

The Economy, Competition, and the Retail Automotive Dealer

Final Report

March, 2001

**Office for the Study of Automotive Transportation
University of Michigan Transportation Research Institute
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Ann Arbor, MI 48109-2150**

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The Economy, Competition, and the Retail Automotive Dealer

A Report to

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The Economy, Competition, and the Retail Automotive Dealer

Executive Summary

Introduction

This report primarily explores how the economy, especially during a recession or economic downturn, influences the trends of auto sales, the retail network, and the performance of dealerships. We postulate that the strength and long-term viability of the dealerships are linked to the trends in segment sales. Examining the strength of these relationships is the primary focus of this report. The analytical portion of this report applies multivariate analytic techniques to data from 1978 to 1998 to explore how the economy affects segment sales. A main goal of this analysis is to discover the key economic indicators that help predict a sales slump and how different segments will be affected.

Chapter One

There is a clear trend of dealer consolidation, with fewer dealerships today than in 1978, but more franchises and more new vehicle sales per dealership. Vehicle sales are higher at import than Big 3 dealers, and this has been the case since 1979. The number of import dealers increased by 9 percent over the 21 years, while that of Big 3 dealers decreased by 23 percent. Since the late 1980s, service has replaced new vehicles as the largest source of dealer profits.

Dealer consolidation has particularly accelerated during the recession periods. The dealers have been badly hurt during recessions due to substantial reduction in new-vehicle sales, which remain their largest revenue source. Big 3 dealers lost more vehicle sales than did import dealers. However, the revenues and profits of service departments have been strengthened. When there is a recession, dealers consolidate and increase their dependency on parts and service sales.

Chapter Two

Without doubt, the most fundamental shift in the vehicle market over the past two decades has been the continuing move of consumers to light trucks rather than passenger car purchases. In spite of this, import competition to the Big 3 has strengthened, and gradually penetrated more and more segments. The current dominance of the Big 3 in the light truck segment could well be as precarious as their hold on luxury vehicles has turned out to be. The past decade has seen the emergence of the luxury sports utility vehicles, a new type of vehicle that most pundits would have scorned just a decade ago.

The two recessions in the 1980s¹ were initiated by energy shocks, which affected fuel prices. This in turn affected buyers' preferences for types of vehicles, as the small car segments expanded sales and large car sales declined. The 1990s recession² developed in

¹ The 1980s' recession periods were from 1/80 to 6/80 and from 6/81 to 10/82, respectively.

² The 1990s' recession period was from 7/90 to 2/91.

quite different circumstances, and was caused more by a general economic downturn, producing less clear effects on consumer preferences for different types of vehicles. Thus, in late 1990, constant-dollar (1998 base) gas prices briefly surged to over \$1.70 per gallon, up from the \$1.39 average for the previous year. However, by early 1991, gas prices fell back to the level of 1989. Indeed, the average gas price in the then-record sales year of 1978 before the second oil shock was \$1.63. This suggests that unless gas prices in the future surge significantly, coming recessions due to general economic conditions will see milder slumps in vehicle sales, similar to the recession in 1990-91 and less severe than the two 1980's recessions.

Light trucks had enjoyed tremendous growth as gas prices fell and stabilized after the second 1980's recession. Since early 1986, gas prices have remained below \$1.50 constant-dollar (1998 base) for the balance of our study period. Indeed, after the 1990-1991 recession, light-truck growth has increased sharply while the passenger car segment, especially its basic transportation components, has had difficulty recovering. This suggests that many car buyers may have shifted to the light truck segment when the economic expansion started. Sales of small cars have continued to fall, and those of midsize cars have recovered only a little from the third recession. GM suffered the largest sales losses in the midsize car segment, while Ford had the largest losses in the small car segment. Japanese companies have steadily increased sales and gained share in passenger cars, especially in the midsize segment. It is important to note that the light truck segment may be more susceptible to an economic downturn, especially those vehicles that are less used for basic transportation.

The luxury vehicle segment has also expanded since the recession in 1990-91. In the late 1980's the Japanese began to introduce luxury brands priced below European brands. By the mid-1990's, European brands also introduced less expensive vehicles. However, the overall growth of luxury vehicle sales is largely due to luxury light trucks, primarily sport utility vehicles (SUVs) rather than traditional passenger cars. Since most luxury SUVs are targeted at the entry-level luxury segment, they expand the numbers of consumers who can afford today's luxury vehicles. Leasing these vehicles makes them even more affordable. However, this may mean that luxury vehicles will be more vulnerable to any coming recession than in the past when luxury vehicles were at least somewhat recession-resistant.

Chapter Three

Auto sales often behave as a leading economic indicator because purchases of large, durable goods are usually among the first to fall as money supply tightens and consumers' confidence in the state of the economy drops. However, new light-vehicle sales are often slow to rebound when the economy turns to an expansion mode after a recession. Thus, light-vehicle sales, like new housing starts, are good lead indicators of recessions but less reliable lead indicators of an expansion.

Our results find the Consumer Price Index (CPI), employment, and disposable income have moderate, negative correlations with passenger car sales, but strong, positive correlations with LT sales. This is consistent with a shift of purchases from passenger car

to light truck categories as the economy expands, and raises the possibility that consumers will shift back to passenger cars in a coming recession.

Chapter Four

The main goal of the project has been predicting vehicle sales, so we emphasize finding leading indicators of sales. We assume that 6 months is sufficient time for changes in the economy to affect consumer's buying patterns. Over the past 21 years, CPI, interest rates, and unemployment rates have generally predicted total vehicle sales. Passenger car sales are moderately predictable by CPI, Consumer Sentiment Index (CSI), interest rates, and other basic economic indicators. However, since passenger cars are increasingly in segments that meet basic transportation needs, their sales levels are less susceptible to economic movements than are light trucks. Indeed, light truck sales are more closely correlated with economic changes. Specifically, disposable income (DI), money supply, CSI, gas prices, and interest rates are all strongly correlated with light truck sales.

The most important predictor of luxury car sales is disposable income, suggesting that consumers "move up" the automotive purchase chain, perhaps an instance of a wealth effect. The most important predictor for luxury SUV sales is the level of the stock market, measured by the S&P 500 Index. Consumers in this segment do seem to reflect a psychological wealth effect, suggesting that when consumers feel good about the strength of the economy and the stock market is rising, their expenditures increase, benefiting this segment.

Because the 1980s' and 1990s' recessions had different causes, we performed separate analyses for the two "decades," from 1978 to 1988, and from 1989 to 1998. Indeed, sales in many segments do behave quite differently in the two decades, and the factors that predict these sales and how well they can be predicted also vary between the two periods. For example, our models predicting sales of small cars are weak for the overall period, while the models for each of the separate periods are much stronger. In the case of midsize cars, the models for the entire period and for the first decade are quite weak, but the model for the second decade is quite powerful. So, too, models for nonluxury SUVs have more predictive power in the first period, perhaps because the addition of luxury SUVs in 1991 altered the customer base and drivers for the nonluxury SUVs.

Chapter Five

We asked dealers which vehicle segments are especially likely to experience declining sales in a recession. They identified sales of SUVs, sports cars, and compact pickups as likely to fall, but sales of luxury cars and full-sized pickups as likely to resist a sales drop. Consistent with our data analysis, most dealers are confident they can generate more revenue from parts and service operations when the next recession comes. They also agreed that the trend to larger dealers with multiple franchises and outlets would accelerate during the period. However, they suggested that the public companies are surviving in good financial times, but that their stock valuation will plummet in a recession and that would damage them.

Dealers confront serious issues and challenges to survive the next recession. Dealers feel that they will face unfair competition if the manufacturers become direct retail competitors. Upgrading facilities, controlling inventory, controlling expenses, and floor planning costs are the major challenges they must overcome. These costs can be covered in good times, but will be very hard to cover during a recession. Another challenge will be to increase profits on vehicle sales. In a recession, increased revenues from parts and service and from finance and insurance will not be sufficient to maintain a dealership. Therefore achieving higher vehicle profits constitutes an important competitive advantage in the dealer business model.

Introduction

Office for the Study of Automotive Transportation (OSAT) research verifies the swift pace of change in the automotive industry in the 1990s, documenting and detailing major arenas of transition. The allocation of task responsibilities along the industry's value-added chain is shifting, and, along with it, the industry's power relationships. The discontinuous and often discordant emergence of a more "tiered" supplier base and a restructured retail base are underway, and new supplier-manufacturer-dealer relationships will shape transactions along this developing value chain. These structural changes are gaining momentum in a climate of continuing competitive pressures to achieve truly system-wide effective performance.

While further changes in the production stages of the industry lie ahead, our work in the retail distribution segment confirms the suspicion of many analysts that this is the likely "hot spot" of change for the coming decade. Now the dealership network faces even more pressure, as the manufacturers look to it for both cost-reductions and profit, apprehensive as well that power shifts to larger dealer organizations will complement such shifts in the supplier industry. Direct sales to individuals by the manufacturers seem just a matter of time. The pace of these changes will remain uneven, uncertain, and often uncomfortable.

Major changes, many already underway, will continue to alter the competitive landscape of the retail automotive dealership. The past decade has witnessed critical developments, and the dealership count continues to shrink, while the number of franchises decreases only slightly. The remaining dealers are more likely to be multibrand and located nearer to their competitors rather than in isolation. The model of a successful dealer is also changing, as Saturn, comarketing, and customer satisfaction raise enthusiasm, expectations, and even a few questions. The single-line, single-point, family-owned store is yielding to larger dealer groups, including publicly owned companies like AutoNation. The Internet offers a wide variety of automotive information and services, and the expansion of e-commerce into retail vehicle sales is likely only a matter of time.

Industry analysts have only recently begun to investigate seriously the structural changes in the automotive retail distribution system, its changing patterns and bases of competition, and the emergence of new business models. How general economic performance and especially automotive sales relate to all of these remains an open question. Moreover, the possibility of a general economic downturn, or even a more restricted but serious slippage in automotive sales raises particular threats for the dealership network today. Concerns about dealership ability to weather a slump are legitimate, and the normal sources of dealer replacement, such as intergenerational transfers, appear to be less available. We suspect the next downturn poses a serious threat to many dealerships, and offers opportunity to those who can muster the resources to survive and forge the creative business strategies to grow.

However, broadly focused, systematic data on the relationships among these issues is currently lacking. We posit that the strength and long-term viability of the dealerships are linked to the trends in segments sales which, in turn, are affected by the performance

of specific aspects of the general economy. Determining the strength of these relationships is the primary focus of this report.

The analytical portion of this report applies multivariate analytic techniques to extensive data covering 1978 to 1998 to examine how segment sales will be affected by changes in the general economy. Shifting trends in segment sales will have direct impacts on new-vehicle dealerships, some more than others, depending on the diversity of products available on the lot and in the showroom. We present findings of the relationships between certain economic measures and the trends of segment sales as a basis for understanding the relationship between dealership viability and the economy.

This research project raised a number of questions concerning the changing automotive retail network, strength of the dealerships, and how a recession, or economic downturn, would likely affect the dealerships. For instance, we explored how the effects of economic recessions or severe automotive sales slumps on the dealership network vary over different types and brands of vehicles. How would such an economic development affect dealer performance and the separate constituent elements of dealer business activity: new-vehicle sales, used vehicle sales, finance and insurance, parts and service, and collision repair? Would a dealership's specific light-vehicle mix affect how it fares in the face of a downturn? Would a dealership's specific business mix affect how it fares in the face of a downturn? For instance, some business activities, like used car sales and parts and service, are likely to increase in a downturn but do they compensate falling revenues from other activities that decrease? Finally, what do the results of these analyses mean for the future? What factors will affect specific segment sales? Can a retail group anticipate recession effects and adjust their offerings accordingly?

A main thrust of our analysis is to determine the key economic indicators that will help forecast a sales downturn, and indicate its general shape, magnitude, which segments will be impacted, and to what extent. We investigate general indicators, for instance, gross domestic product, unemployment, household income, interest rates, inflation levels, and Consumer Price Index, in addition to wealth indicators such as disposable income and stock market performance. We account for the fact that automotive sales themselves constitute an important lead indicator for the overall economy. We lead the economic performance indicators 6 months ahead of vehicle sales figures, since we are ultimately most interested in how changes in the performance of the general economy will affect automotive sales. These analyses tell us a great deal about consumers' likelihood of purchasing in any particular segment during economic cycles. This in turn yields clues as to how an economic downturn might affect the number and vitality of dealerships.

We have arranged the report according to these separate analyses. The first two chapters give a historical perspective to the automotive retail industry. We review the history of the postwar automobile dealership, detailing the trend of decreasing numbers of dealerships and their changing sources of profits. We also provide segment sales histories, an important introduction to our examination of the relationship between sales and changes in the general economy. Specifically, chapter one focuses on changes the

dealer network has experienced to the present, while chapter two examines changes in market segmentation and sales trends of new light vehicles during the last 21 years.

In chapter three, we discuss whether recessions can be “predicted,” and what happens to selected economic indicators before and during a recession. three also examines the correlation between these economic indicators and sales in the broadest segments of the vehicle market—all light vehicles, passenger cars, and light trucks. Chapter four is a more rigorous quantitative analysis of the sales trends of the subsegments using multiple regression analysis. This analysis incorporates multiple economic indicator variables in a series of econometric models—of varying predictive power—which help provide an understanding of the factors that affect segment sales.

