	Merchandise	Manufacturer	Current Acct.
1988	43%	46%	44%
1987	36%	44%	38%
1986	37%	44%	40%
1985	33%	44%	38%
1984	27%	42%	31%
1983	38%	80%	52%

Table 11:
1988 Trade Deficits and Change from 1987

Deficit	($ Billions)	Percent of 1987
Current Account	135	84%
Merchandise Trade	137	80%
Manufacturing	129	93%
Automotive	59	97%

Table 12a:
U.S.-Japanese Automotive Trade Data
($ Billions)

Year	U.S. Auto Deficit (Current $)	U.S. Auto Deficit (88:4 Constant $)	U.S. Auto Deficit (88:4 Constant ¥)	U.S. Auto Imports (88:4 Current $)
1988	27.69	28.14	3,608.32	28.43
1987	29.34	31.03	4,178.28	29.68
1986	31.85	34.93	5,303.80	32.12
1985	22.44	25.06	5,238.00	22.65
1984	17.39	20.13	4,360.24	17.60
1983	13.96	16.86	3,522.25	14.14
1982	11.92	14.86	3,260.77	12.09
1981	11.96	15.85	2,970.23	12.12
1980	10.48	15.30	2,705.30	10.65
1979	6.67	11.06	1,872.39	6.87
1978	5.95	10.99	1,582.28	6.12

Table 12b:
U.S.-Japanese Automotive Trade Data
($ Billions)

Year	U.S. Auto Imports (88:4 Constant $)	U.S. Auto Imports (Current ¥)	U.S. Auto Imports (88:4 Constant ¥)
1988	28.88	3,675.87	3,704.53
1987	31.39	4,164.21	4,226.12
1986	35.23	5,263.80	5,348.50
1985	25.31	5,173.20	5,288.20
1984	20.38	4,230.75	4,412.91
1983	17.07	3,344.55	3,566.75
1982	15.08	3,042.36	3,308.35
1981	16.06	2,695.30	3,010.11
1980	15.55	2,343.11	2,749.73
1979	11.38	1,528.66	1,927.45
1978	11.29	1,240.75	1,626.11

Memo: Table 12 data is used for Graphs 12, 13, and 15.

Table 13:
U.S. Automotive Exports to Japan
(Millions of Current U.S. Dollars)

Year	Total Automotive Goods	Passenger Cars	Non-Passenger Cars
1988	737	271	466
1987	340	72	268
1986	268	42	226
1985	215	19	196
1984	210	29	181
1983	177	31	146
1982	175	44	131
1981	160	47	113
1980	168	60	108
1979	196	117	79
1978	164	91	73

Memo: Table 13 data is used for Graph 14.

Table 14:
Japanese Automotive Imports to the United States
($ Billions)

Year	Vehicle Imports	Part Imports	Total Imports	Vehicle Value as a Percent of Total
1988	23.60	4.83	28.43	83%
1987	25.52	4.16	29.68	86%
1986	28.41	3.71	32.12	88%
1985	20.49	2.16	22.65	90%
1984	15.48	2.12	17.60	88%
1983	12.82	1.32	14.14	91%
1982	11.11	0.98	12.09	92%
1981	11.30	0.82	12.12	93%
1980	8.60	2.05	10.66	81%
1979	6.50	0.37	6.87	95%
1978	5.77	0.34	6.12	94%

Memo: Table 14 data is used for Graphs 16 and 17.

APPENDIX II

Comparative Trade Statistics

WEFA Base Case Scenario
(April 1989)

	1988	1989	1990	1991	1992	1993
United States						
Real GDP Growth (%)	4.0	3.1	1.7	3.2	3.2	2.7
Current Account Balance	-136.0	-142.0	-135.0	-136.0	-136.0	-138.0
Merchandise Trade Balance	-143.0	-140.0	-134.0	-137.0	-132.0	-129.0
CPI	4.1	5.2	5.2	4.8	4.6	4.3
Japan						
Real GDP Growth (%)	5.6	4.4	3.3	3.8	4.2	3.8
Current Account Balance	79.0	73.0	73.0	67.0	63.0	57.0
Merchandise Trade Balance	78.0	70.0	74.0	72.0	70.0	67.0
CPI	0.7	2.1	1.5	1.4	1.9	2.4
¥/$ Exchange Rate (Average)	128.0	124.0	113.0	109.0	107.0	105.0
U.S. Trade Balance with Japan	-49.0	-46.0	-46.0	-44.0	-41.0	-39.0
U.S. Exports to Japan	44.0	55.0	64.0	73.0	83.0	94.0
U.S. Imports from Japan	93.0	101.0	110.0	117.0	124.0	133.0

WEFA Base Case Scenario Alternative
(April 1989)

	1988	1989	1990	1991	1992	1993
United States						
Real GDP Growth (%)	4.0	2.7	0.2	2.4	3.1	3.4
Current Account Balance	-136.0	-141.0	-121.0	-110.0	-95.0	-92.0
Merchandise Trade Balance	-143.0	-139.0	-124.0	-116.0	-106.0	-85.0
CPI	4.1	4.9	4.7	4.2	4.1	4.2
Japan						
Real GDP Growth (%)	5.6	4.6	5.2	4.0	4.0	3.1
Current Account Balance	79.0	72.0	65.0	55.0	47.0	39.0
Merchandise Trade Balance	78.0	68.0	60.0	54.0	50.0	46.0
CPI	0.7	2.4	1.5	1.4	1.7	3.0
¥/$ Exchange Rate (Average)	128.0	124.0	122.0	118.0	111.0	110.0
U.S. Trade Balance with Japan	-49.0	-44.0	-43.0	-37.0	-31.0	-27.0
U.S. Exports to Japan	44.0	56.0	63.0	72.0	82.0	93.0
U.S. Imports from Japan	93.0	100.0	106.0	109.0	113.0	120.0

