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8 Exchange Rates and U.S. Auto Competitiveness

J. David Richardson

8.1 Introduction and Overview

This paper develops unique disaggregated data to assess how changes in exchange rates, factor costs, and voluntary export restraints have affected recent price competitiveness in the U.S. passenger car market. The changes share a common feature. Each alters the relationship of the auto sector's prices abroad to those at home. This would seem in turn to influence various measures of competitiveness in predictable ways; indeed that is one of the principal purposes of sectoral policies like voluntary export restraints. Such sectoral policies also alter the relationship of the auto sector's prices to prices of other goods.

I find support for several familiar relationships. The support provided by the experience of the late 1970s is straightforward. The dollar's foreign-exchange value fell below its historical trend, in both nominal and cost-adjusted (real) terms, relative to the major suppliers of U.S. auto imports. U.S. price competitiveness tracked U.S. cost competitiveness quite closely, as average prices of U.S. automakers rose more slowly than those of their principal rival firms (all Japanese). Misalignment of the dollar toward weakness by historical norms was reflected

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in competitive relative pricing by U.S. auto firms, again with respect to a historical norm.

The support provided by the experience of the years 1980–85 is more complex and interesting. Relative to major auto suppliers, the effective nominal dollar rose gradually toward its level of the mid-1970s, but the effective real "auto dollar" rose much faster, increasing to a level well above its historical norm by early 1985. U.S. cost competitiveness deteriorated, not so much because of exchange rates, but because unit labor costs in manufacturing rose in the United States relative to those in major auto suppliers. U.S. auto price competitiveness began to deteriorate correspondingly, but soon stopped and instead improved gradually between 1982 and 1985. The Voluntary Restraint Arrangements (VRAs) with Japan, which began in 1981, seem to be the explanation for why the negative effects of exchange rates and costs on U.S. auto price competitiveness were swamped between 1982 and 1985. Average prices of U.S. automakers in fact rose more slowly than those of Japanese rival firms over this period, but they rose faster than other U.S. prices as measured by the consumer price index. In Japan, average prices on auto sales to the United States rose much faster than other Japanese prices.

"Offsetting strong forces" seems the best phrase for summarizing U.S. auto price competitiveness in the early 1980s. Average prices of U.S. automakers were at about the same level relative to Japanese rivals in 1985 as in 1980. Misalignment of the dollar toward strength by historical norms, and deteriorating labor cost competitiveness, which tended to undermine the competitiveness of U.S. auto firms, were offset by the Japanese VRAs, which buttressed it.

To arrive at these conclusions, I compiled a unique data set for effective exchange rates relevant to auto trade and for three U.S. automakers and three Japanese. The data were aggregated in ways suitable to detecting the influence of exchange rates, factor costs, and voluntary export restraints. Existing auto data, although abundant, were unsuitable for my purposes—inadequately disaggregated or inappropriately (even peculiarly) aggregated.

8.2 Inadequacies in Existing Data

Studies of recent U.S. auto trade encounter a number of data problems.[1] Lack of data is not one. There is a veritable car-nucopia of facts and figures. Yet not many are in a format suitable for empirical analysis. There are at least four important difficulties, each of which is addressed in this paper.

8.2.1 Lack of Suitable Exchange-Rate Series

Most researchers are confident that exchange rates have had some important influence on recent U.S. auto trade. Those who have attempted to estimate it have generally employed bilateral rates (e.g., between yen and dollars) or measures of overall effective exchange rates—based on aggregate trade dependence in all products.[2] Over most of the 1970s and 1980s, however, more than 90% of U.S. trade in passenger cars has involved just three trading partners: Canada, Germany, and Japan. An attempt is made below to compute effective exchange rates for these three suppliers and Britain that are appropriate for U.S. passenger car imports. Some surprising insights emerge.

8.2.2 Lack of Suitable Disaggregation

Some of the most readily accessible series on autos lump all domestic suppliers together, and their counterparts for U.S. auto imports lump all foreign suppliers together. This causes difficulties in several ways. First, exchange rates among the various import suppliers have moved quite differently over the past 15 years. Second, during the 1980s U.S. imports from Japan were restrained, and the effects of such discriminatory restraints on aggregate data may be hard to detect if imports from Canada or Europe expanded through trade diversion (see Dinopoulos and Kreinin 1987). Third, the United States and Canada produce virtually identical passenger cars, and intracorporate trade is free of border restraint; for some purposes, it may be better to count net auto imports from Canada as part of the U.S. auto sector rather than as shipments from abroad. Fourth, firm-by-firm competitiveness is interesting in its own right: General Motors (GM) and Honda may be more sheltered than other firms from exchange rates because of their global diversification. Disaggregation along all these lines is begun below, again with some surprising insights.

8.2.3 Inadequate Price Indexes

A number of price indexes for autos exist, yet some of the indexes mix together domestic and imported auto prices, and some mix together new and used car prices. Other indexes are relative newcomers, and many of the indexes are incestuously related to each other.[3] A first-pass attempt is made below to construct several price indexes that would be helpful for empirically assessing the impact of trade policy and exchange rates on the U.S. auto market.

8.2.4 Inadequate Measures of "Real" Variables

Some "real" variables that are available are untrustworthy principally because of the inadequate price indexes.[4] Other real data embody

a surprising tolerance for simply adding up numbers of autos produced and imported, as if relative prices of foreign and domestic cars, large and small cars, stripped-down and spruced-up cars were always the same. An attempt is made below to recompute several important real variables for the auto sector as a natural extension of having recomputed the price indexes.

8.3 Effective Exchange Rates for U.S. Passenger Automobiles

Central to any assessment of how exchange rates affect U.S. auto competitiveness are measures of what is meant by "exchange rates" and "competitiveness." This section evaluates alternative measures of effective exchange rates for passenger automobiles in the U.S. market and one measure of U.S. auto cost competitiveness, comparing them to their counterparts for overall trade. Section 8.4 examines alternative measures of the price competitiveness of U.S. automakers and their Canadian affiliates relative to Japanese automakers and their U.S. affiliates and assesses their covariation with the auto exchange rates calculated below.

Figures 8.1 through 8.5 record six alternative measures of effective nominal auto exchange rates for the United States since 1974, computed

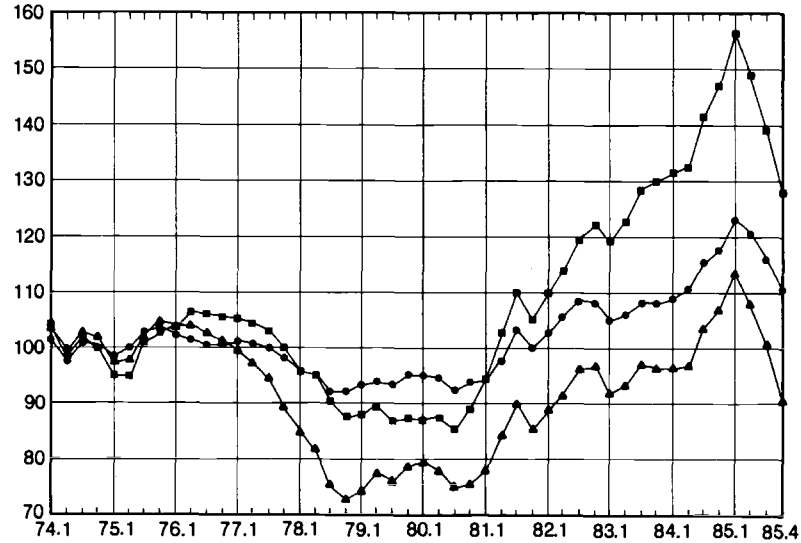

Fig. 8.1 Effective Exchange Value of the U.S. Dollar Overall and Two Measures of the Effective Nominal Auto Dollar: 1972–76 Weighted (Laspeyres) Indexes. ■ = Overall Dollar; ● = Auto Dollar with Canada; ▲ = Auto Dollar without Canada; 100 = March 1973.