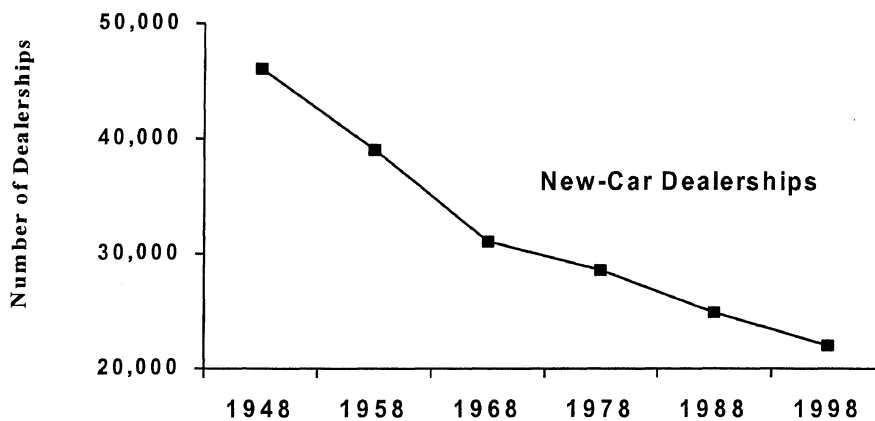
In chapter five, we analyze the results of interviews conducted with a select group of dealers. These results address general dealership profitability issues and how a recession might impact dealerships and new-vehicle sales. The interview responses from the dealer group serve as a counterbalance to the results of our sales analysis in chapters three and four. We make no claim that one type of analysis is better than another, but the combined analyses provide insight into the overall changes that will occur as a result of an economic downturn.

Chapter One: The Changing Retail Network and Dealership

The past two decades have witnessed substantial change in the retail distribution system, and all evidence suggests that at least as much change is likely over the next two. Dealership count has dwindled, average size of the dealership has increased substantially, and manufacturers' sales and franchise shares have shifted dramatically. It is important to consider the overall dimensions of these changes before trying to understand the forces that account for them and perhaps predict further changes down the road.

Retail Dealership Network

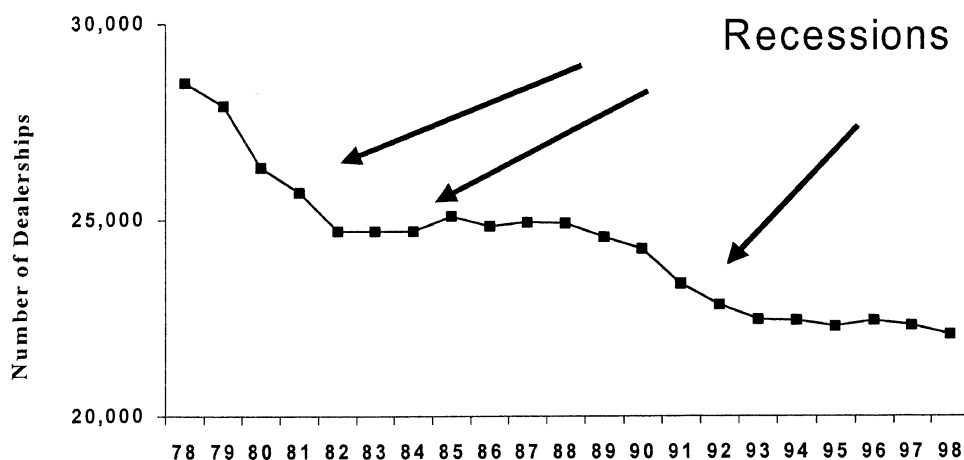
Figure 1-1 displays the fundamental trend in dealerships over the past 50 years: reduction in numbers, as 52 percent of the initial dealerships have been eliminated. The dealership census has fallen from some 48,000 to 22,000 over that period.



Source: Automotive News Market Data

Figure 1-1: Retail Automotive Concentration: the Shifting Structure of Retail

The decline in new-car dealerships continues throughout our sample period, falling from 28,512 in 1978 to 22,076 in 1998, a total of 23 percent, or an average of just over 300 dealerships per year. Dealership decline increased during the three recession periods, as displayed in figure 1-2. The years 1979 to 1982, including the first two recessions, saw a net dealership decline of more than 1,050 per year, or nearly 4 percent of the initial census. From 1990 to 1992, including the third recession, the decline in total dealerships averaged 700 per year, or just less than 3 percent per year. The effects of the third recession on dealer counts were somewhat smaller than the earlier two recessions, a shift in recession effects we shall see in other data as well.

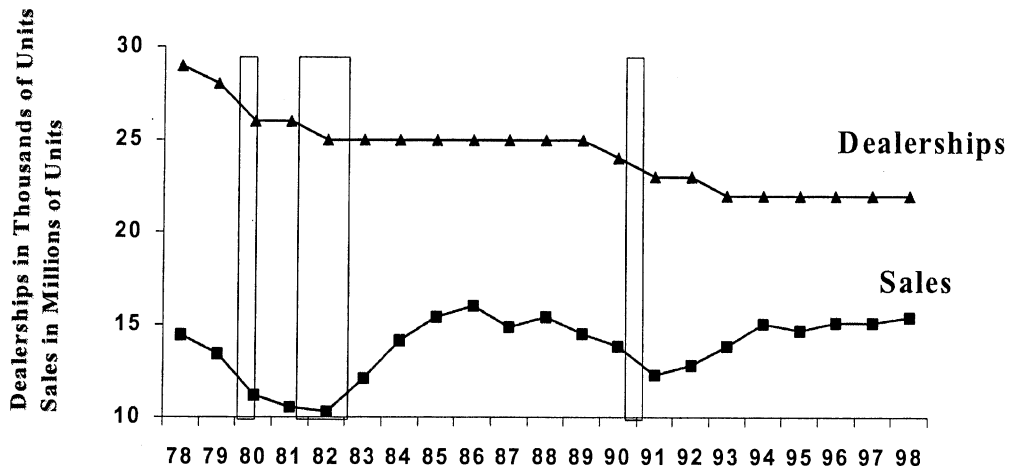


Source: Automotive News Market Data

Figure 1-2: Total Number of U.S. Dealerships 1978-1998

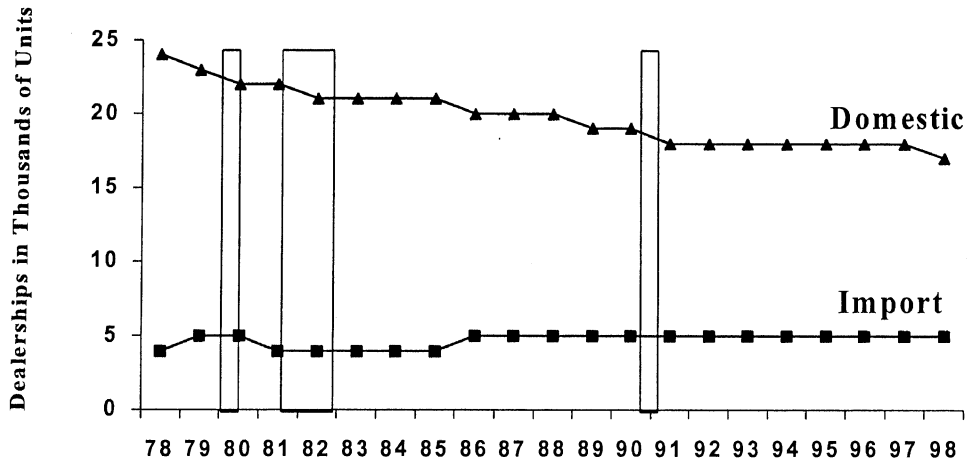
Over this 21-year period, sales trend up and dealerships down. Nevertheless, they tend to move together. The years in which there were large declines in vehicle sales saw larger declines in total dealerships, while years of booming sales saw the addition of small numbers of dealerships. However, this pattern has changed in recent years. From 1991 to 1998, the decline in total dealership count has flattened, while sales have increased to form a plateau of strong total sales.

This dealership shrinkage has occurred in spite of two factors that might be expected to increase the dealership count: substantial sales increases, displayed in figure 1-3, and the entry of numerous new manufacturers into the U.S. market. In fact, the fall in Big 3 dealerships has been sharp over the past 21 years, somewhat masked in the totals by the slow expansion of import dealerships (dealerships selling vehicles made by companies headquartered outside the United States), as shown in figure 1-4.



Source: Automotive News Market Data and Ward's

Figure 1-3: Total U.S. Sales and Dealerships 1978-1998¹



Source: Automotive News Market Data

Figure 1-4: Domestic and Import Dealerships 1978-1998

¹ In figure 1-3, and all subsequent charts, we use rectangular boxes to highlight the three recession periods of our dataset. These occurred from 1/80 through 6/80, 6/81 through 10/82, and 7/90 through 2/91.

Domestic and import dealerships follow different patterns. While this 21-year period experienced a 23 percent decline in total dealerships, domestic dealerships decreased by 28 percent and import dealerships increased by 9 percent. For example, in 1986, despite a strong sales year, there was a 973 decrease in the number of domestic dealerships but an increase of 721 in the number of import dealers, making the net number of dealerships for the year 252 lower than 1985.

Perhaps recessions have less effect on import dealerships than they do on domestic dealerships. This might be related to the fact that a larger proportion of import dealerships sell luxury vehicles, which are somewhat recession-resistant. Moreover, while the import brands have fewer sales than the domestic brands, they have proportionately even fewer dealerships. One could say that they have a relatively small market share, but a strong business performance.

Nevertheless, both domestic and import dealerships can experience significant additions and deletions during a 1-year period, but these often occur in different years. For example, in 1990, a year in which sales were decreasing, there was a decline of 395 dealerships, or 2 percent of the total, but import dealerships grew by 91 dealerships, or a 2 percent increase. As the recession hit the next year, sales figures and dealership numbers decreased. In 1991, domestic dealerships fell by 3 percent, or 628 dealerships, but import dealerships declined even more, falling by 5 percent, or 276 dealerships. The increase and then decrease in the number of import dealerships could be due to the rapid influx of weaker Japanese and Korean nameplates. These weaker brands, which sold well during a strong economy, added to the total import dealership count, but were the first nameplates to suffer, and consequently close, when the economy faltered.

The Economist predicts that this trend of dealer loss will accelerate, with the loss of another 50 percent, or about 11,000 dealerships, in the next 5 years.² By contrast, 1978-1998 data indicate that the decline in total number of dealerships has eased significantly since the last recession. *The Economist* believes that consolidators and Internet buying will be responsible for this large dealership loss. While the premises of this argument are persuasive, the extent of the expected decline seems extremely large in view of the population distribution and branding efforts of the manufacturers.

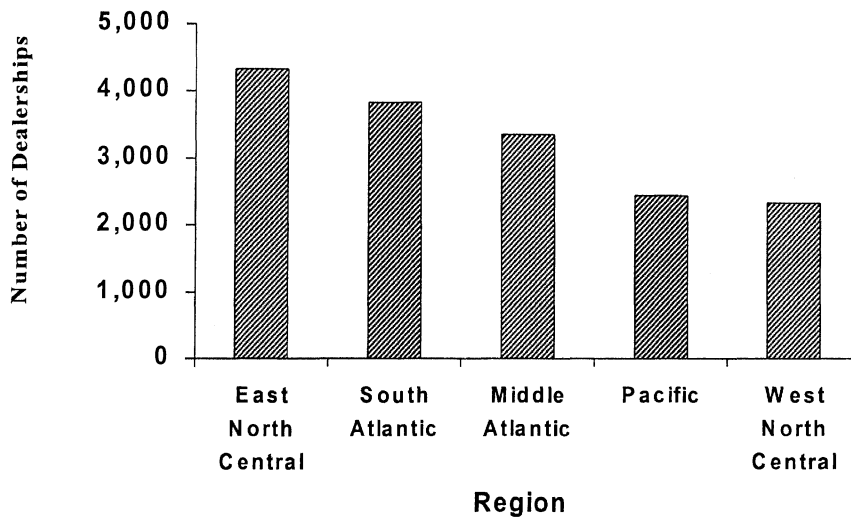
Dealerships by Region

The states with the largest number of franchised new-car dealerships are California (1,680 in 1997), Texas (1,360), Pennsylvania (1,355), New York (1,320), and Illinois (1,140). From 1979 to 1997, these states have seen the following percent decreases in new-car dealerships: California (13 percent drop), Texas (14 percent), Pennsylvania (24 percent), New York (23 percent), and Illinois (23 percent).

The geographic distribution of dealerships is also changing. As displayed in figure 1-5, the region with the largest number of franchised new-car dealerships is the East North Central region, composed of Illinois, Indiana, Michigan, Ohio, and Wisconsin with 4,330

² "Who Will Deal in Dealerships?" *The Economist*, February 14, 1998, pp. 61-63.