APPENDIX III

A Model of 1993 Japanese Automotive Dollar Imports to the United States

Introduction

This Appendix details the empirical model used to forecast the nominal and real levels of Japanese automotive imports to the United States in 1993. Automotive exports from Japan to the United States are both large in dollar volume and varied in markets. We develop a diferentiated accounting approach to estimation in order to reflect this situation. Total Japanese auto imports ($JIMP) are disaggregated into six categories, separately estimated, then combined into a summed estimate of the total. The six categories are:

1. Imports of four cylinder engine passenger cars.
2. Imports of six cylinder and above engine passenger cars.
3. Imports of gasoline light trucks.
4. Parts and components for Japanese NAM vehicle (transplants) production.
5. Parts and components for the Japanese light vehicle aftermarket.
6. Other motor vehicle imports (e.g. heavy trucks).

We initially assume that import quantity is determined by the following general demand relationship for the first three categories:

$$IQ(t) = f[PJ(t), PD(t), CPI(t), GNP(t), Other(t)]$$

Where IQ is import quantity, PJ is Japanese price in the United States, PD is competitive domestic price, CPI is the consumer price index, GNP the U.S. Gross National Product, and "Other" a series of control variables, such as the interest rate, U.S. industry capacity utilization, and so on.

An important determinant of change in quantity demanded of an import is relative price elasticity. Relative import price elasticity, η_{import}, measures the percentage change in imports relative to the percentage change in the ratio of import price to domestic price:

$$\eta_{import} = - \frac{\%\ \text{Change in } Q_{import}}{\%\ \text{Change in } [P_{import} / P_{domestic}]}$$

We successfully estimated the relative price elasticity for the case of total automotive imports to the United States. We regressed quarterly data on real imported auto product shipments (371IMP) on relative import price (RELPRICE), the consumer price index (CPI), real disposable income (DISINC), and the rate of capacity utilization (CAPUT) for SIC 371. The estimation period covered 1982:3 through 1987:3.[20] A Koyck specification and results, with coefficient t-statistics in parentheses, follows:[21]

$$\begin{aligned}\ln[371IMP(t)] = {} & -23.546 - 3.321\ln[RELPRICE(t)] + \\ & \underset{(-2.91)}{} \quad \underset{(-2.66)}{} \\ & 2.253\ln[CPI(t)] + 3.778\ln[DISINC(t)] \\ & \underset{(2.03)}{} \quad \underset{(2.88)}{} \\ & \\ & 0.166\ln[CAPUT(t)] + 0.390\ln[371IMP(t-1)] \\ & \underset{(.354)}{} \quad \underset{(1.63)}{} \\ & \text{R-Square} = .894 \quad \text{F-Stat} = 37.9 \quad n = 23\end{aligned}$$

Thus, relative import price elasticity, η_{IMPORT}, is estimated to be -5.6 (-3.321 * [1 / (1 - .390)]).

We made a similar attempt to estimate relative price elasticity for Japanese imported passenger cars to the United States. We constructed a weighted price for the three major importers (Toyota, Nissan, and Honda), on a model year basis, for the period 1972 through 1988, and a matching domestic price series for the three largest domestic producers. We then regressed sales of passenger cars for the three major importers on relative price and a series of control variables, as in the case of general automotive imports. Despite the use of a variety of specifications, we could not obtain a significant coefficient for the log of relative price. In fact, additional attempts to estimate "own" price elasticity for Japanese passenger car sales in the United States (Weighted car price relative to the CPI index) also failed.

This failure to estimate "own" price elasticity in a long-term specification is not surprising. Previous attempts to estimate long run price elasticity for motor vehicles in the United States have demonstrated either insignificant or low value

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[20] Import shipments data was collected from the FT990 publication of the Foreign Trade Statistics Division of the Bureau of the Census. Import and domestic producer prices were supplied by the Bureau of Labor Statistics' Labstat Series Report program. Other data was taken from the Citibase aggregate data set produced by CitiCorp and accessed through the University of Michigan's Michigan Terminal System.

[21] The general specification for the estimated relative import price elasticity was suggested by the model described in Ch. 2 of Robert Stern and Edward Leamer, *Quantitative International Economics*, Aldine Publishers, Chicago, 1970.

(inelastic) coefficients.[22] However, the failure to find empirical evidence of relative price elasticity between Japanese and U.S. passenger cars is surprising. One possible explanation is that there was a continuing shortage of Japanese passenger car imports at given consumer preferences and prices throughout the analysis period.[23] However, closer inspection of the available data provides a more likely explanation. There was very little variance in the log of the relative price variable. During the 1972-1988 period, Japanese auto price increases tended to match closely price increases implemented by U.S. domestic producers. The lack of variance in the explanatory variable, then, may account for our poor estimation results. **Japanese importers and domestic manufacturers matched their U.S. vehicle price increases, presumably for competitive reasons. In other words, competitors in the U.S. motor vehicle market, foreign and domestic, may have followed an oligopoly pricing pattern similar to that observed in the industry in the years prior to significant foreign competition**. The major differences to past behavior may have to do with who is now the price leader and what now constitutes the overall objective market goals of the major competitors. Our data do not permit identification of who is the "price-leader." This pattern has important ramifications for future levels of the dollar value of Japanese automotive imports to the United States.

Import demand for Japanese motor vehicles is thus assumed to be price inelastic. A completely separate model, described elsewhere, is employed to estimate levels of Japanese imported motor vehicles in 1993. As will be seen below, forecast levels of Japanese imported vehicle sales are used directly to estimate related levels of Japanese imports in constant dollars.