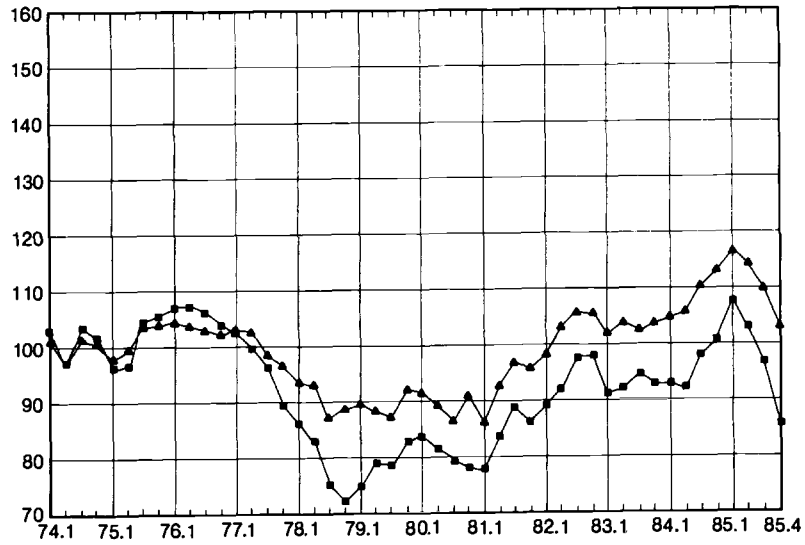

Fig. 8.2 Effective Nominal Auto Dollar with and without Canada: 1980 I, II Weighted (Laspeyres) Indexes. ▲ = Auto Dollar with Canada; ■ = Auto Dollar without Canada; 100 = March, 1973.

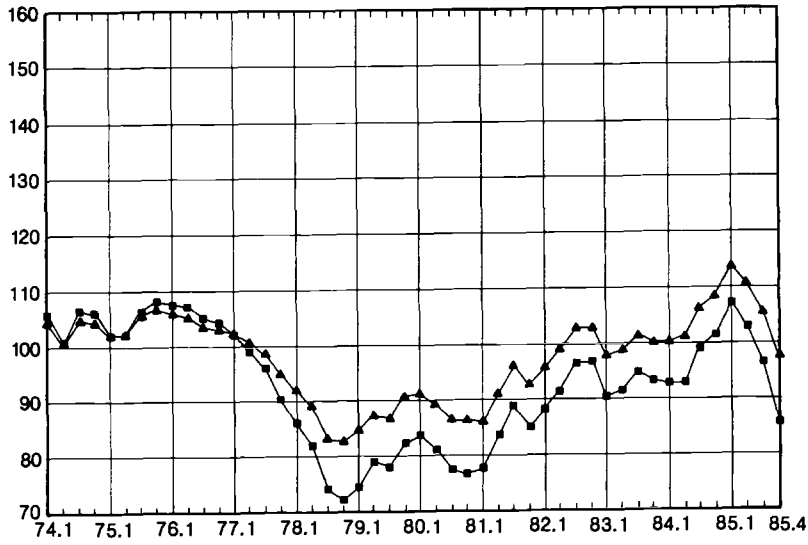

Fig. 8.3 Effective Nominal Auto Dollar with and without Canada: Current-Weight (Paasche) Indexes. ▲ = Auto Dollar with Canada; ■ = Auto Dollar without Canada; 100 = March, 1973.

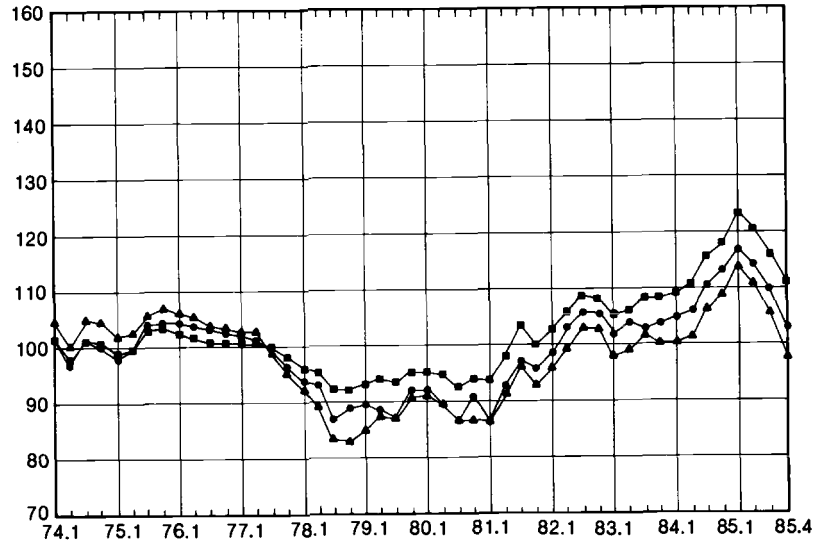

Fig. 8.4 Effective Nominal Auto Dollar with Canada: Alternative Weights. ■ = 1972–76 Weighted (Laspeyres) Indexes; ● = 1980 I, II Weighted (Laspeyres) Indexes; ▲ = Current-Weight (Paasche) Indexes; 100 = March 1973.

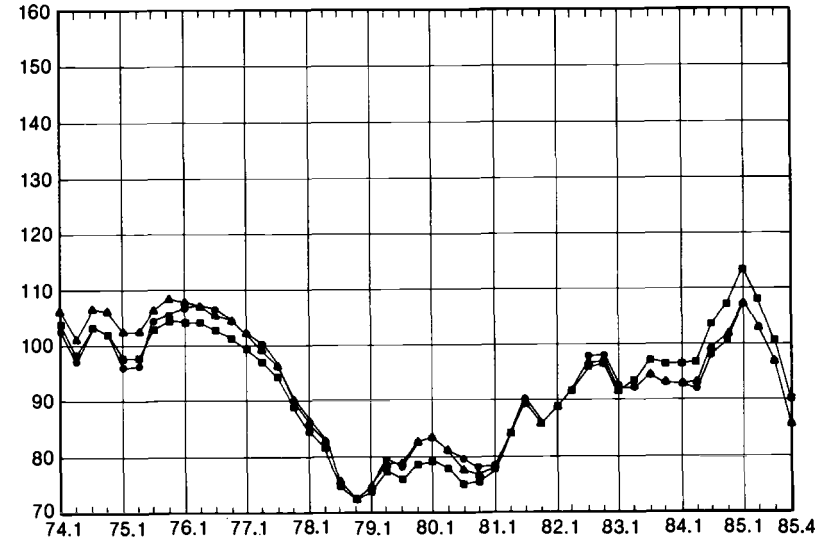

Fig. 8.5 Effective Nominal Auto Dollar without Canada: Alternative Weights. ■ = 1972–76 Weighted (Laspeyres) Indexes; ● = 1980 I, II Weighted (Laspeyres) Indexes; ▲ = Current Weight (Paasche) Indexes; 100 = March 1973.

quarterly. Figure 8.6 compares one of these to a labor-cost-adjusted ("real") measure of auto exchange rates. An "effective" exchange rate is a weighted average of bilateral exchange rates, where the weights often reflect trading-partner transaction shares. In all tables the weights are the value shares of total U.S. passenger car imports accounted for by Britain, Germany, and Japan, with and without Canada.[5] Bilateral exchange rates are expressed as index numbers of the strength (price) of the "auto dollar," with March 1973 = 100.