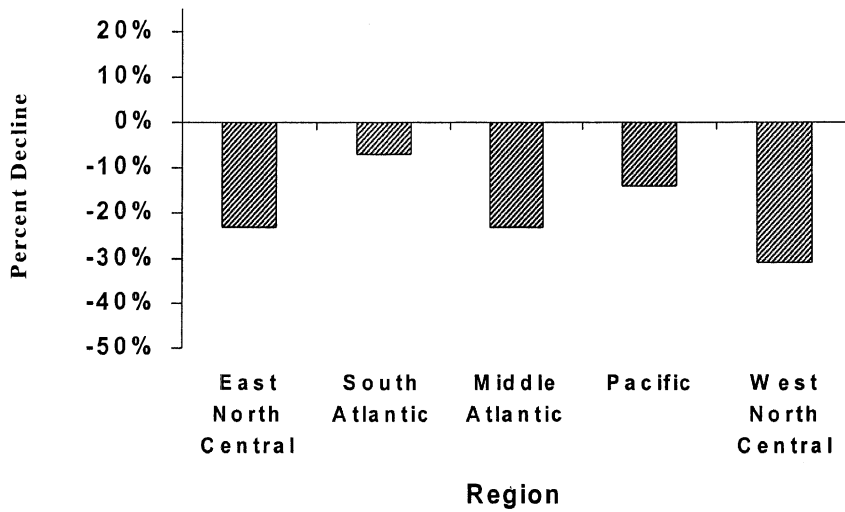
dealerships in 1997. The other top regions in new-car dealerships are as follows: South Atlantic includes Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia; Middle Atlantic includes New Jersey, New York, and Pennsylvania; Pacific includes Alaska, California, Hawaii, Oregon, and Washington; and West North Central includes Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.



Source: NADA Industry Analysis Division

Figure 1-5: Number of Dealerships by Region: 1997

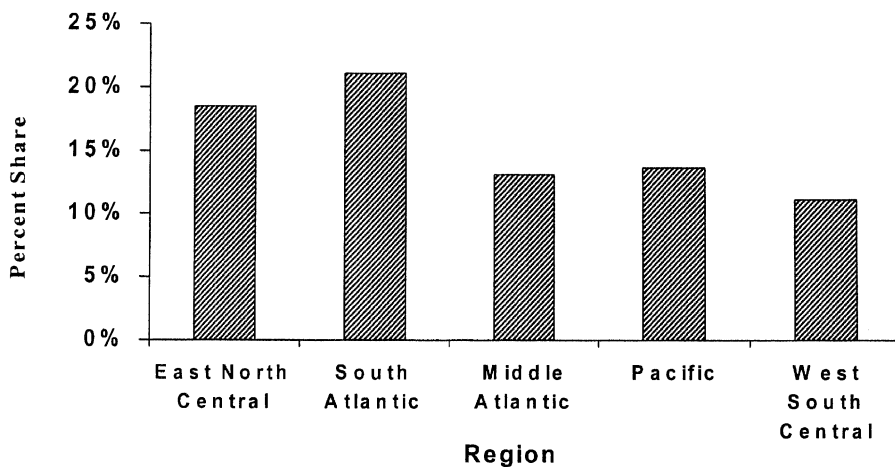
Figure 1-6 displays the regional decline.



Source: NADA Industry Analysis Division

Figure 1-6: Percent Decline in Dealerships, by Region: 1979-1997

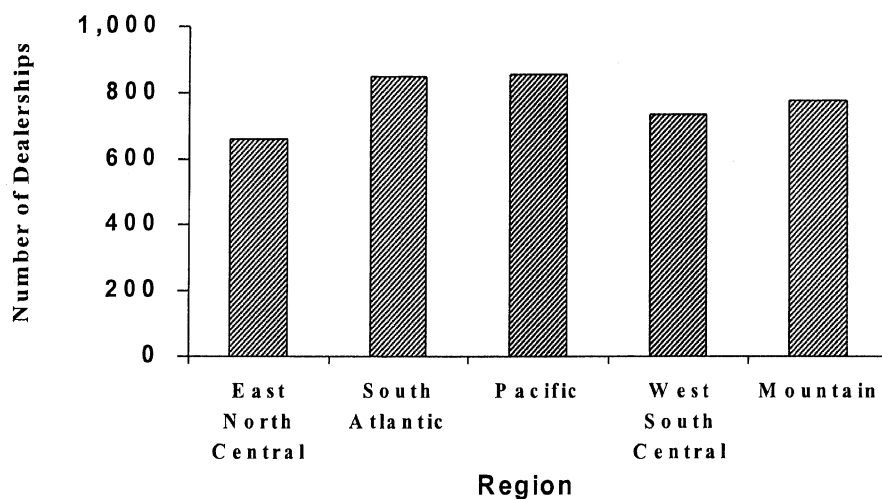
The top regions in share of U.S. 1997 new-vehicle registrations are displayed in figure 1-7, below. They were the South Atlantic (3,253,386 vehicles sold), East North Central (2,859,113), Pacific (2,098,647), Middle Atlantic (2,022,473), and West South Central (1,705,905).



Source: NADA Industry Analysis Division

Figure 1-7: Percent Share of 1997 U.S. New-Vehicle Registrations, by Region

The regions vary somewhat in sales per dealership, as figure 1-8 shows. The Pacific region is highest at 857 sales per dealership and the East North Central region is lowest, at 660.



Source: NADA Industry Analysis Division

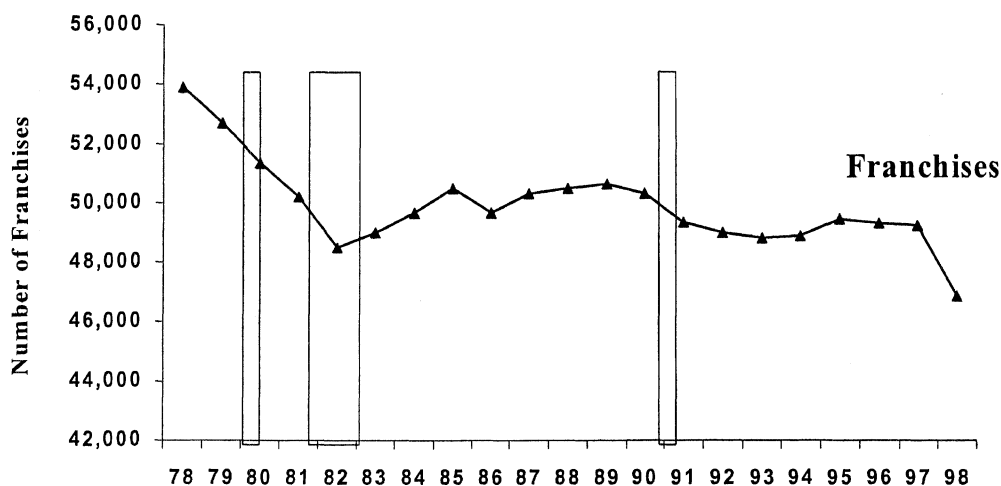
Figure 1-8: 1997 Sales per Dealership, by Region

The South Atlantic region dealerships experienced a serious decline after the 1981-1982 recession period and then gained in the following years. This is interesting because the South Atlantic region overall has experienced the least change in the number of dealerships during the last 21 years—7 percent decline versus the 14 percent to 31 percent decline of the other regions. The South Atlantic region has the largest share of the U.S. new-vehicle market, 21 percent in 1997. This undoubtedly reflects the population and economic expansion of the South over this period.

Total Retail Franchises

The higher percent changes in dealership counts occurred in regions with lower sales, as would be expected. Thus the West North Central region of Iowa, Kansas, Missouri, Minnesota, Nebraska, North Dakota, and South Dakota declined 31 percent. It seems that 3 regions, all with sales averaging less than 800 per dealership, are likely to see dealer closings over the next few years, and these would undoubtedly be accelerated by an economic downturn. These are the Mountain (776 sales), West South Central (734 sales), and East North Central (660 sales) regions.

Dealerships are retail points, and, of course, increasingly may offer more than one brand franchise. However, franchises too are falling, as seen in figure 1-9, above. Most of the loss occurs early in our sample period, while the 1998 plunge is largely explained by two factors: the elimination of the Eagle brand and some loss of European franchises.

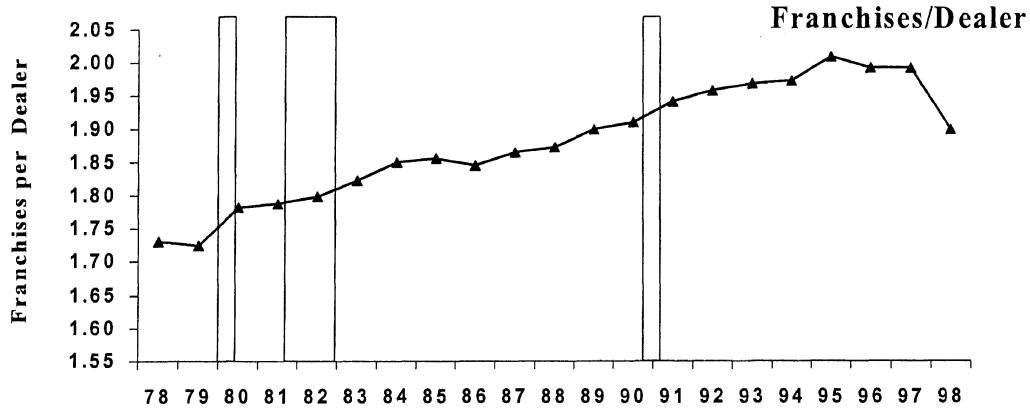


Source: Automotive News Market Data

Figure 1-9: Total Franchises 1978-1998

So, dealerships experienced a 23 percent decline over our sample period, but total franchises declined 5 percent, from 50,393 in 1978 to 46,882 in 1998. Total domestic franchises decreased only 4 percent during this period and import franchises declined by 8 percent.³ Therefore, there must be an increasing average number of franchises per dealership during the same time period. Figure 1-10 confirms this.

³ Some of this decline is more apparent than real, since it reflects the elimination of GM's GEO franchises. These were arguably artificial in any case, since they did not represent a specific or distinct manufacturer, but rather just the collection of cars GM sourced from foreign manufacturers.

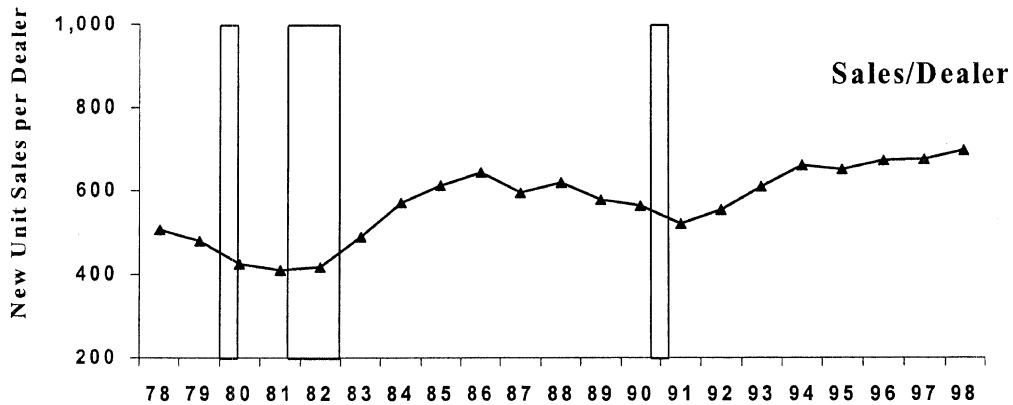


Source: Automotive News Market Data

Figure 1-10: U.S. Franchises per Dealer 1978-1998

The average number of franchises per dealership in 1978 was 1.9 for Chrysler and 1.5 for both General Motors (GM) and Ford. For 1998 the average number of franchises per dealership has increased to 2.6 for Chrysler, 2.1 for GM, and 1.7 for Ford.⁴ These numbers help to demonstrate a shift that has occurred from smaller, single-franchise dealerships to larger, dual franchise or multifranchise dealerships, including dealer superstores. They also help to explain the increase in the number of vehicle sales per dealership, displayed in figure 1-11.

⁴In 1998, Daimler-Benz acquired Chrysler, forming DaimlerChrysler. We refer to Chrysler throughout this report because the data and analyses treat Chrysler, now the Chrysler division, and Mercedes-Benz as separate nameplates.