Model and Estimation

A separable accounting method is used to estimate dollar values of each type of Japanese automotive exports to the United States in 1993. Overall parts imports are split into two major components: demand resulting from transplant production, and aftermarket demand from the stock of operating Japanese light vehicles. Three separate categories of light vehicle imports are estimated. These estimates rely on unit sales forecasts described elsewhere in this report, and estimates of constant unit custom values produced especially for this forecast. The constant dollar levels of

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[22] See for example: S.H. Hymans, "Consumer Durable Spending: Explanation and Prediction," *Brookings Papers on Economic Activity*, no. 2, pp.173-199, 1970.

[23] This raises the immediate question of whether recent (since 1985) Japanese vehicle price increases have reached an elastic portion of their demand curve in the United States. At the extreme, Japanese relative import price elasticity could be expected to reach levels estimated for all imported vehicles (-5.6). There is no current way to check this possibility except through the use of recent monthly data on prices and sales which were unavailable at the time of this study.

parts and and vehicle imports are adjusted to forecast current dollar levels for 1993 through a special empirical transformation. The general import level estimation model is the following:

$$\begin{aligned}\$JIMP(t) = F[&IMPSMALLCARS(t), \$CV(SCAR),\\ &IMPLARGECARS(t),\\ &\$CV(LCAR), IMPTRUCKS(t), \$CV(TRUCK),\\ &\$TRANSPARTS(t), \$OTHERPARTS(t),\\ &\$OTHERIMPORTS(t)] \times CVINDEX(t)\end{aligned}$$

The first three vehicle variables are measured in units and affect current Japanese imports through expected levels of average custom value per unit ($CVs) in constant dollars. The three dollar denominated import categories are measured in constant dollars and must be corrected through an index of custom value as well. We assume that average custom value for both vehicles and parts is related to current Japanese price in the United States. The CVINDEX(t) variable is meant to represent the influence of Japanese current import price changes upon current custom values for the various categories of imports.

The additive model starts with the estimation procedures followed for the parts component markets, then vehicle markets, followed by the final value correction for increases in the CVINDEX(t).

Imports of Parts and Components

Data on dollar levels of Japanese imports of parts and components were collected from the International Trade Administration (ITA) for the period 1978-1988. We transformed these data to quarterly observations, making them constant through the use of the Consumer Price Index-Wages (CPI-W). Imports of constant dollar levels of parts and components used in the production of transplant vehicles in the United States is estimated by the following relationship:

$$(1)\ \$TransParts(t) = g[TransProduction(t+1)]$$

A simple linear specification is employed to estimate the parts coefficient for transplant production. We regress total Japanese imports of parts and components (1988 dollars) on led transplant production (cars and trucks). Twenty-four quarters of observations were used in the estimation (1983-1988), which covered the period of active Japanese NAM production in the United States. The simple regression results were as follows:

Least Squares Regression

ANALYSIS OF VARIANCE OF $TRANSPARTS N= 24 OUT OF 25

SOURCE	DF	SUM SQRS	MEAN SQR	F-STAT	SIGNIF
REGRESSION	1	.15450+13	.15450+13	154.59	0000
ERROR	22	.21987+12	.99942+10		
TOTAL .	23	.17649+13			

MULT R= .93564 R-SQR= .87542 SE= 99971.

VARIABLE	PARTIAL	COEFF	STD ERROR	T-STAT	SIGNIF
CONSTANT		.35775 +6	40280	8.8818	.0000
TRANSPRO(+1)	.93564	3.5760	.28761	12.434	.0000

TRANSPRO(+1) is transplant production in units one quarter subsequent to the import of components used in transplant production. Transplant production, the only explanatory variable for this category of imports, is estimated separately elsewhere in this report. Results show that on the average, each unit of transplant production can be associated with roughly $3,600 of parts and components imported in the previous quarter. This value is used with forecasted levels of 1993 production and domestic content level of Japanese transplants to estimate the dollar value of parts imports from this source of import demand.

Aftermarket constant dollar imports of parts and components are estimated through the following simple general model:

$$(2)\ AFTERPARTS\$(t) = h[JStock(t)]$$

JStock(t) is the stock of operating Japanese light vehicles in the United States in period t.[24] We could not estimate dollar imports of parts and components related to aftermarket demand simultaneously with transplant parts demand in a general parts imports equation because of strong multicollinearity between the two explanatory variables. Instead, a separate estimation of the relations between operating stock and parts imports was performed for the period 1978-1982 (20 quarters). The results are as follows:

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[24] Stock levels for the 1978-1988 period were estimated on the basis of actual Japanese imported passenger car sales in the United States for the period 1964-1988 and published survival rates by vehicle age listed in *MVMA Motor Vehicle Facts & Figures '88*, Motor Vehicle Manufacturers Association of the United States, Detroit, 1988, p.29. For the forecast period, it was necessary to estimate annual Japanese light vehicle sales from 1989-1993 through the use of a trending analysis.

Least Squares Regression

ANALYSIS OF VARIANCE OF AFTERPARTS$ N= 20 OUT OF 20

SOURCE	DF	SUM SQRS	MEAN SQR	F-STAT	SIGNIF
REGRESSION	1	.28751+12	.28751+12	5.9746	.0250
ERROR	18	.86621+12	.48123+11		
TOTAL	19	.11537+13			

MULT R= .49920 R-SQR= .24921 SE= .21937 +6

VARIABLE	PARTIAL	COEFF	STD ERROR	T-STAT	SIGNIF
CONSTANT		-.25695 +6	.25210 +6	-1.0193	.3216
STOCK	.49920	49249.	20149.	2.4443	.0250

About $49.25 (1988 dollars) worth of parts imports are associated with each unit of operating Japanese automobile stock. This coefficient is used with an estimated 1993 level of overall operating Japanese vehicles (in the U.S.) to determine the level of estimated aftermarket parts imports from Japan for that year.