These series for the auto dollar are arguably broader measures of exchange rate pressures on U.S. auto manufacturing than the bilateral exchange rates used in other research. Effective exchange rates like these for other sectors have also been calculated recently by Arndt (1986), Belongia (1986), Clifton (1985), Dutton and Grennes (1985), Hartman (1986), and Marston (1986).

The first important question in calculating a measure of the auto dollar is whether the Canadian dollar should be included or excluded. In principle, the answer depends on the purpose of the calculation. Inclusion seems advisable for purposes of assessing the impact of exchange rates on U.S. geographical variables such as auto employment.

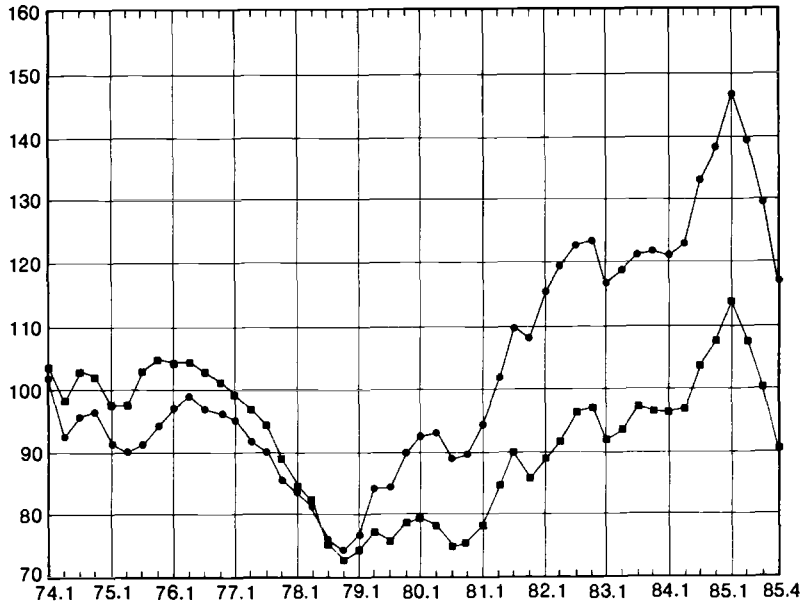

Fig. 8.6 Effective Real and Nominal Auto Dollar without Canada. ■ = Nominal, 1972–76 Weighted (Laspeyres) Index from Figures 8.1 and 8.5; • = Real = Nominal Index Adjusted for Manufacturing Unit Labor Costs in U.S. and Rival Automaking Countries, Using Same Weights and Base; 100 = March 1973.

Exclusion seems advisable for purposes of assessing the impact of exchange rates on U.S. corporate variables such as Chrysler Corporation market share—Chrysler is free to trade across the U.S.-Canadian border without barriers. Inclusion or exclusion of Canada makes a significant difference in measuring the exchange value of the auto dollar. Two issues that turn out to make much less difference are whether the effective exchange rate index should be fixed weight or current weight, and whether fixed weights should represent trade shares from distant periods or from recent periods.[6]

Figures 8.1, 8.2, and 8.3 reveal the effect of Canada's inclusion or exclusion for alternative weighting schemes. Figures 8.1 and 8.2 differ from figure 8.3 in displaying fixed-weight indexes. One set of fixed weights represents average value shares of U.S. passenger car imports over the period 1972–76. These weights were chosen to make the auto indexes as comparable as possible to the Federal Reserve System's index of the overall weighted-average value of the U.S. dollar, based on 1972–76 global trade of the Group of Ten countries plus Switzerland. This aggregate index is plotted in figure 8.1 for reference, is also equal to 100 in March 1973, and is published monthly in the *Federal Reserve Bulletin*.[7] The other set of fixed weights represents average value shares of U.S. passenger car imports over the first two quarters of 1980. These weights were chosen because the period from late 1979 to late 1980 is often thought to represent a watershed in a number of ways for both auto trade and global economic trends.[8] Figure 8.3 differs from figures 8.1 and 8.2 in displaying current-weight indexes. Each period's set of bilateral exchange rate indexes is weighted by that period's value shares of trade. In general, the choices of weighting system and of base year for the fixed weights make very little difference to the effective value of the auto dollar. This can also be seen in either figure 8.4 or figure 8.5, where the alternative time trajectories for the effective auto dollar are packed tightly together.[9]

Excluding Canada makes a significant difference. The U.S. dollar was much weaker during most of the period in its command over non-Canadian autos than in its command over Canadian autos (which are, of course, usually identical to U.S. manufactured models). This finding arises, naturally, from the general weakening of the Canadian dollar, but its implications for U.S. auto competitiveness need emphasis. The exchange rate between the U.S. and Canadian dollar since the mid-1970s has worked against U.S. geographical competitiveness in auto production. One can interpret the gap between the trajectories in figures 8.2 and 8.3 as one component of a Canadian competitiveness edge in autos, which developed in the late 1970s and which has been more-or-less stable since then. This edge may have little impact on the global competitiveness of integrated U.S. automakers (GM, Ford, Chrysler)

but a large impact on where in North America they expand and contract.[10]

A second important question in calculating a measure of the auto dollar is whether the real auto dollar moves differently from the nominal. One familiar way of measuring a real exchange rate is to adjust the nominal exchange rate for relative national factor costs. Indexes of unit labor costs are often employed for this purpose. In focusing on auto competitiveness, the natural choice might seem to be unit labor costs among major producing countries in that sector alone. Yet unit labor costs in all manufacturing, not just the auto sector, give an arguably better indicator of exogenous factor market pressures on auto producers—pressures beyond their ability to influence, in the same way as are exchange rate pressures. I have chosen this method of cost adjustment below. It is a way of detecting how endogenous auto price competitiveness measured in section 8.4 corresponds to (arguably) exogenous cost and exchange rate pressures measured in this section. My inferences are, of course, less meaningful the more insulated or divergent labor cost trends are in each country's auto sector from labor costs in other sectors.

Figure 8.6 reveals the effect of adjusting the nominal auto dollar for manufacturing unit labor costs in the United States relative to manufacturing unit labor costs in rival automaking countries.[11] Fixed weights are used in averaging cost trends across Britain, Germany, and Japan (Canada excluded), for 1972–76 trade shares as described above. The resulting cost-adjusted exchange rate index can be called a measure of the real auto dollar, but it is more revealingly a measure of the cost competitiveness of the U.S. auto sector. Figure 8.6 shows that there is a significant difference between auto cost competitiveness measured by the real auto dollar and the contribution that the nominal auto dollar alone makes to it.

Taken together, figures 8.1 through 8.7 reveal some striking observations on the effective value of the U.S. dollar for purposes of assessing U.S. auto competitiveness.