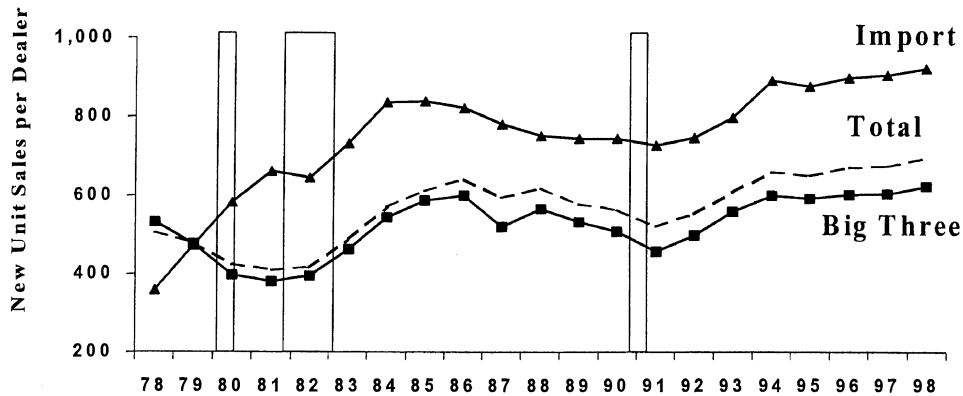


Source: Automotive News Market Data & Ward's

Figure 1-11: Average Dealership Profile: Annual New Unit Sales 1978-1998

Dealership Profile

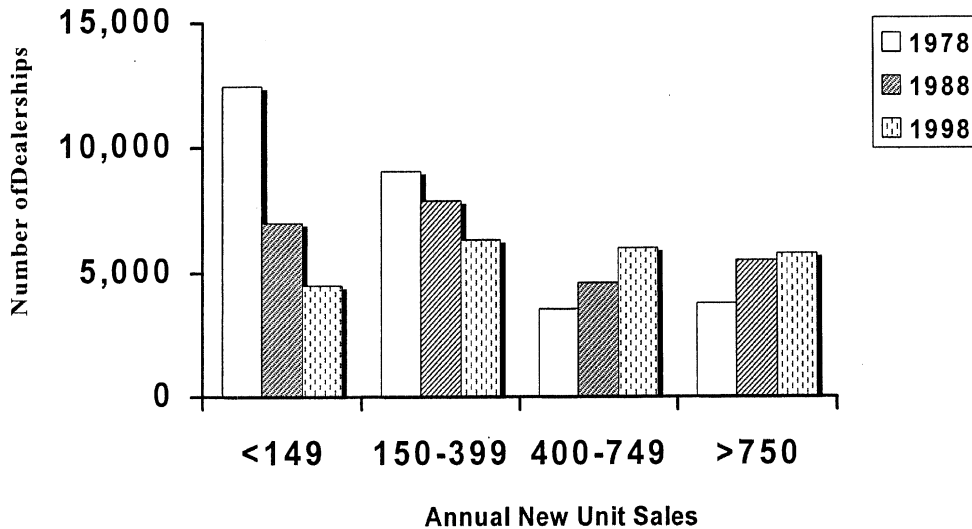
Figure 1-12 displays sales per dealership. Average sales per dealership have increased dramatically, from just 144 in 1958, to 540 at the start of our analysis period in 1978, and to 696 in 1998, the end of the period. Clearly, dealerships are larger today, and import dealerships are larger on average than are dealerships selling products from the Big 3. But is this simply due to the emergence of a relatively small number of truly mammoth dealerships?



Source: Automotive News Market Data & Ward's

Figure 1-12: Average Dealership Profile: Sales per Dealership 1978-1998

Data from National Automotive Dealers Association (NADA), shown in figure 1-13, allow us to distinguish the different sizes of dealerships. Indeed, smaller volume dealerships saw the greatest decline during the 1978 to 1998 period, while larger volume dealerships saw an increase in number. More specifically, dealerships selling fewer than 150 new vehicles per year declined in number from 12,470 in 1978 to 4,520 in 1998. On the other hand, the number of dealerships selling more than 750 vehicles increased from 3,770 in 1978 to 5,763 in 1998. In 1998, the largest number of dealerships (6,326) fell in the 150 to 399 new unit sales per year category, closely followed by the two larger groups. Perhaps more interesting is the fact that dealerships selling between 400 and 749 new vehicles a year show substantial growth. So consolidation at the dealer level is not simply the disappearance of the small and the emergence of the huge.



Source: NADA Industry Analysis

Figure 1-13: Number of Dealerships by Unit Sales

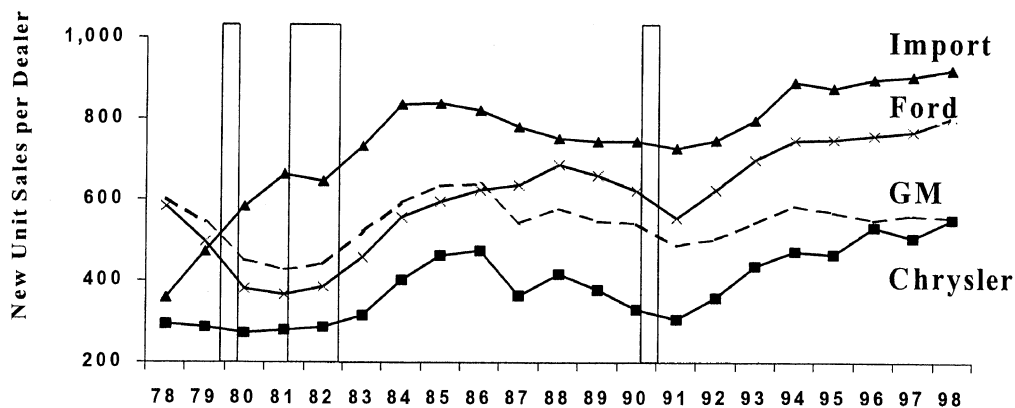
Rising vehicle sales, a decrease in the number of dealerships, and a smaller decrease in the number of franchises result in larger dealerships with multiple franchises selling and servicing a larger number of brands.

This consolidation into larger dealers has had important effects on the structure of the market. The largest 5 percent of dealerships account for nearly one-third of all auto sales in 1998, up from one-quarter in 1988.⁵ J.D. Power and Associates estimate that this number will increase to include half of all vehicle sales by 2008. The implications of this for shifts in relative power between manufacturers and dealers are enormous. As the manufacturers' market shares fragment, and dealers' shares concentrate, the relative dependence of each on the other dramatically alters. Perhaps the next round of consolidation will see the emergence of powerful dealer groups, much as Sears emerged to redefine the fragmented home appliance market of the 1920s.

Sales per dealership vary across the imports and the Big 3, as shown in figure 1-14. There are two important aspects to these data. First, as the imports gained share after the second oil shock, they were slow to add dealerships, yielding a high sale per outlet ratio, and the stronger business performance of their outlets. Second, Ford has succeeded in converting its share gain over this period into stronger dealership performance as well, by reducing its dealership count. Among the Big 3, GM (8118 dealerships in 1998) has nearly double the number of dealerships of Ford (4834) and Chrysler (4484). Over the 1978 to 1998 period, GM has seen a 30 percent decrease in U.S. dealerships,

⁵ J.D. Power and Associates, *The Power Report*, January 1999, p. 4.

accompanied by large share losses, Ford a 27 percent decrease, and Chrysler a 6 percent decrease.⁶ Whether GM's higher dealer count provides it with greater geographical coverage, or just more inter-company competition is not clear.



Source: Automotive News Market Data & Ward's

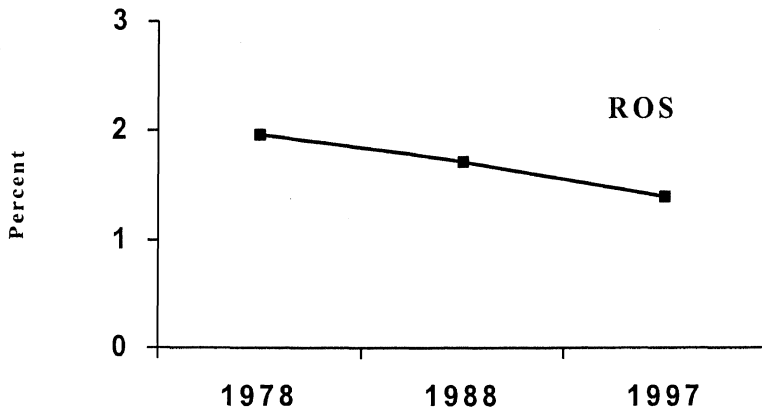
Figure 1-14: Average Dealership Profile: Sales per Dealership 1978-1998

Ford and GM would like to consolidate the number of their dealerships in order to strengthen their brands and decrease the number of weak dealerships. Ford had advanced further than GM in this effort, rationalizing its points under the Ford Retail Network (FRN) plan. However, this plan has recently seemed to be, if not abandoned, certainly less aggressive. GM's Project 2000 aimed at reducing its dealership count and paring its brands, but this does seem to have been abandoned, at least to the extent it involved GM buying a substantial share of its current dealerships. Both Ford and GM are trying to develop e-commerce models to strengthen their retail activities. Some import brands are focusing on consolidation as well; for example, Mercedes is engaged in a similar effort to consolidate and reorganize.

At the dealer end, the emergence of public companies is consolidating ownership, as is the frequent merging of several dealerships into large automotive groups and/or superstores. Many of these groups are also pursuing Internet or e-commerce strategies as major business strategies.

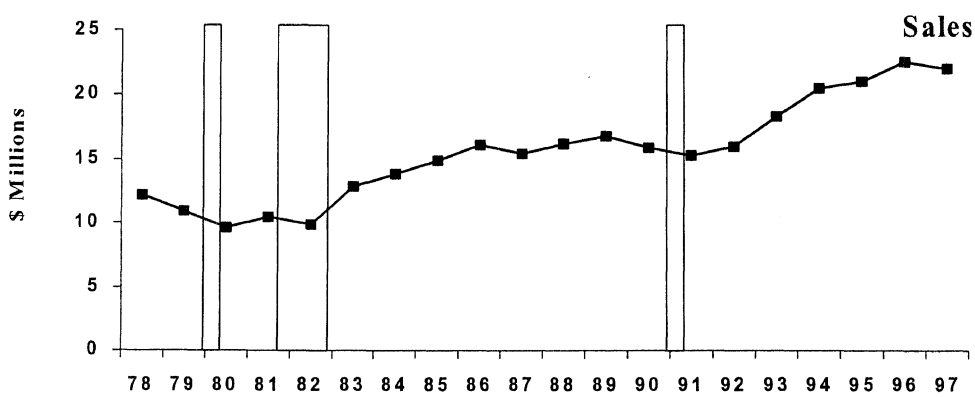
⁶ These dealership figures include intercorporate duals, which have decreased significantly during this time period (from 600 in 1978 to 220 in 1998). In general, our dealership figures are for passenger car or combined passenger-car and light-truck dealerships for 1978 through 1995. The 1996-1998 figures include light-truck-only dealerships as well. These light-truck-only dealerships number in the 300s until they take a sharp jump to 878 in 1998. We do not have any information behind this large number, but we speculate that perhaps the rise is in part due to the demise of the Eagle franchise in 1997. Since an Eagle franchise was typically accompanied by a Jeep franchise, the remaining dealership would be a Jeep or a truck dealership.

Dealers have experienced declining returns across our sample period, as shown in figure 1-15. This has occurred in spite of the real dollar revenue increases displayed in figure 1-16, and in spite of some improvement in gross profits, displayed in figure 1-17.



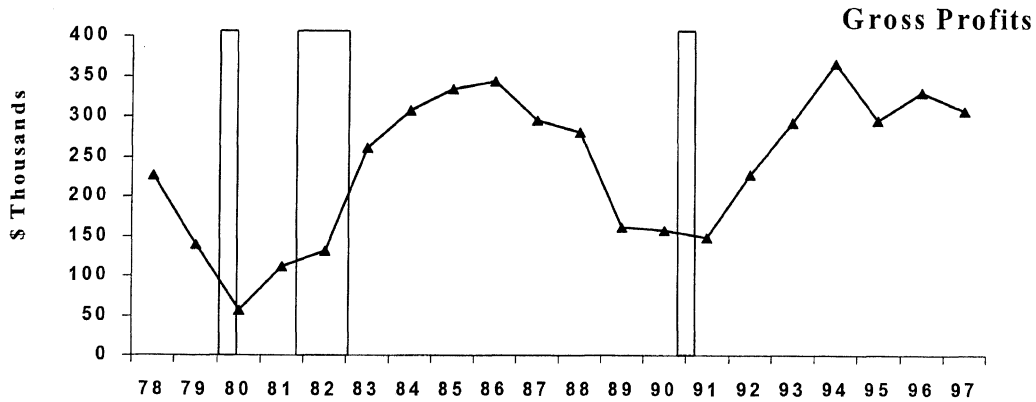
Source: NADA Industry Analysis

Figure 1-15: Retail Automotive Concentration: Declining Dealer Return on Sales (ROS)



Source: NADA Industry Analysis

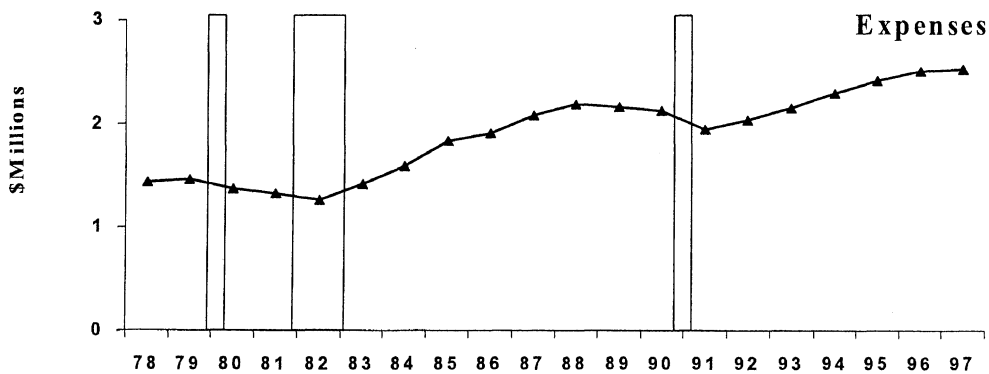
Figure 1-16: Average Dealership Profile: Sales (Adjusted to 1997 \$)



Source: NADA Industry Analysis

Figure 1-17: Average Dealership Profile: Gross Profits (Adjusted to 1997 \$)

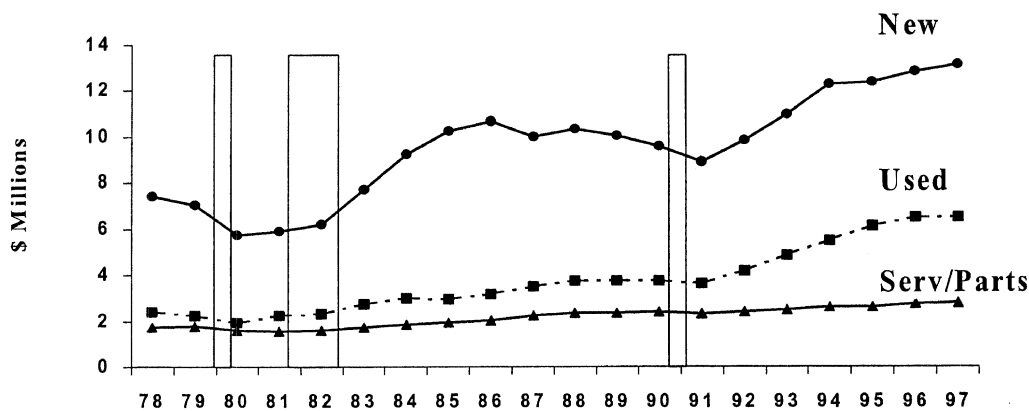
Note that the recession periods are extraordinarily important for gross profits, depressing them severely, while the correlative reduction in expenses during a recession is relatively small, as revealed in figure 1-18, below. If growth typically enhances profits, as it does in the manufacturing end of the industry, it has not had a strong effect on the dealership net.