Other Vehicle Imports

A simple trend estimation is used to forecast future levels of other motor vehicle constant dollar imports, excluding vehicles and parts covered elsewhere:

(3) OTHERIMPORTS$(t) = O[t]

A simple exponential trend is fitted to this category of imports for the 44-quarter estimation period (1978-1988). Growth in "other imports" was particularly strong during the second half of the period, averaging almost 7% quarterly growth. The quarterly exponential growth rate is estimated as follows:

Least Squares Regression

ANALYSIS OF VARIANCE OF LNOTHERIMPORTS$ N= 44 OUT OF 44

SOURCE	DF	SUM SQRS	MEAN SQR	F-STAT	SIGNIF
REGRESSION	1	33.652	33.652	401.93	.0000
ERROR	42	3.5164	.83725 -1		
TOTAL	43	37.168			

MULT R= .95152 R-SQR= .90539 SE= .28935

VARIABLE	PARTIAL	COEFF	STD ERROR	T-STAT	SIGNIF
CONSTANT		9.8500	.88752 -1	110.98	.0000
TIME	.95152	.68870 -1	.34352 -2	20.048	.0000

Starting with an actual value of $.989 billion in 1988:4 the level of OTHERIMPORTS$ is trended using the estimated growth rate through 1993. The final four values for that year are summed to yield the annual forecast level.

Light Vehicles

The remaining elements of the model involve the estimation of the expected Customs Value (CVs) for the three vehicle categories. We planned to regress constant dollar levels of Japanese passenger car imports on units of 4-cylinder and 6 cylinder automobile imports to fit the following general model:

$$\$CARIMPORTS(t) = C[IMPSMALLCARS(t) + IMPLARGECARS(t)]$$

However, reliable data on unit imports for the two separate categories of passenger cars are not available in the ITA data set. Therefore, we estimated total passenger car imports from Japan for the 1978:1 through 1988:4 period from ITA data published in other sources. We then regressed this unit variable (CARUN) on total dollar custom values for passenger car imports (ALLCAR$):

Least Squares Regression

ANALYSIS OF VARIANCE OF ALLCAR$ N= 44 OUT OF 44

SOURCE	DF	SUM SQRS	MEAN SQR	F-STAT	SIGNIF
REGRESSION	2	.59828+14	.29914+14	187.35	.0000
ERROR	41	.65465+13	.15967+12		
TOTAL	43	.66375+14			

MULT R= .94941 R-SQR= .90137 SE= .39959 +6

VARIABLE	PARTIAL	COEFF	STD ERROR	T-STAT	SIGNIF
CONSTANT		-.66341 +6	.37159 +6	-1.7854	.0816
CARUN	.74860	6.7226	.92987	7.2296	.0000
TIME	.71857	46981.	7101.2	6.6160	.0000

The results indicate a custom import value of $6,722 (1988 dollars) for each additional import unit. A linear time trend is also included in the estimation. This trend value indicates that overall dollar imports of passenger cars grew at a rate of $47 million per quarter since 1978:1.

These simple linear results for car imports do not reflect the most sensitive determinant affecting the level of Japanese automotive dollar imports to the United States: the increasing proportions of larger, more expensive vehicles in the import vehicle mix. We collected alternative information for the 1988 period to estimate, through inspection, the average custom value of larger Japanese car imports.

The ITA reported a total of 2,123,051 passenger car imports in 1988. We determined that 232,085 of this total were cars containing 6 cylinder engines.[25] The ITA aggregate 1988 custom value for such cars totaled $4.399 billion. The quotient of dollar value to import units is then

$$\$18{,}954 = \$CV(LCAR) = (5).$$

The ITA aggregate custom value for 4 cylinder passenger cars was $15.019 billion. When this total is divided by the remaining small car import total of 1,890,966, the quotient is

$$\$7{,}942 = \$CV(SCAR) = (4).$$

These two unit custom value estimates are used directly to calculate 1988 dollar value levels of Japanese imported passenger cars in 1993.

We use ITA unit import levels (TRUCKUN) for light trucks in a simple regression estimation to estimate $CV(TRUCK), as follows:

$$\$TRUCKIMPORTS(t) = X + Y[IMPTRUCK(t)] + E(t)$$

So that,

$$(6)\ \$CV(TRUCK) = Y$$

Least Squares Regression

ANALYSIS OF VARIANCE OF IMPRUCK$ N= 44 OUT OF 44

SOURCE	DF	SUM SQRS	MEAN SQR	F-STAT	SIGNIF
REGRESSION	1	.34942+13	.34942+13	594.58	0000
ERROR	42	.24682+12	.58767+10		
TOTAL	43	.37410+13			

MULT R= .96645 R-SQR= .93402 SE= 76660.

VARIABLE	PARTIAL	COEFF	STD ERROR	T-STAT	SIGNIF
CONSTANT		12730.	32613.	.39033	.6983
TRUCKUN	.96645	5.3218	.21825	24.384	.0000

Each additional truck imported to the United States is associated with$5,322 of 1988 dollar imports over the 1978:1 through 1988:4 period. This value of

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[25] We assume that sales totals of such cars one quarter subsequent to the import period form a reasonable proxy for actual imports. Unit sales data for the 1988:2 through 1989:1 period were collected for the following large engine models: Toyota's Cressida, Supra and Camry (V6); Nissan's 200SX, 300ZX and Maxima; Honda's Accura Legend.

$CV(TRUCK) is used to estimate 1993 levels of dollar imports due to light truck imports.