(1) The nominal auto dollar has been far weaker than the overall nominal dollar ever since 1975, as figure 8.1 reveals. Focusing on nominal rates alone makes it appear that U.S. automakers were protected more by the general weakening of the dollar in the late 1970s than other U.S. producers,[12] and that U.S. automakers were penalized less by the general strengthening of the dollar in the early 1980s than other U.S. producers. Indeed, if exchange rates of the mid-1970s are taken as an alignment norm, figure 8.5 shows that the nominal auto dollar has been weaker than normal from 1977 to date except from early 1984 to early 1985. By this norm, the past 15 years' nominal exchange rates have almost all been procompetitive (or protectionist) for U.S. auto firms, and not just those of the late 1970s.

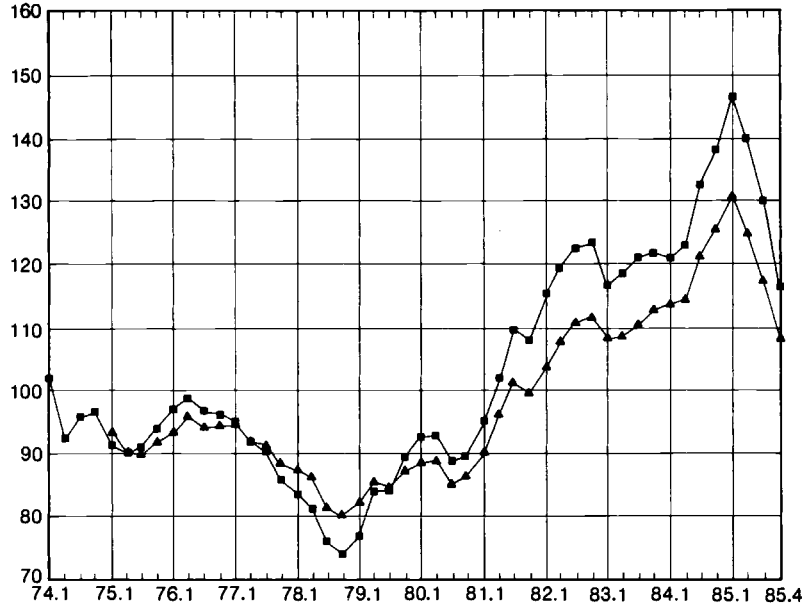

Fig. 8.7 Effective Real Auto Dollar without Canada and Effective Real U.S. Dollar Overall. ■ = Real Auto Dollar from Figure 8.6; ▲ = Effective Nominal Value of U.S. Dollar Overall, from Figure 8.1, adjusted for Manufacturing Unit Labor Costs in U.S. and Rival Trading Countries, Using Same Weights and Base; 100 = March 1973.

(2) But the account is quite different for the real auto dollar. The cost-adjusted auto dollar of figure 8.6 tracks the nominal auto dollar reasonably closely during the 1970s. Adjusting for trends in unit labor costs in the United States and its auto rivals if anything accentuates the procompetitive weakening of the dollar in this period. During the 1980s, however, the parallelism between real and nominal measures vanishes. The real auto dollar becomes progressively stronger than the nominal beginning around 1979. A marked anticompetitive rise in unit labor costs in the United States relative to the (auto-trade-weighted) average of unit labor costs in Britain, Germany, and Japan essentially eclipses the procompetitive sluggishness with which the nominal auto dollar creeps back toward its historical norm.[13] The result is remarkably similar 1980s trajectories for the overall nominal dollar in figure 8.1 and the real auto dollar in figure 8.6. In other words, whatever the advantage was that the U.S. auto sector enjoyed in the 1980s relative to other U.S. producers from confronting rivals whose currencies fell relatively slowly, this advantage was offset by a rapid rise in U.S. unit labor costs relative to these same rivals. In fact, it was perhaps more than offset, as the next paragraph suggests.

(3) The real auto dollar tracks the overall real dollar reasonably closely during the 1970s, as figure 8.7 reveals. During the 1980s, however, the real auto dollar rose progressively more steeply than the overall real dollar. So when exchange rates are adjusted for unit labor costs relative to principal foreign rivals, the U.S. auto sector appears increasingly uncompetitive in world markets relative to other U.S. producers during the 1980s—whereas unadjusted nominal exchange rates suggested exactly the opposite.[14] Trajectories of the 1980s overall dollar and auto dollar have an opposite relation to each other in figure 8.1 (nominal trends) and figure 8.7 (cost-adjusted trends).

Exchange rates and factor costs are obviously some of the most important exogenous contributors to sectoral competitiveness.[15] We turn in section 8.4 to two of its most important indicators, relative product prices and market shares.[16] We see if we can detect any of the expected correlations between relative prices or market shares and exchange rates or factor costs. The indicators of auto competitiveness I calculate are unique, applying to the three largest integrated North American automakers and to their largest three rivals (all Japanese).

8.4 Price Competitiveness for U.S. Passenger Automobiles

To what extent did U.S. auto prices and market shares reflect the international cost and exchange rate pressures described above? To what extent did they reflect other important changes, such as the Japanese VRAs? This section attempts an answer by describing measures of prices and market shares in the U.S. auto market and assessing their covariation with exchange rates, factor costs, and trade policy. Because of inadequacies in existing data aggregates (described in section 8.2), data were collected and constructed for the six firms with largest recent passenger car sales to U.S. buyers. The data were then reaggregated with an eye to detecting the covariations of interest. The six largest suppliers were General Motors (GM), Ford, Chrysler, Toyota, Nissan, and Honda. A data appendix to this paper outlines details for what follows, and is available from the author on request.

8.4.1 Disaggregated Prices by Firm

The U.S. Department of Commerce regularly publishes data on average transaction price per new car, broken down by U.S. domestic sales and imports.[17] Through 1985, the U.S. International Trade Commission regularly published data on maximum and minimum retail list prices by domestic and foreign automaker.[18] Remaining retail prices are, of course, distributed between the maximum and minimum in a way that could be described by a frequency distribution—one for each automaker. By assuming that each automaker has a comparable and symmetric distribution of model list prices between its own unique

maximum and minimum, yet around the relevant average transaction price, I have blended the two data sources to obtain a time series of average transactions price per new car for each of the six largest automakers.[19]

These average transaction prices by firm are plotted in figures 8.8 and 8.9, normalized so that 1982's price = 100. Several features are notable. One is that some U.S. firms' average prices turn down after 1983, not only because the component price indexes do (e.g., Chrysler's maximum prices), but also because U.S. automakers' market share of the highest-price models begins to fall off.[20] A second feature is that variation across firms in these price trajectories is quite moderate, and especially slight for the Japanese firms.[21] Third, as a result, there is little indication that exchange rates or other exogenous fundamentals affect different Japanese firms differently or different U.S. firms differently. One might have surmised some such differences due, for example, to different multinationality of production among the firms (GM and Honda having more multinationality than others). In this regard there is only a very slight tendency for GM prices to be more stable over the period than Ford or Chrysler prices.