Source: NADA Industry Analysis

Figure 1-18: Average Dealership Profile: Expenses (Adjusted to 1997 \$)

The profit structure of the dealership has changed over our sample period. New vehicles continue to be the main source of revenue, with some increases for used vehicles, and service and parts relatively flat in real dollars, displayed in figure 1-19. It merits mention that the conventional wisdom suggests that dealers must make up for falling vehicle revenues during a recession by increasing their repair and maintenance activity, as customers hold cars longer. However, figure 1-19 suggests that revenue from these operations are flat during a recession, perhaps as customers move to specialist and independent shops perceived to be less expensive. Indeed, our recent survey of dealers suggests that the more profitable dealers, in general, are not those especially reliant on repair and services for profits, but rather those that can also make profits on new-vehicle sales.⁷

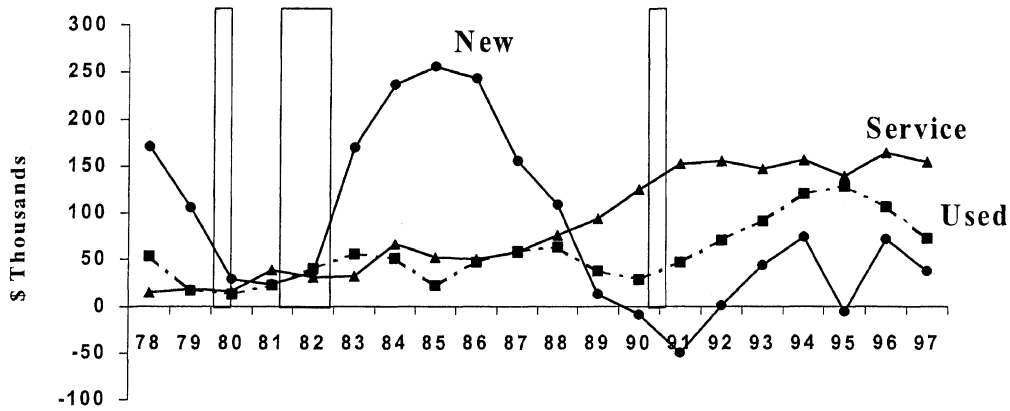


Source: NADA Industry Analysis

Figure 1-19: Average Dealership Profile: Department Sales (Adjusted to 1997 \$)

However, figure 1-20 shows that while new vehicles were also the most profitable activity heading into the first recession, and recovered nicely after the second, their profits have languished since 1988. Indeed, used vehicles and service and parts operations now return higher profits than do new-vehicle sales. New-vehicle profits are affected by leasing and manufacturer incentives.

⁷ Flynn, Michael S., Mateyka, James A., et al. *Divergent Views on the Future of Automotive Retailing*, Office for the Study of Automotive Transportation (OSAT), March 1999.



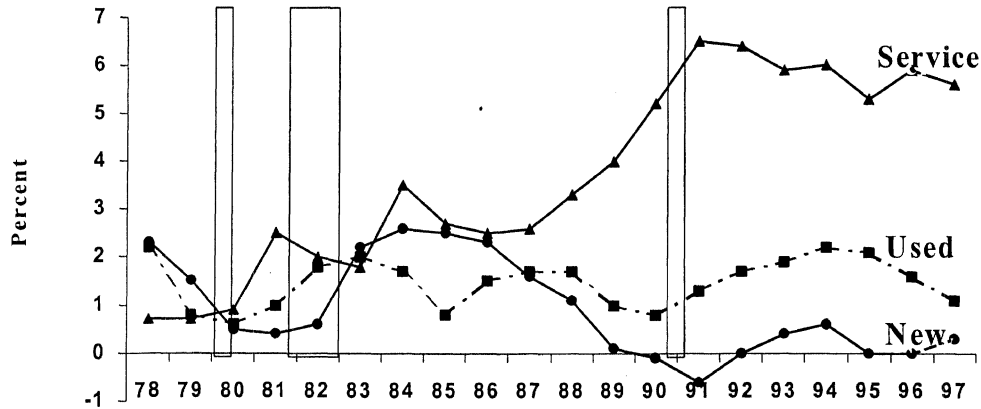
Source: NADA Industry Analysis

Figure 1-20: Average Dealership Profile: Department Profits (Adjusted to 1997 \$)

New-vehicle departments even incurred losses in 1990, and these losses grew sharply in 1991. New-vehicle sales became profitable for the next 3 years until they incurred losses again in 1995. The new-vehicle departments have become profitable on average once again in the years since 1996 but, according to NADA, are typically break-even operations for most dealerships today. Profits on sales in the service and parts department hit a record high in 1996 and then fell slightly in 1997.⁸

As shown in figure 1-21, new-car profits as a percent of sales now seriously lag used cars and especially parts and service. Profits as a percent of sales in the used-vehicle department reached a peak in 1994, but since then, department profits have dropped 40 percent.

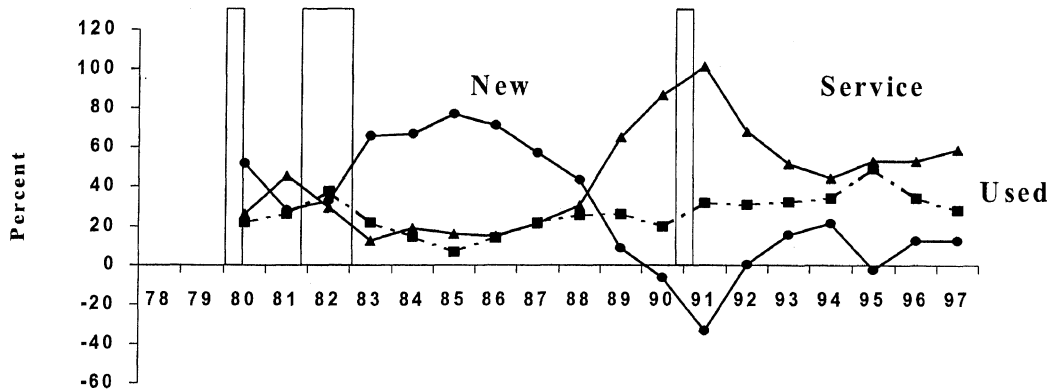
⁸ National Automobile Dealers Association (NADA) Industry Analysis Division, *NADA Data*, 1998.



Source: NADA Industry Analysis

Figure 1-21: Average Dealership Profile: Department Profits as Percent of Department Sales

Figure 1-22 displays the average contribution of the three basic departments to dealer profits for our sample period. In 1997, new-car sales accounted for less than 13 percent of dealer profit, while used-vehicle department profits accounted for 28 percent of total profits. This switch to used-vehicle sales and profitability since 1989 is a fundamental shift in the retail environment. Consumers are interested in used vehicles because they are more durable than they were in the past, are of higher quality, and are perceived as being a good value. There has been an influx of nearly new vehicles, typically off-lease 1- to 4-year-old vehicles, and this increased supply has restricted growth in the used-vehicle price-to-value ratio.



Source: NADA Industry Analysis

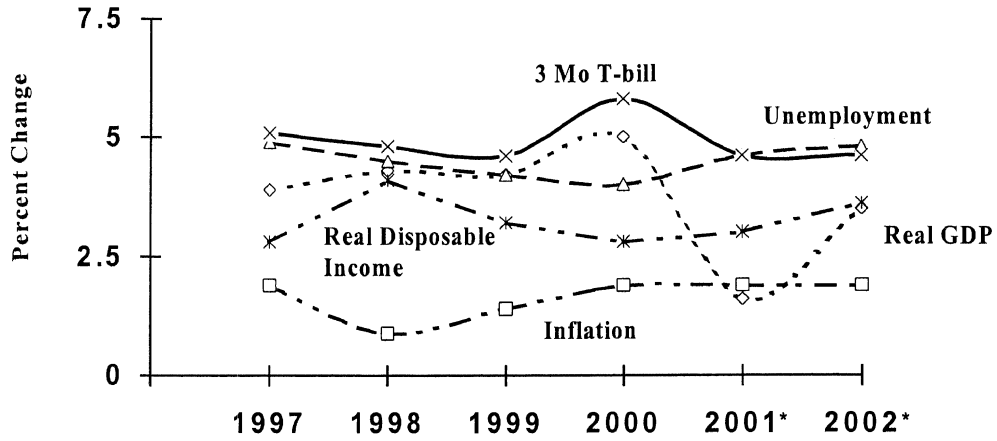
Figure 1-22: Average Dealership Profile: Share of Total Profits by Department

In 1997, parts and service operations accounted for 59 percent of total dealership profits. NADA attributes this to “The tremendous investment dealers have made in facilities, equipment, and technician training ... paying off in increased market share, greater operating efficiency, and enhanced customer satisfaction.”⁹ However, as shown in figure 1-19 (p.19), the sales in these operations have been essentially flat for the past 21 years. It is difficult to see how these sales can represent increased market share, since the total market for these services has grown with the size of the in-use fleet, longer vehicle life, and often more complex maintenance and repair.

Will the economy hold, perhaps providing the manufacturers and dealers some time to improve and better the distribution system? Figure 1-23 displays recent economic forecasts that reflect the consensus of economists: no hard landing in sight. More specifically, figure 1-24 suggests that the auto market downturn still appears to be further in the future rather than right at hand.¹⁰ Of course, whether dealers use this time to change and ready themselves for the next downturn, or perhaps just to enjoy their current situation a little longer remains to be seen.

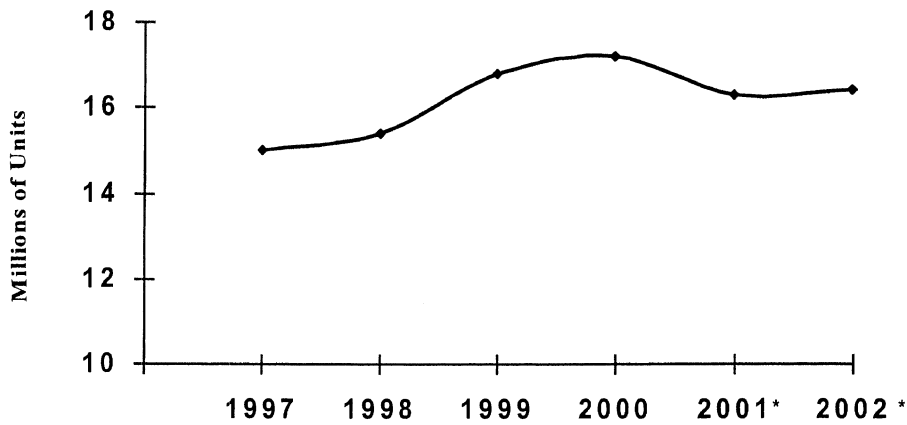
⁹ National Automobile Dealers Association (NADA) Industry Analysis Division, *NADA Data*, 1998.

¹⁰ Research Seminar in Quantitative Economics (RSQE) at the University of Michigan predicts, “With the economy’s still-strong fundamentals boosted by expansionary fiscal and monetary policies, the pace of output expansion picks up to 3 percent in the final quarter of 2001 and then accelerates to 4.1 in late 2002.” It also predicts that lower interest rates with federal tax cuts will support vehicle sales in the 16 ¼ – 16 ½ million range during the next two years.