The Correction to Current Dollars

Thus far, we estimate the components of the import trade model in constant 1988 dollars. However, average custom value for vehicles and components can be expected to rise because of some "pass through" from changes in the real yen to dollar exchange rate or price inflation of Japanese auto products in the United States. If changes in current dollar unit custom value are related to changes in current dollar sale price, both the relationship between custom value and price, and estimates of future levels of Japanese prices must be determined. Natural log values of a weighted nominal price series for the three largest Japanese vehicle importers (LNJPRICE) was first regressed upon the natural log of the real yen to dollar exchange rate (LNREALEXCH)[26] The results are as follows:

Least Squares Regression

ANALYSIS OF VARIANCE OF LNJPRICE N= 17 OUT OF 17

SOURCE	DF	SUM SQRS	MEAN SQR	F-STAT	SIGNIF
REGRESSION	1	3.0008	3.0008	280.10	.0000
ERROR	15	.16070	.10713 -1		
TOTAL	16	3.1615			

MULT R= .97425 R-SQR= .94917 SE= .10351

VARIABLE	PARTIAL	COEFF	STD ERROR	T-STAT	SIGNIF
CONSTANT		4.6823	.55110 -1	84.963	.0000
LNREALEXCH	-.97425	-.88586	.52931 -1	-16.736	.0000

Results show that approximately -88% of changes in the real yen to dollar exchange rate were "passed through," on the annual average, to passenger car price during the 1972-1988 period. But this simple relation may be inadequate for forecasting future Japanese price levels through 1993. In the past, it is quite likely that a portion of the change in Japanese automotive price could be explained by a desire to closely match or restrain U.S. competitor prices for competitive purposes, perhaps to maximize or maintain market share. We develop an alternative specification which includes a strong proxy for U.S. vehicle price in the 1972-1988 period to relate Japanese price changes to U.S. vehicle price change. The proxy is the CPI-W for the United States:

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[26] The real yen exchange rate is merely the annual average yen/dollar exchange rate divided by the average annual Japanese CPI for that year.

$$\ln[JPRICE(t)] = a + b\ln[REALEXCH(t)] + c\ln[CPI(t)] + e(t)$$

The inclusion of this additional variable[27] produces superior estimation results, as follows:

Least Squares Regression
ANALYSIS OF VARIANCE OF LNJPRICE N= 17 OUT OF 17

SOURCE	DF	SUM SQRS	MEAN SQR	F-STAT	SIGNIF
REGRESSION	2	3.1399	1.5699	1015.4	.0000
ERROR	14	.21646 -1	.15461 -2		
TOTAL	16	3.1615			

MULT R= .99657 R-SQR= .99315 SE= .39321 -1

VARIABLE	PARTIAL	COEFF	STD ERROR	T-STAT	SIGNIF
CONSTANT		4.7159	.21234 -1	222.09	.0000
LNYENINX	-.83341	-.34257	.60713 -1	-5.6425	.0001
LNCPIW	.93022	.80125	.84488 -1	9.4836	.0000

These results indicate that during the 1972-1988 period, a 10% decline in the real yen exchange rate resulted in a 3.4% increase in nominal Japanese passenger car price (e = -.34) controlling for relative changes in the U.S. CPI-W. A 10% increase in the U.S. CPI-W typically resulted in a 8% increase in Japanese nominal price if the effect of the real yen exchange rate is controlled.[28]

Two sets of forecast values through 1993 were available for the real yen exchange rate and the U.S. CPI-W. Estimation results from the CPI-W included real exchange model were used to project increases in the Japanese nominal price index using a 1988:4 base. A second major question focuses on the effect of these increases on average unit custom value. We constructed an index of average unit custom value for all passenger car imports (the largest import category) for the 1978-1988 period.[29] We regressed the log of the unit custom value index on the log of the index of nominal Japanese price:

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[27] All prices, the exchange rate, and the CPI-W were indexed to the starting data point, 1972.

[28] A larger elasticity, .96, was found to exist between U.S. domestic price and Japanese price. Since forecast values of U.S. domestic price levels were not available through 1993 and because a separate regression indicated a .96 elasticity between U.S. domestic car prices and the CPI-W, the Japanese price estimation was controlled for CPI-W.

[29] This involved dividing annual average custom values by the 1978 average custom value, creating a 1978-1988 index of average custom value.

Least Squares Regression

ANALYSIS OF VARIANCE OF LOGCVINDEX N= 10 OUT OF 17

SOURCE	DF	SUM SQRS	MEAN SQR	F-STAT	SIGNIF
REGRESSION	1	.12448	.12448	12.738	.0073
ERROR	8	.78179 -1	.97723 -2		
TOTAL	9	.20266			

MULT R= .78373 R-SQR= .61424 SE= .98855 -1

VARIABLE	PARTIAL	COEFF	STD ERROR	T-STAT	SIGNIF
CONSTANT		-3.3141	.96983	-3.4172	.0091
LNJPRICE	.78373	.59470	.16663	3.5690	.0073

This analysis suggests there is a significant elasticity coefficient of .60; on the average, a 10% increase in the level of Japanese nominal price results approximately in a 6% increase in unit custom value. The CVINDEX(1993) was estimated as follows:

(7) CVINDEX(1993) = .60 X [%Change in JPRICE(1988-1993)] + 1

Since there were two matched forecasts of the real yen/dollar exchange rate and the U.S. CPI-W, two separate CVINDEX(1993)s were calculated. The "strong yen" version results in a forecast price increase of 17.3% in the nominal dollar index of Japanese automotive imports. A "weak yen" forecast produces a 14.3% increase in the index, with 1988:4 set to 100.