8.4.2 U.S. and Japanese Auto Price Indexes

These disaggregated average price indexes were then aggregated across firms by nationality to obtain an index of U.S. auto prices and

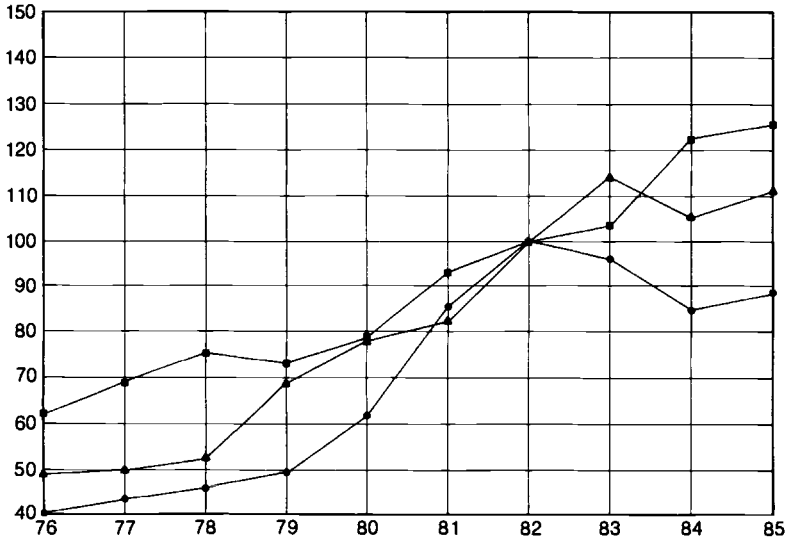

Fig. 8.8 U.S. Firms' Average Normalized Auto Prices. ■ = General Motors; ▲ = Ford; ● = Chrysler; 100 = 1982.

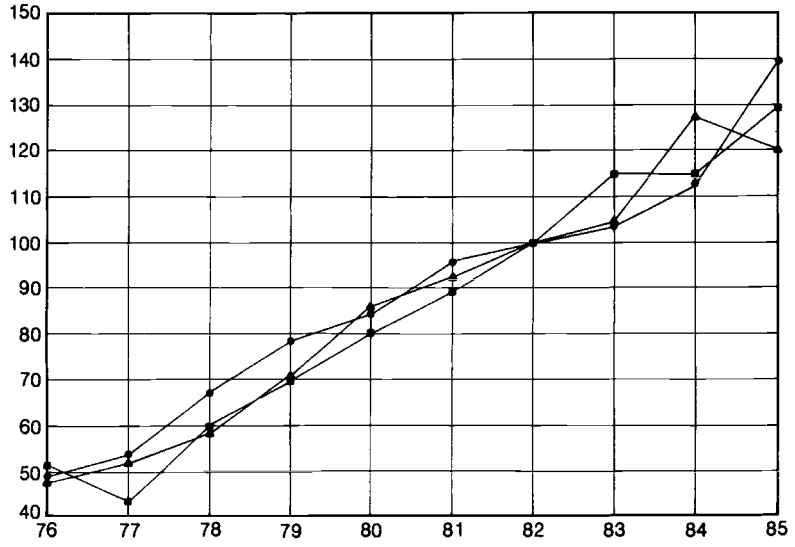

Fig. 8.9 Japanese Firms' Average Normalized Auto Prices. ■ = Toyota; ▲ = Nissan; ● = Honda; 100 = 1982.

an index of Japanese auto prices, both measuring average transaction prices on sales to U.S. buyers. Each index was a current-period weighted average of three firms' average prices, with weights representing each firm's share of real (constant 1982 dollar) U.S. sales of passenger cars.[22]

Figure 8.10 plots the resulting indexes, and figure 8.11 normalizes them by the U.S. Consumer Price Index (CPI) for all items. Table 8.1 records the year-to-year change in the U.S. auto price index relative to that for the Japanese firms. Several observations are notable.

(1) The 1970s feature auto price variation that is consistent in a straightforward way with the trends in the nominal and cost-adjusted exchange rates from figures 8.1–8.7. The relative price of U.S. to Japanese autos falls (U.S. price competitiveness improves) as the auto dollar declines from 1977 through 1979, and by a roughly comparable magnitude.

(2) The 1980s feature auto price variation that is more complex and more interesting. As the nominal and cost-adjusted auto dollar begin rising after 1979, U.S. auto price competitiveness begins to decline (with a slight lag) as expected. But it does not continue to decline as the dollar continues to rise. On the contrary, U.S. auto price competitiveness improves (U.S. auto prices fall relative to Japanese) from 1982 through 1985. This improved price competitiveness is especially striking in contrast to the deterioration in U.S. cost competitiveness suggested by the real exchange rates of figures 8.6 and 8.7. The contrast

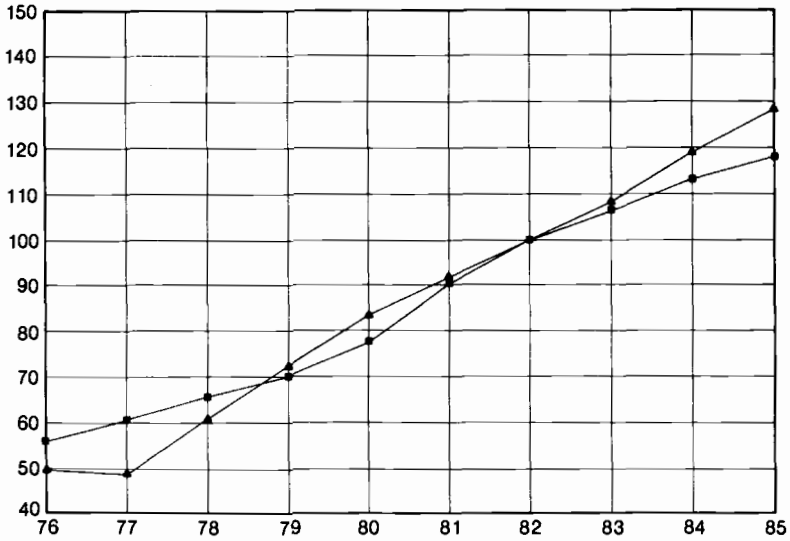

Fig. 8.10 Average Normalized Auto Prices of U.S. Firms and Japanese Firms. ■ = U.S. Firms; ▲ = Japanese Firms; 100 = 1982.

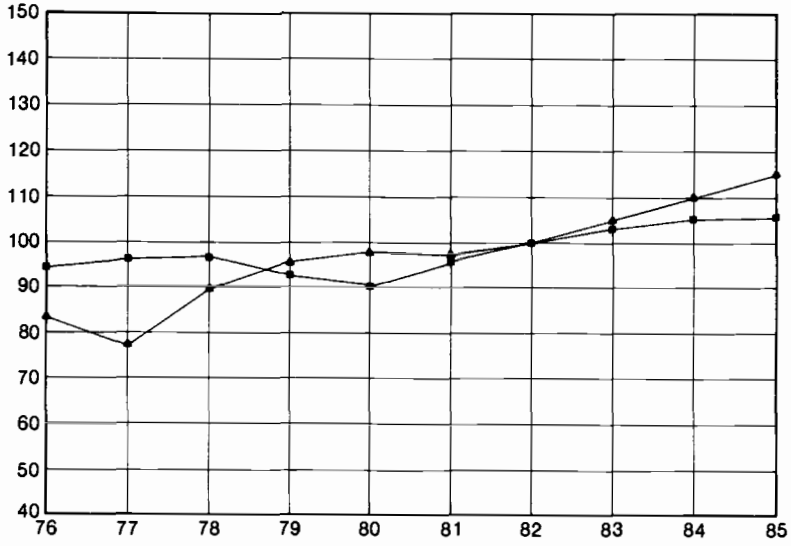

Fig. 8.11 Average Normalized Auto Prices of U.S. Firms and Japanese Firms Relative to U.S. Consumer Price Index. ■ = U.S. Firms; ▲ = Japanese Firms; 100 = 1982.