Source: rsqe.econ.lsa.umich.edu (Note: Year 2001 and 2002 are estimated)

Figure 1-23: Another Year, Another Soft Landing 1997-2002



Source: rsqe.econ.lsa.umich.edu (Note: Year 2001 and 2002 are estimated)

Figure 1-24: Auto Sales Slowing? 1997-2002

To this point we have considered the total light-vehicle market, making only passing references to different types of vehicles. However, segmenting that total market along two dimensions reveals differences that may be important to the future shape of the retail distribution systems and even critical to the success of individual dealerships. We turn in the next chapter to a closer analysis of the vehicle market.

Summary

The number of dealerships has declined over the past 21 years, and the disappearance of retail outlets has been particularly sharp during recession periods. The decline in dealerships has been concentrated in the Big 3, as import dealerships have actually enjoyed a small increase over the period. Franchises have also declined over the periods, but the size of the decline is much smaller than that of dealerships.

There has been a shift in the distribution of dealerships across the nation, reflecting closings, but also openings, as the population has shifted. The number of dealers has declined the most in the West North Central region, with less than 10 percent market share, while the number of dealers in the South Atlantic region, with over 20 percent share, has changed the least.

There are fewer dealerships today than in 1978, but they have more franchises and sell more new vehicles. So there is a clear pattern of dealer consolidation. Vehicle sales are higher at import dealers than the Big 3, and this has been the case since 1979. If dealer sales have increased over time, so have dealer expenses. Nevertheless, profits have been high in good economic times, although quite low in recession periods. Since the late 1980s, profits of the service departments have replaced profits of new-vehicle departments as the largest source of dealer profits.

Chapter Two: Market Segmentation

We now provide some perspective on light vehicle sales during the period 1978-1998. We highlight the differences between the markets for passenger cars (PC) and light trucks (LT), as well as exploring some of the differences between the Big 3—Ford, GM, Chrysler (now DaimlerChrysler) and their imported-brand¹¹ competitors.

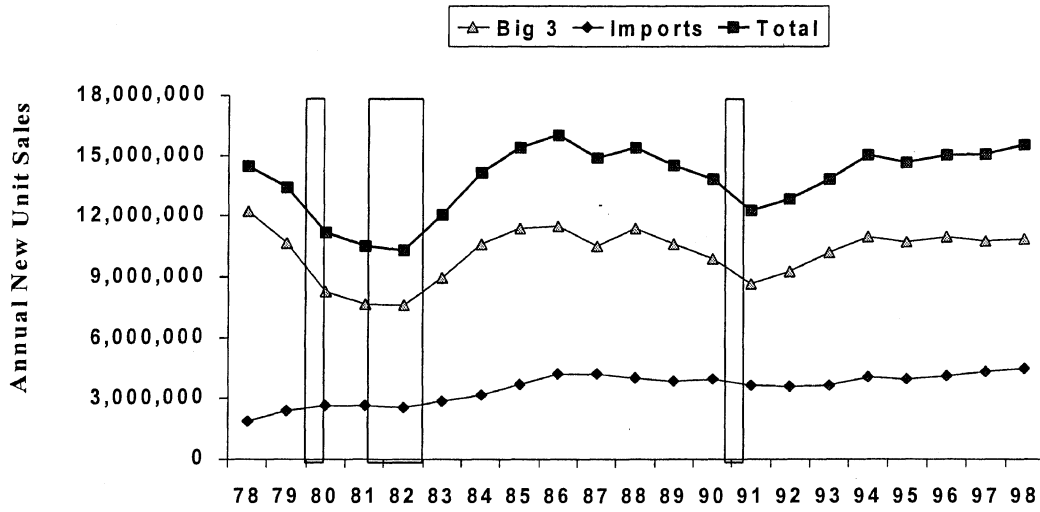
We first examine the distinction between the traditional PC and the LT category. However, the luxury/nonluxury distinction is now of such primary importance, that we treat luxury vehicles as a third major division, rather than only as subsets of PCs and LTs. Consequently, our major market segmentation divides the market into nonluxury PC, nonluxury LT, and luxury vehicles. For analytic purposes, we divide nonluxury PCs into large, midsize, and small cars, while nonluxury LTs include vans, pickups, and sport utility vehicles (SUVs). Luxury vehicles include PCs and LTs, primarily SUVs. It is important to note how the shares of these segments have shifted substantially over the past two decades.

After examining the different segments, we turn our attention, although less systematically, to the second dimension, examining differences between the Big 3 manufacturers and their major competitors, typically the Japanese automotive companies. In a few instances, we also examine market share trajectories for selected individual companies.

Total sales

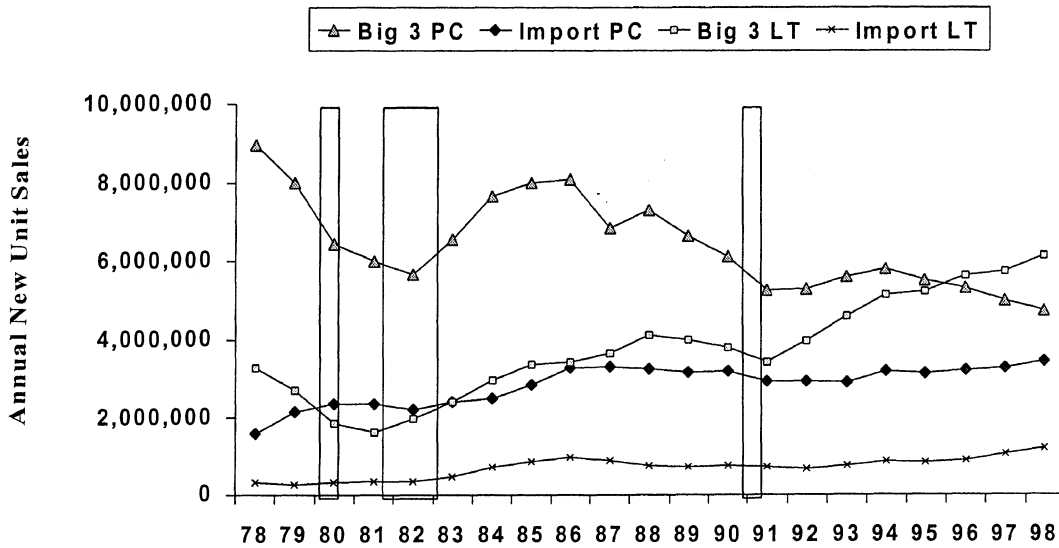
Total sales have been relatively stable recently, and it is noteworthy that most of the fluctuation in the market is experienced by the Big 3 rather than their import competitors, as shown in figure 2-1. Moreover, this is the case whether we look at the passenger-car market, where the Big 3 face declining sales, or in light trucks, where Big 3 sales are increasing, as displayed in figure 2-2.

¹¹ For convenience, we refer to these vehicles as “imports,” but in fact many of them are manufactured in North America.



Source: Ward's

Figure 2-1: Total-Vehicle Sales 1978-1998

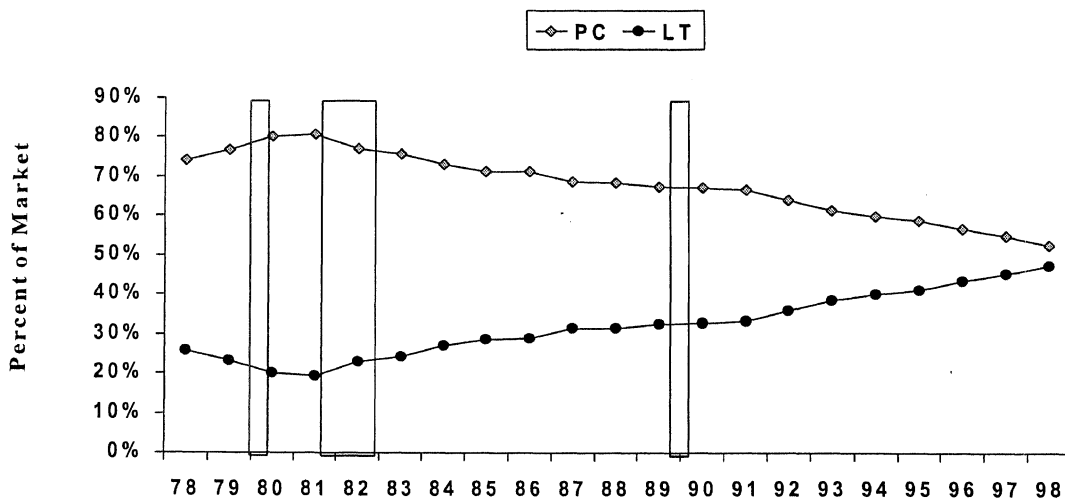


Source: Ward's

Figure 2-2: Vehicle Sales, By Type and Company 1978-1998

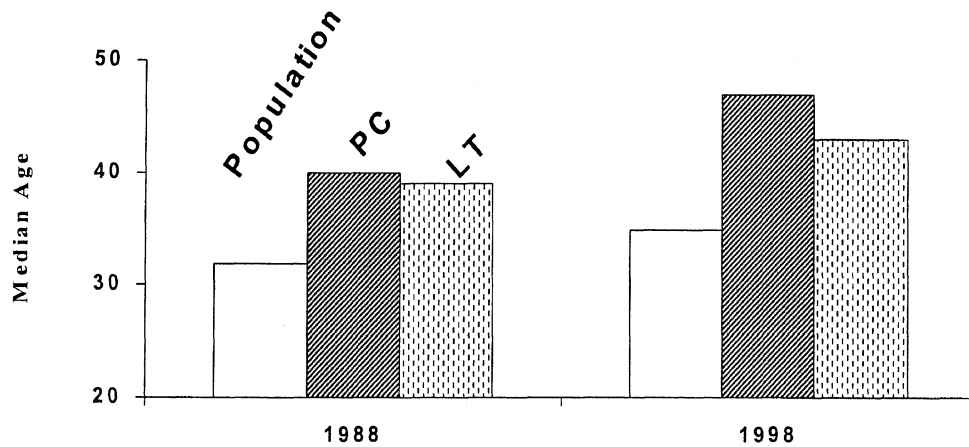
Segment Shifts

The industry, especially the domestic manufacturers, have welcomed the surge in the relative popularity of light trucks, including vans, pickups, and sport utility vehicles, shown in figure 2-3. This is easy to understand since many of these vehicles provide a high profit margin to both manufacturers and dealers. This especially benefits the Big 3, because they are traditionally strong in the light-truck segment. However, many of these vehicles are also relatively less expensive than their PC alternative. Indeed, the data in figure 2-4 suggest that age is an important factor in vehicle purchasing, and generally, it is not the older—and more affluent—buyers that are purchasing LTs.



Source: Ward's

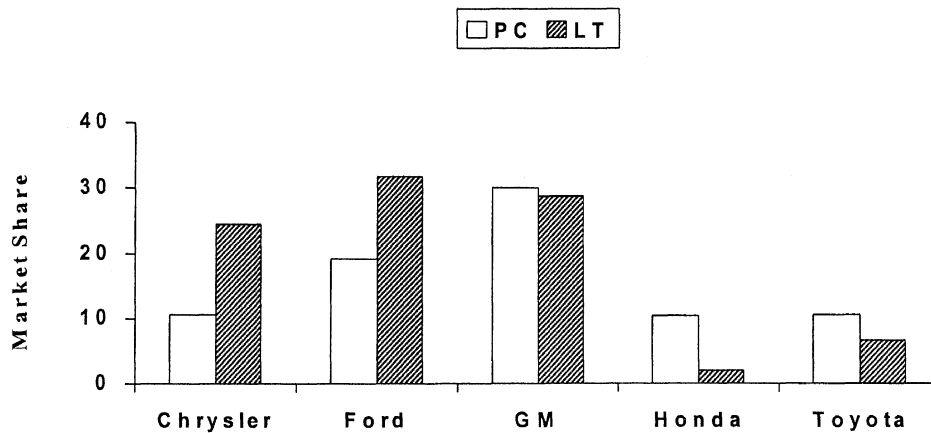
Figure 2-3: PC vs. LT Sales 1980-1998



Source: New York Times 3/1/99, Authors' Estimates

Figure 2-4: Age and the New-Vehicle Buyer 1988 vs. 1998¹²

This shift to LTs has different implications for different brands, as revealed in figure 2-5, showing the relative shares in PC and LT markets held by the six largest manufacturers for the U.S. market. Chrysler and Ford are relatively more successful in the LT market, while Toyota and especially Honda have done better in the PC market than they have in the light-truck market.