The actual estimation model for the 1993 nominal level of Japanese imports is then the following (equation numbers, rather than equations are used for clarity):

(10) $JIMP = (7) x {[(1) x DOMCONTENT(1993)] + (2) + (3) +
[(4) x IMPSMALLCARS(1993)] +
[(5) x IMPLARGECARS(1993)] +
[(6) x IMPTRUCKS(1993)]}

We use forecast levels for imports of small cars, large cars, light trucks, and NAM production in 1993 to specify the model. These forecasts are discussed in the body of the report. **Alternative forecasts of Japanese unit sales and NAM build in 1993 could be used to produce alternative levels of dollar-denominated automotive imports to the United States.** Four separate estimates of the level of automotive imports are presented in tables 4-5 and 7-8. They correspond to the two alternative sales forecasts, and the two yen/dollar, U.S. CPI-W forecasts employed by this study. The nominal level of these alternative

levels of $JIMP can be converted to real dollars for any base year through the use of a CPI index.

APPENDIX IV

Listing of Vehicles and Components Included in Various Model/Component Categories

JAPANESE IMPORTS TO THE UNITED STATES

Passenger Car
Autos, new 4 cylinder, other than station wagons & vans
Station wagon autos under 63 inches 4 cylinders
Automobiles, over 4, not over 6 cylinders
Automobiles, new, except piston engine type

Trucks
Automobile trucks, gasoline

Parts
Auto air conditioners and parts
Auto filters for piston engines
Automotive 6-12-24 voltage regulators and parts
Automotive laminated glass
Axle spindles, motor vehicle
Battery charging generators and alternators
Beam hanger brackets
Bodies (incl cabs), truck
Bodies for motor buses
Bodies, motor vehicle
Bodies, passenger automoble
Bodies, truck tractor
Brake drums and rotors
Cast iron parts for motor vehicle not alloyed
Cast-iron parts for internal combustion engines
Chain sprock, u-joints, etc. and parts
Chassis for motor buses
Chassis, auto truck tractors
Chassis, motor vehicle, not specified
Chassis, passenger car
Chassis, truck, 26000-33000 pounds GVW
Chassis, truck, except gasoline, under 19500 pounds GVW
Chassis, truck, gasoline under 6000 pounds GVW
Chassis, truck, gasoline, 6000-10000 pounds GVW
Chassis, truck, gasoline, over 10000 pounds GVW
Chassis, truck, over 33000 pounds GVW

Parts (continued)
Complete radiators, motor vehicles
Compressors, air conditioners & refrigeration for motor vehicles
Connecting rods for piston-type engines
Crankshafts auto diesel engines
Distributor contact point sets, for internal combustion engines
Electic starting and ignition equip., int. comb. civil a/c engines
Electric lighting equipment for motor vehicles & parts
Fans and blowers for motor vehicles
Forged sprock & segments
Glass lenses filters and parts
Glass reflector lenses, buttons, etc.
Hubcaps and wheel covers
Ignition coils for internal combustion engines
Ignition wire sets for transportation equipment
Motor vehicle body stampings
Motor vehicle bumpers
Motor vehicle pumps for liquids
Motor vehicle wheels
Mufflers and tailpipes
Other brake parts for motor vehicles
Parts for radiators except cores
Parts, not specified, of motor vehecles
Parts, not specified, piston auto diesel engine
Piston-type auto engine except diesel used
Piston-type auto, truck, and bus engine
Radiator cores
Sealed beam filament lamps 6 inches & over
Sealed beam filament lamps under 6 inches
Seat belts for motor vehicles
Shock absorbers, motor vehicle
Spark plugs
Starter and ignition equipment, engine
Starting motors
Transmissions for motor vehicles not specified
Transmissions for passenger cars
Transmissions, truck & motor bus

Other
Automobile truck valued under $1000
Automobile trucks, diesel
Jeep, cargo, utility vehicles, passenger
Mobile cranes
Motor buses, except gasoline

Other (continued)
Motor buses, gasoline
Motor vehicles which operate on runners or skis
Motor vehicles, not specified
Other, cargo, utility vehicles, over 63 inches
Other, cargo, utility vehicles, under 63 inches
Passenger automobiles used
Piston-type diesel engines for marine
Special purpose vehicles, not specified
Tractor/trailer combination, gasoline
Truck tractors shipped separate
Truck trailers except van type, not specified
Truck trailers, van type

UNITED STATES EXPORTS TO JAPAN

Passenger Vehicles
Passenger cars, new, 6 cylinders & under
Passenger cars, over 6 cylinders

Other
Air conditioning machines, except compressor
Automobile tires pneumatic new except recapped and radial
Automotive hardware except hinges and butts of base metal
Automotive hinges & butts of base metals
Axles for motor vehicle except truck trailors
Axles for truck trailers
Bodies, motor bus
Bodies, motor vehicle, not specified
Bodies, passenger automobile
Bodies, truck (incl cabs)
Bodies, truck tractors
Body stampings, motor vehicle
Brake linings & pads, motor vehicle
Brakes & parts, motor vehicle
Bumpers, motor vehicle
Cable cranes, crawler mounted
Cable cranes, truck mounted
Cable cranes, wheel mounted
Camper coaches, new, 5th wheel & king pin type
Chassis for trucks & truck tractors, not specified
Chassis for trucks 6000-10000 pounds G.V.W
Chassis for trucks, gasoline, not over 6000 pounds G.V.W