Table 8.1 **Changes in Big-Three U.S. Auto Prices Relative to Big-Three Japanese Auto Prices (Percentage Change in Aggregate Normalized Price Index)**

Period	Percentage Change
1977 over 1976	10.29
1978 over 1977	−13.12
1979 over 1978	−10.38
1980 over 1979	−4.58
1981 over 1980	6.38
1982 over 1981	1.51
1983 over 1982	−1.73
1984 over 1983	−3.14
1985 over 1984	−3.59

Source: Data underlying figure 8.10 or 8.11.

Notes: U.S. big three are General Motors, Ford, Chrysler. Japanese big three are Toyota, Nissan, Honda.

between price and cost competitiveness hints at either a profit squeeze among U.S. automakers or a profit surge among their foreign rivals on sales in the U.S. market.

(3) The Japanese VRAs and oligopolistic auto market structure are ingredients that give these trends explanation and coherence. Trends in cost competitiveness and price competitiveness need not be parallel when abnormal profits can persist due to entry barriers. Since a VRA pressures Japanese suppliers to raise their prices relative to U.S. automakers, its effects counteract the opposing pressures from the stronger dollar and rising U.S. labor costs. Indeed, U.S. auto price competitiveness begins improving around the time the VRAs are first imposed (spring 1981), and relative U.S.-to-Japanese auto prices end up in 1985 at roughly the same level as in 1980.

(4) Figure 8.11 shows how both auto price indexes begin rising relative to other prices, as measured by the CPI, around the time that the VRAs are imposed. This also is a familiar effect of a sectoral trade barrier, in contrast to exchange rates and labor costs, which should probably not be expected to produce strong effects on auto prices relative to other prices.

(5) Figure 8.12 sheds interesting light on the possible benefits to Japanese automakers of developments in the U.S. auto market, suggestive of surging profits. It converts the dollar price index of Japanese sales in the United States into yen (using the corresponding yen-dollar exchange rate), and compares the implied yen price received to other Japanese prices, measured by their GNP deflator. The yen price of autos exported to the United States rises steeply and continuously from 1978 on, relative to other Japanese goods, signaling either real-

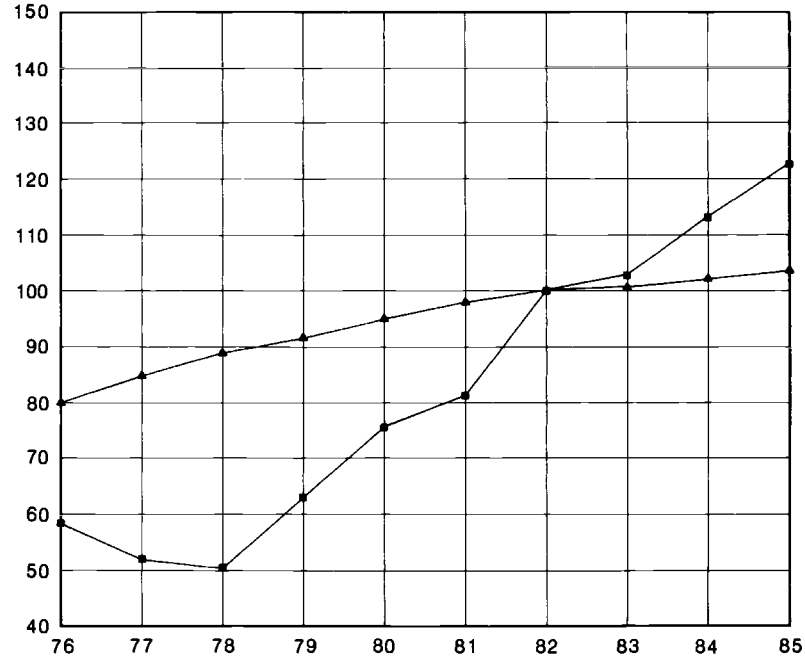

Fig. 8.12 Normalized Yen Prices of Japanese Autos Sold to U.S. and of Other Japanese Goods. ■ = Normalized Auto Price of Japanese Firms, from Figure 8.10, times Index of Yen per Dollar; ▲ = Japanese GNP Deflator; 100 = 1982.

location of production and resources toward U.S. activities in the Japanese auto sector, in a competitive model, or rising profitability if there are entry barriers.

8.4.3 Real Auto Sales and Market Shares

One of the products of the disaggregation described above is an ability to refine aggregate measures of auto sales volume, real market shares, and quantitative indexes. Instead of simply adding together units sold, as is the custom in many tabulations and studies, I weighted each firm's unit sales by its average 1982 price and developed a time series for each firm of real (constant 1982 dollar) sales.[23] These were then aggregated to obtain a measure of real Japanese and U.S. big-three auto sales in the United States, along with corresponding market shares which are often interpreted as ex post indicators of competitiveness.

Figure 8.13 shows how the U.S. market shares of the big-three Japanese suppliers (Toyota, Nissan, Honda) vary over time if measured in units and if measured in real terms. The real market shares lie uniformly below the shares of units, because 1982 prices of Japanese autos were below their U.S. equivalents. The covariation in the series

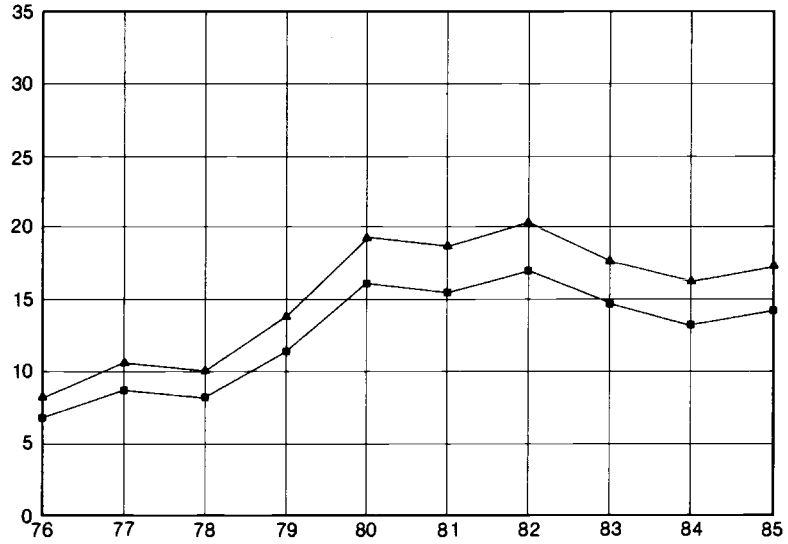

Fig. 8.13 Japanese Firms' Share of Real Auto Sales and Units Sold by Largest Six Firms. ▲ = Share of Units Sold; ■ = Share of Real Sales.

over time, though, is very strong. For this period, indexes of real change and measures of growth are not much affected by choosing simple or more refined aggregation of quantities. If there had been sharper changes in average prices across Japanese firms, there would have been less covariation in the two series in figure 8.13.

Figure 8.14 shows how mild recent variation has been in the real shares of the six principal auto suppliers in their own summed sales.[24] It also suggests only modest covariation with the exchange rate and cost pressures described above. The Japanese incursions of the late 1970s came in spite of adverse trends in exchange rates and at the expense of Ford and Chrysler. Ford's and Chrysler's gradual rebound in the 1980s came at the expense of all other firms except Honda, whose market share continued to rise gradually, as might be expected in light of Honda's 1982 entry into U.S. production facilities that allowed it to avoid the full impact of the Japanese VRAs. Controlling for Honda's unique situation, there is some suggestion of the expected negative covariation between firm-by-firm price competitiveness from figures 8.8 and 8.9 and market shares from figure 8.14.