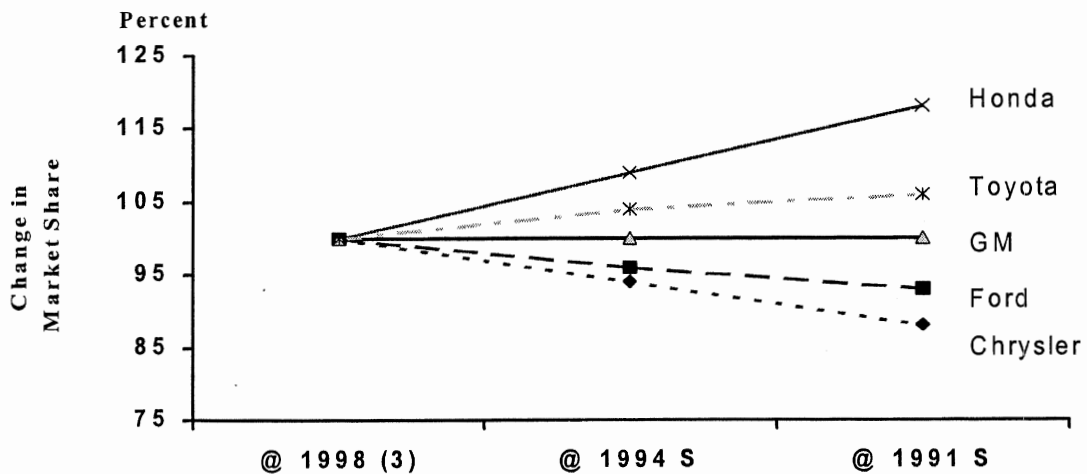


Source: Ward's

Figure 2-5: U.S. 1998 Market Share, By Company and Type

¹² "As U.S. Buyers Age, Designers of Autos Make Subtle Shifts," *New York Times*, March 1, 1999.

The market has shifted, and it can shift back. Figure 2-6 illustrates the threat to market share for the top five vehicle makers if the market shifts back, and each maintains its relative performance in the PC and LT markets. For instance, if the demand mix for PCs and LTs shifts back to 1991 levels, Honda would gain the most, capturing approximately 118 percent of its late 1998 total market share. Chrysler, on the other hand, would suffer the most, dropping back to about 87 percent of its 1998 market share.

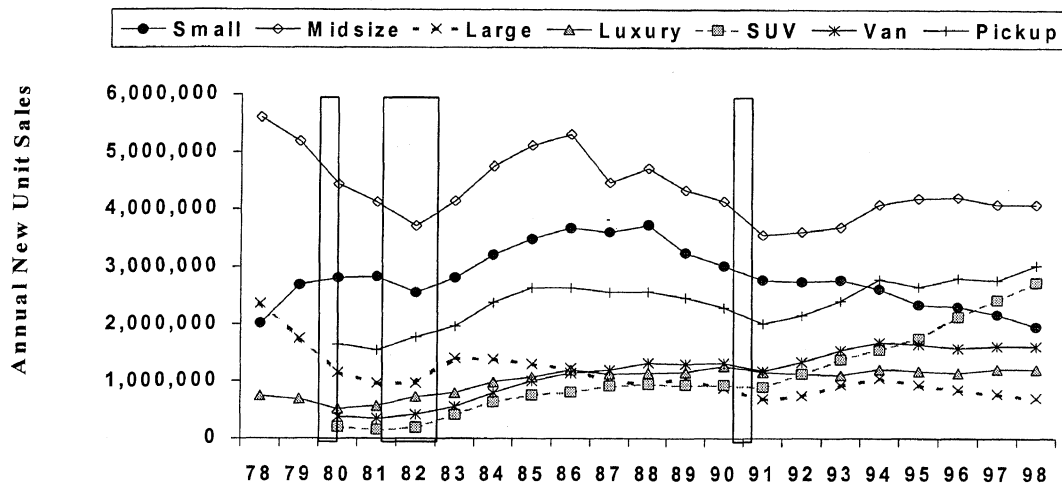


Source: Ward's

Figure 2-6: Shifting U.S. Market Segmentation

Segment Sales

Figure 2-7 displays the sales patterns of the different types of PCs and LTs over the past two decades. Since reaching their peaks in the mid-1980s, both midsize-car and small-car sales dropped through the recession of 1990-91. While midsize-car sales stabilized following the third recession and have even grown somewhat, small-car sales have never recovered, and now lag midsize cars, SUVs, and pickups. This trend suggests that midsize cars may have replaced small cars as the basic transportation purchase. The SUV segment has experienced the largest growth since the recession of 1990-91. Large-car and luxury-car sales are currently the two smallest vehicle sales segments, although in the 1980s their sales levels were somewhat above vans and sport utility vehicles.

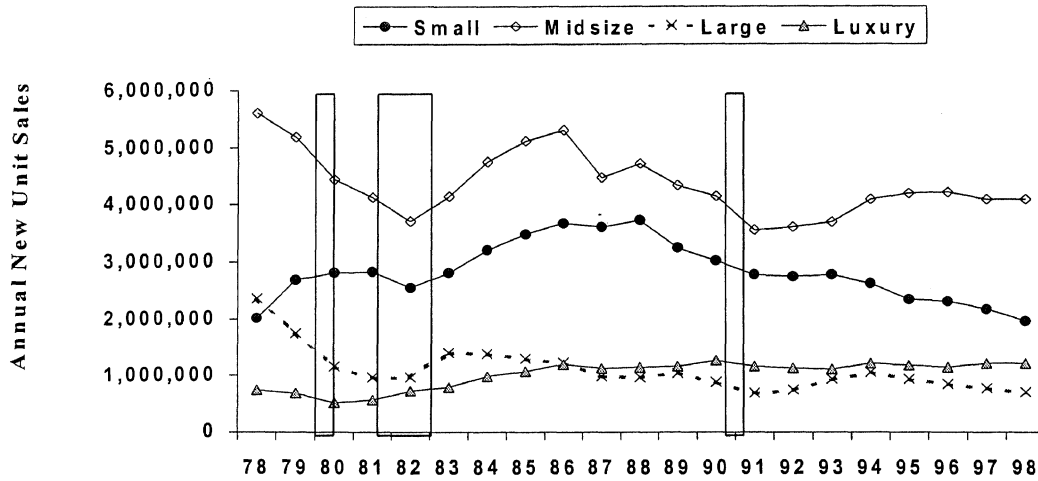


Source: Ward's

Figure 2-7: PC & LT Segmentation 1978-1998¹³

Figure 2-8 displays just the 4 passenger-car types: luxury, large, middle, and small. In absolute terms, as figure 2-8 shows, midsize cars have been the dominant PC sales segment over the past 21 years, even though they have declined precipitously from their high of 5.6 million in 1978 to about 4.1 million sales in 1998. In the 1980s they averaged 4.5 million units and in the 1990s they averaged 4 million units per year. Midsize market share of total PC sales has dropped from a high of 40 percent in 1980 to a low of 27 percent in 1994, 1997, and 1998.

¹³ Due to the method used to compile light-truck totals prior to 1980, our dataset does not include light-truck segment sales before 1980. We chose to use the segment data from 1980-1998, rather than to use questionable additional estimate for 1978 and 1979.



Source: Ward's

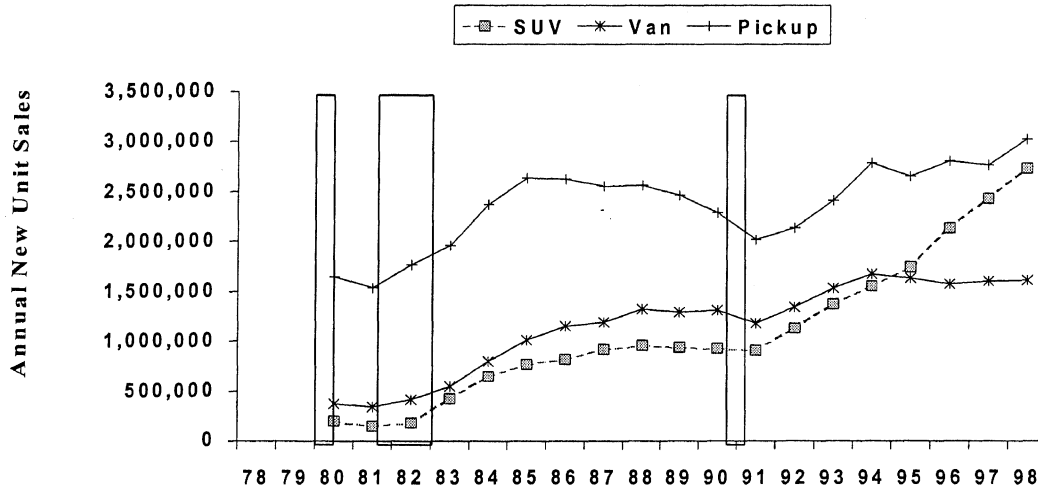
Figure 2-8: PC Segmentation 1978-1998

Small cars grew dramatically during and after the oil shocks of the 1970s, but have seen a marked decrease in sales since their high of 3.7 million sales in 1988 to a low of about 2 million in 1998. Their market share reached a high of 27 percent in 1981 and low of 13 percent in 1998. In the 1980s they averaged 3.2 million in sales, but in the 1990s they averaged 2.5 million in sales.

In the 1980s large cars averaged 1.1 million sales per year, whereas in the 1990s they have averaged about 850,000 per year. Both of these averages are a substantial decrease from the 1978, 21-year high of 2.4 million cars. In 1978 the large-car segment share was 22 percent; but by 1998 this segment represented only a 5 percent share of the PC market.

Luxury cars, perhaps the most recession-resistant segment, reached one million annual sales in 1985 and have reached a high of 1.2 million cars sold in 1994, 1997, and 1998. During the 1980s, luxury cars averaged about 930,000 sales annually while in the 1990s sales have averaged 1.1 million cars. But the market has grown, so despite this increase in annual sales, the average PC market share for this segment still hovers between 7 percent to 9 percent.

Turning to light trucks, figure 2-9 displays the sales of the three segments: pickup trucks, vans, and sport utility vehicles (SUVs). All three of these types have increased their sales over the past 21 years, most notably SUVs. Indeed, pickups and SUVs have surpassed small cars and are the second and third highest selling segments, respectively, behind midsize cars.



Source: Ward's

Figure 2-9: LT Segmentation 1978-1998

Pickup trucks grew significantly during the 1980s, averaging 2.2 million in sales, and in the 1990s they averaged 2.5 million in sales annually. Total market share for this segment has grown from 15 percent in 1980 to 20 percent in 1998.

Vans, particularly minivans, have also seen major increases over the past 21 years, but have leveled off since the mid-1990s. In the 1980s, the van segment grew from slightly less than 400,000 to about 1.2 million, averaging about 845,000 for the decade. In the 1990s, vans continued their growth, peaking in 1994 with sales of about 1.7 million. But in 1995, sales decreased slightly and appear to have leveled off since then. Average sales for the decade so far are about 1.5 million per year.

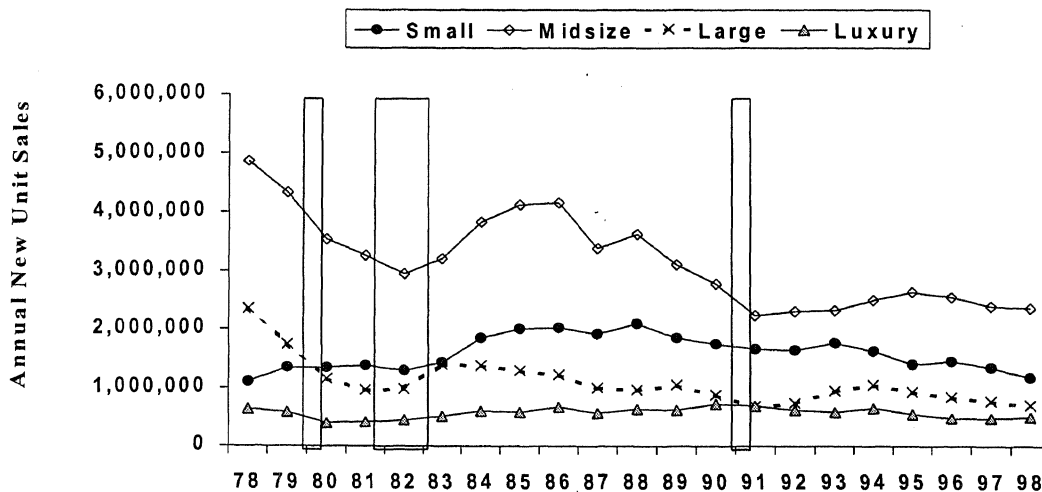
SUV sales increased in the early 1980s and leveled off for the rest of the decade, averaging 600,000 sales annually, but in the 1990s sales have grown dramatically, exploding from about 700,000 in 1990 to 1.7 million in 1998. Consequently, total market share for SUVs has seen a dramatic increase, from only 2 percent in 1980 to a high of 18 percent in 1998. Vans also had a very low market share of about 3 percent in 1980, but by 1993 that share had grown to 11 percent. At that point, van market share leveled off and remained at 11 percent while SUVs increased significantly. This suggests that potential van buyers, particularly minivan buyers, might be shifting to SUVs instead.

OEM Sales

In examining OEM (Original Equipment Manufacturers, referring to the automakers) sales across segments, it is important to keep in mind that OEM shares in particular segments may result from a number of contingencies. Most critically, shifts in the OEM segment and even total sales over time certainly reflect the popularity of the OEM's vehicles, but they are also very dependent on the OEM's product decisions, and these may vary widely. For example, an OEM may elect to balance offerings across segments, hoping to experience whatever market growth may develop. Or, it might put less emphasis on one segment by reducing the number of models in it, and its sales in that segment are likely to decrease. OEMs may also choose to concentrate product investments in yet another segment, hoping to enjoy expanded sales in a hot segment, or a niche segment, although that entails risks as well as rewards.