Other (Continued)
Chassis for trucks, over 10000 pounds G.V.W
Chassis, motor bus
Chassis, passenger car
Clutch facings & linings, motor vehicles
Compressors, automotive & truck, air conditioning & refrigeration
Distributors for internal combustion engines
Electrical equipment and parts for internal combustion engines
Electrical lighting & parts for motor vehicle
Fans & blowers for motor vehicles
Fire engines
Fuel pumps for compression-ignition engines
Gasoline engines, automotive, truck and buses
Hardware for transportation equipment except motor vehicles
Hubcaps & wheel covers
Hydraulic cranes, truck mounted
Ignition coils internal combustion engines
Ignition wiring sets
Light truck tires newpneumatic new except recapped & radial
Mobile hydraulic cranes, not Specified
Motor buses, new, gasoline
Motor buses, new, not specified, including diesel
Motor buses, used
Motor homes
Motor vehicle chassis, not specified
Motor vehicle pumps for liquids, not specified
Motor vehicle wheels to be mounted pneumatic tires
Motor vehicles, not specified
Motor, spot, fog and auxiliary lighting vehicular except motor vehicles
Mufflers & tailpipes, motor vehicle
Off-highway trucks, new rear dump diesel 71-100 ton
Off-highway dump trucks 31-45 ton
Off-highway trucks, new rear dump diesel 46-70 ton
Parts not specified, for diesel engines, automotive, trucks, buses
Parts not specified, for gasoline engines, automotive, trucks, buses
Parts, not specified, for motor vehicles, cast iron
Parts, not specified, motor vehicle
Passenger automobiles, used
Passenger cars, new, not specified
Radial automobile tires pneumatic new except recapped
Radial light truck tires pneumatic new except recapped
Radial truck & bus tires pneumatic new except recapped, not specified
Radiators, motor vehicle
Sealed beam filament lamps 6 inches & over

Other (Continued)
Sealed beam filament lamps under 6 inches
Shock absorbers, motor vehicle
Spark plugs for internal combustion engines
Special purpose vehicles non-military, not specified
Springs for motor vehicle suspension, iron or steel
Starter motors internal combustion engines
Transmissions, motor vehicle, not specified
Transmissions, passenger car
Transmissions, truck & bus
Truck & bus tires pneumatic new except recap & radial, not specified
Truck tractors, diesel, new under 44000 pounds G.V.W
Truck tractors, diesel, new, over 44000 pounds G.V.W
Truck tractors, gas, new, over 44000 pounds G.V.W
Truck tractors, new, gas under 44000 pounds G.V.W
Truck tractors, used
Truck trailer, tank type, 5th wheel & king pin type, new
Truck trailers, new, 5th wheel or king pin type, not specified
Truck trailers, platform type, 5th wheel, new
Truck trailers, used, 5th wheel or king pin type
Truck trailers, van type, 5th wheel & king pin type
Trucks diesel, new, 16001-26000 pounds G.V.W.
Trucks diesel, new, 26001-33000 pounds G.V.W
Trucks diesel, new, 33001-44000 pounds G.V.W
Trucks diesel, new, not over 16000 pounds G.V.W
Trucks gasoline new 19501-26000 pounds G.V.W.
Trucks gasoline new 26001-33000 pounds G.V.W.
Trucks gasoline new 33001-44000 pounds G.V.W.
Trucks gasoline new 6000 pounds GVW & under
Trucks new gasoline 10001-14000 pounds G.V.W.
Trucks non-military gasoline, new, over 44000 pounds G.V.W.
Trucks, all fuels and sizes, used
Trucks, Non-military, new diesel, over 44000 lbs GVW not off h-way
Trucks, non-military, new gasoline 6000-10000 pounds GVW
U.S. Exports to Japan
Vehicles operating on runners & skis

APPENDIX V

SENSITIVITY ANALYSIS INFORMATION

Our regression analysis provides unit dollar values for the four categories of automotive imports, as detailed in Appendix III. These unit values are then multiplied by the numbers appropriate to our scenarios, and then corrected in two ways to arrive at the values displayed in Tables 4, 5, 7, and 8. This Appendix identifies those values, and provides some rules that permit adjusting them in light of alternative assumptions the reader may find more persuasive.

JAPANESE EXPORTS TO THE UNITED STATES

The unit values times the number of units must be adjusted to current 1993 dollars. This adjustment is likely Japanese price increases, reflecting changes in the real yen/dollar exchange rate. The actual adjustment depends on the economic scenario selected. For the base economic scenario, the estimated value in 1988:4 dollars must be increased by 17.2%, while the alternative economic scenario implies an increase of 14.3%. These calculations yield the current 1993 dollar values of the correction (the middle column of the appropriate table).

These derived values must then be deflated to 1988:4 dollars to yield the entries comparable to the right-hand column of the appropriate table. Again, the correction factor depends on the economic scenario selected. The base scenario requires dividing the 1993 current dollar estimate by 1.264, since 26.4% is the expected CPI increase. For the alternative scenario, 1.241 is the appropriate divisor.

For large cars, small cars, and light trucks:

1) Begin by multiplying the unit values times the units you wish to subtract or add to the projection in the table.

For Tables 4 and 7 (BASE SCENARIO),

2) Current 1993 dollar correction factor: multiply the result of step 1 by 1.172;

3) For 1988:4 dollar value: divide step 3 by 1.264.

For Tables 5 and 8 (ALTERNATIVE SCENARIO),

2) Current 1993 dollar correction factor: multiply the result of step 1 by 1.143;

3) For 1988:4 dollar value: divide step 3 by 1.241.

If you wish to go directly to 1988:4 dollars, multiply step 1 by 0.927 (1.172/1.264) for the base scenario, or by 0.921 (114.3/1.241) for the alternative scenario.