8.5 Conclusion

Trends in U.S. automakers' competitiveness relative to foreign rivals, especially as measured by relative prices, seem reasonably consistent from 1976 through 1985 with trends in exchange rates, relative

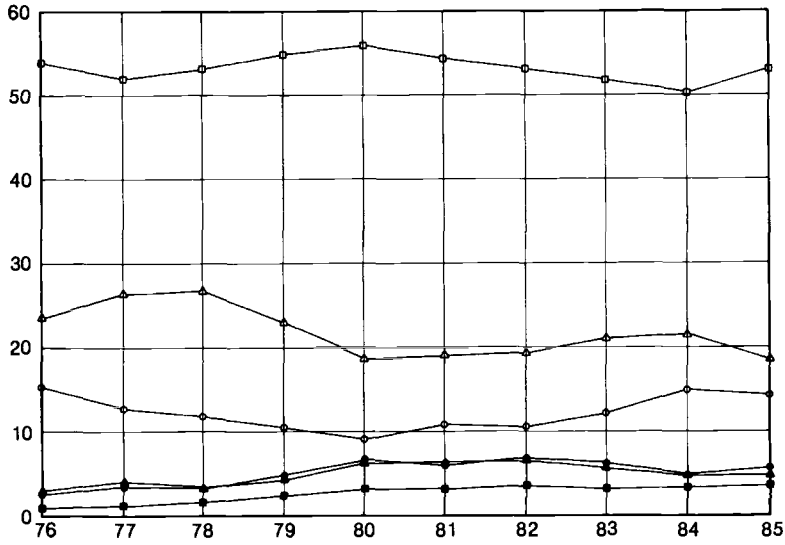

Fig. 8.14 Firm Shares of Real Auto Sales of Largest Six Firms. □ = General Motors; △ = Ford; ○ = Chrysler ▲ = Toyota; ● = Nissan; ■ = Honda.

labor costs, and U.S. trade policy. Table 8.2 summarizes how auto price competitiveness might be very roughly decomposed over this period, as described above. A sensible agenda for ongoing research along these lines would focus on measurement of trends in quality, product mix, and market share, largely ignored above, and on more subtly conditioned covariations and explanations.

Notes

1. Such studies include Bryan and Humpage (1984), Citrin (1985), Collyns and Dunaway (1987), Crandall (1984, 1985, 1987), Dinopoulos and Kreinin (1987), Dixit (1986), Feenstra (1984, 1985a, 1985b, 1986a, 1986b), Gomez-Ibanez and Harrison (1982), Gomez-Ibanez et al. (1983), Hickok (1985), Kaplan (1986), Lambson and Richardson (1987), Levinsohn (1987), Mannering and Winston (1987), Tarr and Morkre (1984), and USITC (1985a).

2. See, for example, Branson and Love (1986), Day (1985), and Schwartz (1985).

3. For example, the imported auto price series from the U.S. Bureau of Labor Statistics (BLS) does not seem to exist in published form prior to 1980. In the U.S. Commerce Department's *Survey of Current Business*, for further example, the price deflator for passenger car imports is calculated to follow the BLS 1980-on series for non-Canadian imports and to follow the U.S. pro-

Table 8.2 Rough Summary of Auto Trends during Sub-periods

	Late 1970s[a]	Early 1980s[b]
Impulses:1		
Effective nominal auto dollar	Roughly 25% decline	Roughly 25% rise
U.S. unit labor costs relative to auto rivals	Little change	Roughly 25% rise
Residual impulse[c]	Little residual impulse	Roughly 50% offset[d] to above
Competitiveness:1		
Prices of U.S. automakers relative to Japanese	Roughly 25% decline	Little change

[a]1977–79.

[b]1980–85.

[c]"Residual impulse" denotes pressure on relative auto prices that is unaccounted for by exchange rates and labor costs and is defined by subtracting the first two rows of the table from the last. It includes VRAs, quality, product mix, etc.

[d]That is, impulses that tended to raise prices of Japanese automakers relative to their U.S. rivals.

ducer price index for Canadian imports; and price deflators for purchases of new domestic autos and for purchases of new imports are identical to each other and made to follow the U.S. CPI for new cars.

4. For example, the Commerce Department's constant-dollar auto series in the *Survey of Current Business* come from deflating current-dollar purchases of imports by an index measuring both import prices and domestic prices and from deflating current-dollar domestic purchases by the same mixed-breed index.

5. Weights that are shares of world trade, rather than focus-country trade, are sometimes recommended when there is export competition in third-country markets as well as import competition at home. For illustration, see Feldstein and Bacchetta (1987), Pauls and Helkie (1987), and Pauls (1987). U.S. trade weights are used here because U.S. passenger car exports, except to Canada, are quite small.

6. See Ott (1987) or Hervey and Strauss (1987) for a general discussion of these issues.

7. The 1972–76 weights were (numerators represent shares of total U.S. car imports)

British pound	0.03/0.94
Canadian dollar	0.40/0.94
German mark	0.26/0.94
Japanese yen	0.25/0.94
Sum of four	0.94/0.94.

8. The 1980 I and II weights were

British pound	0.020/0.932
Canadian dollar	0.211/0.932
German mark	0.233/0.932
Japanese yen	0.468/0.932
Sum of four	0.932/0.932.

9. The undulating path of effective exchange rates during this period may help explain the invariance of the trajectories to the choice of fixed and current weights. Fixed-weight (Laspeyre's) indexes overstate inflation but understate deflation; current-weight (Paasche) indexes understate inflation but overstate deflation. Over an undulating price path the biases offset each other within each weighting system.

10. The Canadian share of North American passenger cars (units) produced by GM, Ford, and Chrysler averaged 9.8% in 1976–78 and 11.5% in 1979–85—after the Canadian competitiveness edge developed.

11. I am indebted to Dick Marston for sharing with me the data necessary to do these calculations and, more importantly, the benefits of his insights on what they imply. The unit labor cost series are national-currency indexes of compensation of employees per unit of real output (in the value-added sense) in the manufacturing sector.

12. This seems likely to be true with respect to the weakening of the dollar from 1985 to 1987, too, concentrated as it was on yen and marks.

13. The eclipse would be only partial if the U.S. measure of unit labor costs had been drawn from the auto sector alone, not from overall U.S. manufacturing. Wage givebacks and technological developments of the early 1980s caused unit labor costs in autos to rise somewhat more slowly than in other U.S. manufacturing (Collyns and Dunaway 1987, p. 154). With similar intersectoral divergence in Britain, Germany, and Japan, however, the eclipse would be restored, since nation-to-nation relative unit labor costs would move comparably for autos and overall manufacturing.

14. The measures and weights employed allowed a broader conclusion. Every U.S. sector whose dominant rivals were Germany and/or Japan appeared increasingly uncompetitive in world markets relative to other U.S. sectors during the 1980s. Obviously, though, these conclusions might (or might not) be moderated by employing sectoral unit labor costs, as discussed in note 13.

15. Another factor that plays an important role in section 8.4 is border trade policy, specifically the VRAs with Japan.

16. Quality is a third important contributor to sectoral competitiveness, although it is largely an endogenous choice of automakers. Quality will usually be reflected in price as well as in inherent product characteristics. Disentangling the price influence of trends in relative quality and in relative competitiveness is discussed in more detail by Feenstra (1984) and Collyns and Dunaway (1987), among others.

17. See tabulations of these data in MVMA (1986, p. 38) and Kaplan (1986, table 2).

18. The last and most recent of its compilations is USITC (1986b). The price series have some interest in their own right. For example, the minimum-price series show very little divergence around trend or dispersion across firms, and especially little for the Japanese firms. The maximum-price series, by comparison, show much more divergence and dispersion, especially for the U.S. firms.

19. An obvious objection to this procedure is that percentage discounts on autos with high list prices are probably larger than on autos with low list prices.

20. Calculated Japanese market shares of these highest-price models rise from 1984 to 1985, but European market shares rise even more sharply.

21. This could be due, of course, either to competitive pressures or to implicit price parallelism among oligopolistic firms.

22. The Japanese and U.S. price indexes are implicit price deflators, and the real sales data, compared below to simple aggregates of units sold, record annual sales valued at 1982 prices.

23. Collyns and Dunaway (1987) is a noteworthy, although fairly primitive, exception.

24. In total U.S. market sales, however, real shares of smaller suppliers, both European and Japanese, began rising in 1984.

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Comment Robert Lawrence

Anyone attempting to explain the behavior of the U.S. automobile market in the 1980s is unusually brave. For the eighties have seen major

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shocks, each of which probably altered the behavioral parameters of the market in a fundamental way. Consumers shifted demand toward Japanese cars, both because they were burned by the second oil shock, which convinced them to shift to smaller cars, and because they perceived Japanese automobiles to be of superior quality. In addition, contributing to the turmoil were voluntary export restraints, currency fluctuations, and toward the end of the period, the arrival of the transplants—Japanese automakers operating assembly plants in the United States. In this paper, David Richardson takes a first cut at trying to understand U.S. auto competitiveness by answering three questions: (1) what is the exchange rate measure relevant for U.S. automotive competitiveness? (2) what is the price series relevant for deflating nominal U.S. automobile aggregates? and (3) what have been the effects of VRAs and exchange rates on price competitiveness?

In my comments, I'd like first to discuss his answers to these questions and then to make a few comments of my own about the effects of VRAs.

Dave argues that conventional multilateral or bilateral exchange rate measures are inappropriate for analyzing U.S. automobile competitiveness. One issue is whether "U.S." includes the profits earned by U.S. firms in their overseas operations or refers only to operations within the geographic boundaries of the United States. He decides that North America is the appropriate focus and proceeds to drop the Canadian dollar from his exchange rate measure. I feel the U.S. domestic industry would be a more pertinent focus, particularly since employment considerations are often a key issue in discussions about competitiveness. But even taking his focus as given, I am not sure he has the correct indicator. If one wants a measure relevant for profitability, why not include consideration of United States-owned corporations in Europe and other parts of the world? The Ford Motor Company, for example, was kept solvent by its European operations during this period. I am also unclear why, given his purpose, Dave uses U.S. import weights and thus neglects to take account of competition between U.S. and foreign automobiles in Canada. Indeed, if the objective is really to capture the impact of exchange rates on profitability, I am not sure that any simple weighting scheme will suffice. It will probably be necessary to obtain weights from a fully specified econometric model of such profit determination (much as the International Monetary Fund uses a trade model in the construction of its multilateral exchange rate measures).

The major finding in the analysis of the automotive exchange rate is that, compared to other U.S. producers, in the 1970s U.S. automakers were helped more, and in the 1980s penalized less, by exchange rate shifts. But surely the real, rather than nominal, exchange rate is rel-

evant for such analysis. Since Japanese and German inflation have been much lower than U.S. inflation, I am not sure this conclusion would hold up.

Dave then turns to construct his own price measures. In general, I agree that the deflators for automobiles are highly questionable. For example, the official data treat government-mandated regulatory changes as if they were improvements in quality. If consumers don't have the same views of these changes, they will be inadequate for explaining behavior. In addition, the measures fail to capture actual transactions prices and the implicit price equivalent of financing.

I am sympathetic to Dave's desire to construct a better price measure, but I have some problems with his. I find it peculiar that he should deliberately construct a quantity measure which is sensitive to shifts in product mix. As Bob Feenstra has shown, VRAs not only led to higher Japanese prices on given models but also influenced the product mix by inducing options loading and shifts towards larger cars. For tracking price competitiveness, I think we need to examine the same products over time.

The analysis of the impact of VRAs and exchange rates does not use an explicit empirical model. Instead, Dave prefers eyeball econometrics. Now I applaud anyone who examines the data closely before using it, but I do not think one can make ceteris paribus statements about cause and effect without controlling for other factors. This is particularly the case when there is strong reason to believe, as I described at the start of these comments, that major influences have not remained constant.

Dave concludes that VRAs had little impact on U.S. relative price competitiveness. First, it should be emphasized that this is not the same as saying they had no effect—domestic and imported auto prices might have risen by the same amount. Second, his analysis leans heavily on the 1982 data. Auto demand was particularly weak when the VRAs were introduced. As the studies of Crandall suggest, their impact might have been more important in subsequent years when demand recovered. But for disentangling such effects, a model is essential. I should note that Dave's conclusion differs from that obtained by others who have used explicit models. More work needs to be done to explain why these findings differ from those in the literature.

Finally, I am not sure that prices are the key issue in auto competitiveness. There could be very important effects from exchange rates, even if prices are similar, if profitability is very different. Indeed, much of the debate about the competitiveness of U.S. autos pertains to the alleged $2,000 difference in production costs between Japan and the United States. A key issue currently is whether, as a result of the recent yen appreciation, that gap has been eliminated. Clifford Winston's

work—and the planned increase in Japanese assembly operations in the United States—seem to signal that it has.

I believe that VRAs are particularly counterproductive policies—even when viewed narrowly from the standpoint of protectionists who supported them and other forms of quota protection. Allegedly protection was required to save jobs and permit the industry to restore its competitiveness. Generally when people talk about saving jobs, they mean those of the workers currently employed, and they refer to the competitiveness of the firms currently in the industry. In theory, of course, if a quota enhances domestic monopoly power, it could lead protected firms to so raise prices and thus lower output that on balance jobs could be lost rather than saved. In fact, the work of Winston finds that the VRAs actually cost auto jobs, since the effect, inducing buyers to switch from Japanese to U.S. automobiles, was less than the effect of higher auto prices on sales by U.S.-based firms.

It is also not clear that VRAs had very beneficial effects on the competitiveness of U.S. automobile firms. While VRAs may have enhanced the profitability of U.S. automotive firms, they also raised the profits of their competitors in both Japan and Europe. Moreover, U.S. investment in the auto industry in the early 1980s was below investment in the late 1970s. In addition, as Crandall shows in his recent Brookings paper, compensation in the automobile industry today retains the same relationship to average compensation in manufacturing as it had in the late 1970s.

But in one sense VRAs may have indeed contributed to the competitiveness of firms based in the United States, if not to the U.S.-owned firms themselves. They speeded the introduction of Japanese transplants. One of the issues in this conference has been the degree to which the strong dollar has led to hysteresis. If it has, the dollar may have to depreciate by more than it appreciated to obtain the same current account level. But, partly because of VRAs, the auto industry could be a case on the other side. Our industrial potential in autos may have increased during this period. There is now talk that some of the Japanese transplants, brought here by fears of protection, may actually begin exporting from the United States—perhaps even back to Japan.