Vehicles

Our regression results indicate that Japanese large car imports have a unit value of $18,954 1988:4 dollars. A 10,000 unit large car addition or subtraction from these projections would yield the following value changes, using $18,950 per vehicle:

Table 1
Large Cars - Change in Value With 10,000 Unit Import Variation
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$222.1	$175.7
Alternative Table 5 and 8	216.6	174.5

Table 2
Small Cars - Change in Value With 10,000 Unit Import Variation
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$93.1	$73.6
Alternative Table 5 and 8	90.8	73.1

Unit light truck value is $5,320, so a 10,000 unit change would yield these correction values:

Table 3
Light Trucks - Change in Value with 10,000 Unit Import Variation
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$62.4	$49.3
Alternative Table 5 and 8	60.8	49.0

Parts

Our regression results indicate that each NAM unit of car and truck production is associated with $3,600 in part imports from Japan. So a 10,000 unit change in

transplant production at current levels of domestic sourcing would yield the following correction values:

Table 4
Parts - Change in Value With 10,000 Unit Transplant Variation
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$42.2	$33.4
Alternative Table 5 and 8	41.1	33.2

A separate calculation of part imports as a function of the NAMs' level of domestic content is required. We assume that current imports reflect a 55% domestic content level, and therefore a 59% imported content level. But this drops to 36% in our best automotive case and to 46% in our most likely case. Therefore, we multiply our expected value by 0.61 (0.36/0.59) in our best case, and by 0.78 (0.46/0.59) in our most likely case. So the correction factors for imported parts depends upon both the automotive and the economic scenarios selected:

Table 5
Parts - Change in Value With 10,000 Unit Variation
Best Case Automotive Scenario
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$25.7	$20.4
Alternative Table 5 and 8	25.1	20.3

Table 6
Parts - Change in Value With 10,000 Unit Variation
Most Likely Scenario
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$32.9	$26.0
Alternative Table 5 and 8	32.0	25.9

The discussion in the text of this report of CAFE domestic content and imported content in trade terms indicates that they do not sum to 100%. However, it is probably adequate for present purposes to proceed as though they do. Therefore a 5% change in CAFE domestic content level would change our estimate for the best case by roughly 14% (0.05/0.36), and for the most likely case by about 11% (0.05/0.46), yielding:

Table 7
Parts - Change in Value With 10,000 Unit Variation
Best Case Automotive Scenario
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$3.6	$2.8
Alternative Table 5 and 8	3.5	2.8

Table 8
Parts - Change in Value With 10,000 Unit Variation
Most Likely Scenario
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$3.6	$2.8
Alternative Table 5 and 8	3.5	2.8

Other Vehicles
The projection for other vehicles is simply the trend line of the 1978 to 1988 period extended to 1993. Probably the most reasonable method for altering these projections is to substitute a different ratio of 1993 to 1988.

U.S. EXPORTS TO JAPAN

U.S. exports must also be adjusted to arrive at appropriate substitute values for tables 4, 5, 6, and 7. However, our corrections must reflect U.S. price increases and CPI changes. For our base economic scenario, the price increase factor is 1.264, which is the CPI divisor as well, since we have no reason to expect U.S. exports' custom declared value growth to differ from the CPI. For the alternative scenario, price increase and CPI divisor is 1.241.

The 1988 unit value of vehicle exports is $12,489; so 10,000 units in exports would be:

Table 9
Export Vehicles - Change in Value With 10,000 Unit Export Variation
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$162.4	$124.9
Alternative Table 5 and 8	155.0	124.9

The other category of vehicles is simply projected by applying the trend of 1978-1987 to the base year of 1988. Inclusion of 1988 data would produce a much higher rate of increase, so we reflect the possibility that it is a new plateau. Again, readers might wish to adjust our estimates by applying a ratio of 1993 to 1988 values that better approximates their own expectations.

NAM EXPORTS

NAM vehicle exports could accelerate or reduce the U.S. bilateral trade deficit with Japan, depending upon the Japanese manufacturers policies for replacing these exports with vehicles from Japan, and upon the destination of the NAM exports.

If NAM exports simply represent extra NAM production and do not affect the level of Japanese import vehicles, then they will simply change the level of Japanese parts imports in line with Table 5 or 6. If these exports go anywhere but Japan, then, they will marginally impact the bilateral deficit with Japan. Of course, if these vehicles are exported to Japan, than they will provide a net shift in the bilateral trade deficit, amounting to the difference between Table 9 and Tables 5 or 6. Using Table 6, our most likely scenario yields:

Table 10
NAM Exports - Change in Value With 10,000 Unit Variation
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$129.5	$98.9
Alternative Table 5 and 8	123.0	99.0

If these NAM exports are replaced in the U.S. market by vehicles imported from Japan, then the impact will depend upon the replacement rate and type of vehicles imported. If the NAM exports do not go to Japan, then the impact on the deficit will be the sum of either Tables 1 or 2 and Tables 5 or 6.

If the NAM exports go to Japan, then the impact in the deficit will be the difference between Table 1 or Table 2 and Table 10, to continue our most likely scenario example. Thus, if replacement is at a 1:1 rate with large cars, the impact on the deficit is:

Table 11
NAM Export Replacements - Change in Value With 10,000 Unit Large Car Variation
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$92.6	$76.8
Alternative Table 5 and 8	83.6	75.5

If small cars imported from Japan replace NAMs exported to Japan at a 1:1 rate, then the impact on the deficit is:

Table 12
NAM Export Replacements - Change in Value With 10,000 Unit Small Car Variation
(Millions of Dollars)

Economic Scenarios	Current 1993 Dollars	Constant Dollars
Base Tables 4 and 7	$36.4	$25.3
Alternative Table 5 and 8	32.2	25.9

These estimated impacts can be adjusted for unit shifts other than 10,000 units, and for replacement rates other than 1:1. For that matter, mixes of replacement large and small vehicles can also be modelled.