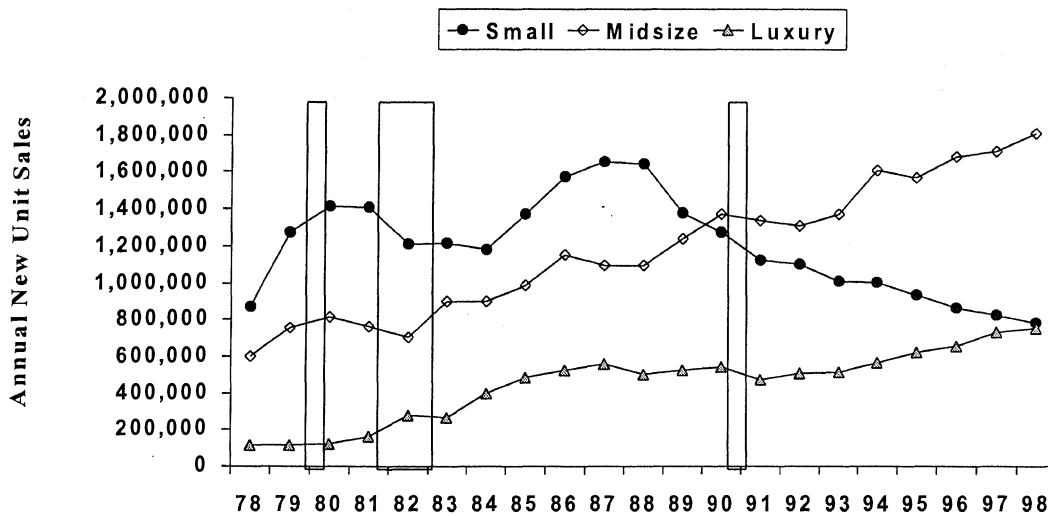
OEM Sales: Passenger Cars

Figure 2-10 displays Big 3 sales in the PC segment. Big 3 performance in three segments has fallen over the past two decades, with only small cars remaining constant. In contrast, while import sales have fallen in small cars, they have increased in midsize and luxury cars, as displayed in figure 2-11.



Source: Ward's

Figure 2-10: Big 3 PC Segmentation 1978-1998



Source: Ward's

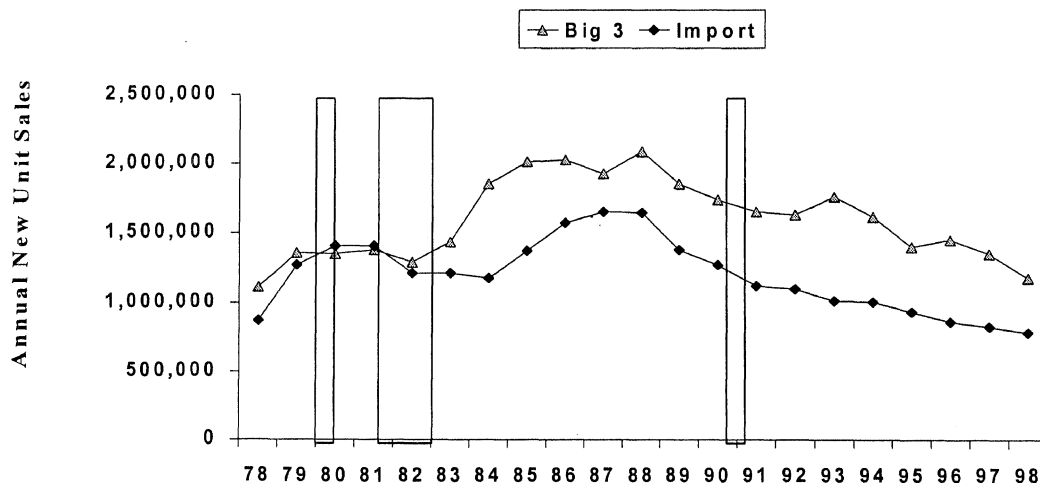
Figure 2-11: Import PC Segmentation 1978-1998

OEM Sales: Small Cars

Examining OEM segmentation is especially complicated by the fact that cars in general have grown in size. This is due to an important set of developments. First, gas prices have stabilized since the oil shock of the late 1970s, undercutting a major factor in small-car sales.¹⁴ Second, members of a substantial customer cohort, Baby Boomers, have aged, and their family and lifestyle circumstances now dictate the purchase of larger vehicles. Third, the Japanese OEMs have moved their product offerings into larger segments, both for market and currency exchange reasons. OEMs may experience decreased sales in one segment because they alter the size of a model, thereby relocating it in the adjacent segment. Therefore, a decrease in one segment's sales is sometimes balanced by increased sales in another.

Figure 2-12 shows that import share in small cars closed on the Big 3 after the second oil shock and through the first of the three recessions in our study period, but then lost ground. But the decline in small-car shares of different manufacturers may also be confounded as a result of "segment repositioning": sometimes a car that was previously designated a small car is re-designed as a larger car and is classified as a midsize car.

¹⁴ At least until the first quarter of 2000.

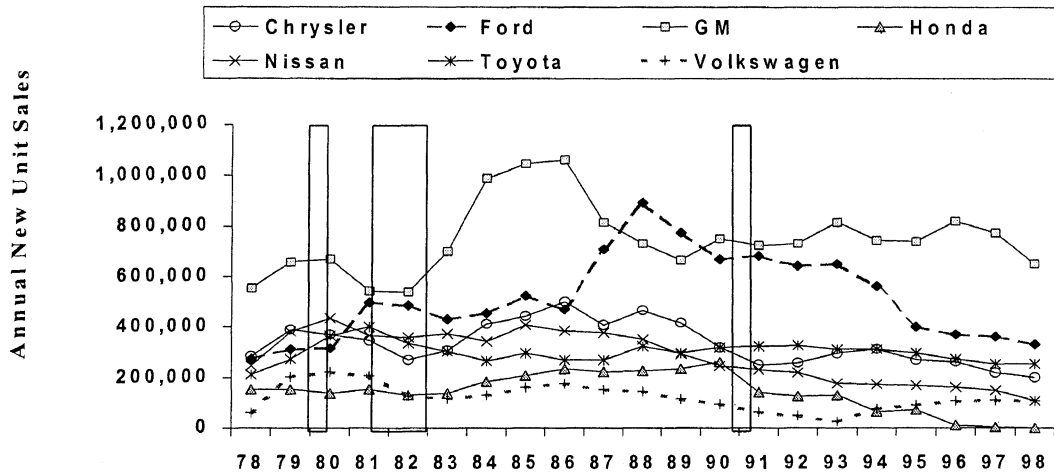


Source: Ward's

Figure 2-12: Small-Car Sales, By Source: 1978-1998

The Big 3 OEMs have not repositioned their small cars to the same degree because most of the cars they built prior to the oil shocks were already midsize or large cars. Prior to the 1980s, the Big 3 tended to shift their midsize cars into the large-car segment during redesigns. Thus the decline in small cars for the Big 3 is less confounded than is the decline for Japanese OEMs. The Big 3 small cars remained small cars, and they designed new midsize cars to compete against Japanese midsize vehicles, such as the Honda Accord and the Toyota Camry.

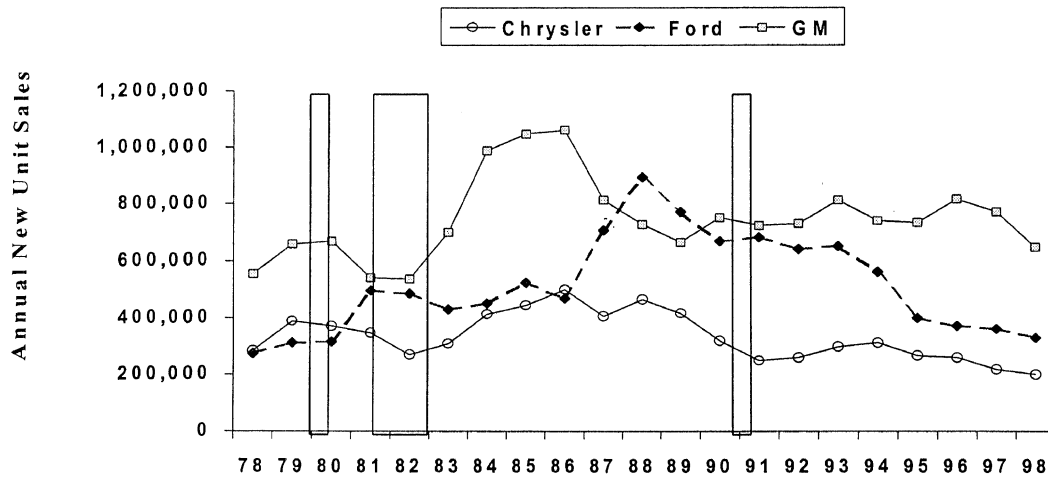
For the past 21 years, the small-car segment has been very volatile for almost all OEMs, as displayed in figure 2-13. The current segment leader is GM, followed by Ford, Toyota, Chrysler, Nissan, and Volkswagen. In the wake of low U.S. gas prices, high consumer interest in light trucks, and the challenge of making a profit on small cars, OEMs have de-emphasized their small-car development programs. For instance, as can be seen in figure 2-13, when the Honda Civic was moved from a small car to a midsize car, the charts show a steep decline from Honda's 1990 high of 260,000 small-car sales to the point where Honda has no small-car sales in 1998. Although this strategy may be appropriate for the current U.S. market, a global development strategy demands vehicles that are smaller, thus providing better fuel economy. The potential growth of vehicle sales in foreign markets will demand that OEMs continue to develop the best small cars possible in order to compete globally.



Source: Ward's

Figure 2-13: Small-Car Sales, By Company: 1978-1998

Figure 2-14 displays the sales of the Big 3. GM small-car sales increased sharply after the 1982 recession, peaking at 1.1 million in 1986 before falling to 666,000 in 1989. Since 1989, GM small-car sales have fluctuated less than they did in the 1980s, but sales fell to a post-1982 low of 648,000 in 1998. Despite this decline, GM continues to be the leader in small-car sales. Ford experienced its growth in the small-car segment in the late 1980s, peaking while GM was declining in 1987 and 1988, with sales of nearly 900,000. But since that peak Ford small-car sales have been on a steady decline to their 1998 low of 330,000. Chrysler small-car sales also peaked in the mid-1980s at 500,000 in 1986, but like Ford, their small-car sales have steadily declined to a 21-year low of 200,000 in 1998.



Source: Ward's

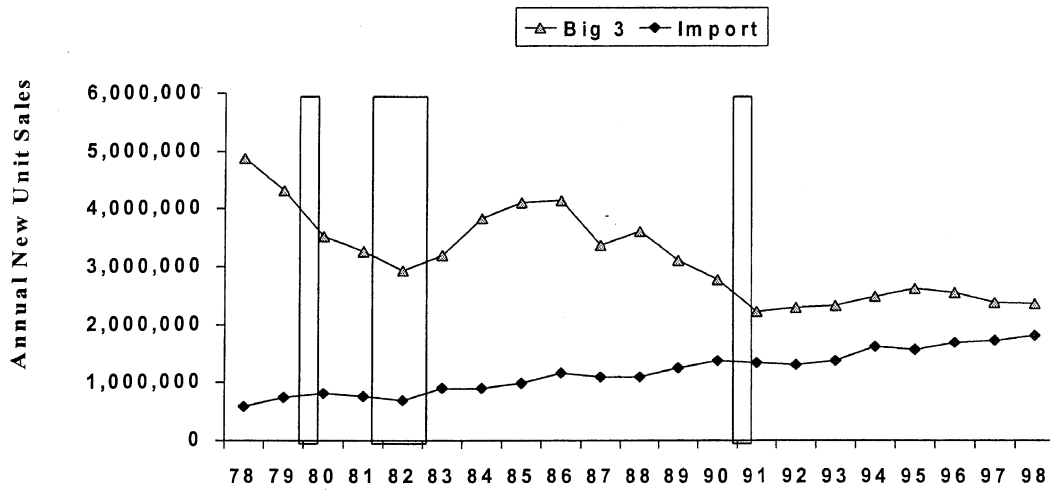
Figure 2-14: Big 3 Small-Car Sales, By Company: 1978-1998

As discussed above, segment repositioning by some Japanese OEMs can result in some very odd inferences from figure 2-13, most notably for Honda. Nissan, which had the highest small-car sales in the 1980s of any foreign-owned OEM, seems to have fallen prey to not only segment repositioning but also a true decline in sales. Nissan reached a sales peak for small cars in 1985, selling 400,000 cars, but since then sales have steadily declined to a 21-year low of 100,000 in 1998.

Toyota, which replaced Nissan as the import segment leader in 1990 with 320,000 units, has had less of a decline in sales in the 1990s, and is third in small-car sales behind only GM and Ford. Volkswagen, like Nissan, peaked in small-car sales in 1986 at 180,000, and dramatically fell to only 26,000 small cars sold in 1993. However, unlike Nissan, Volkswagen sales have improved steadily since 1993 to reach 100,000 small-car sales in 1998. In this case, Volkswagen may have pursued the opposite strategy of the Japanese manufacturers and actually focused on the small-car segment as part of their renewed North American sales efforts.

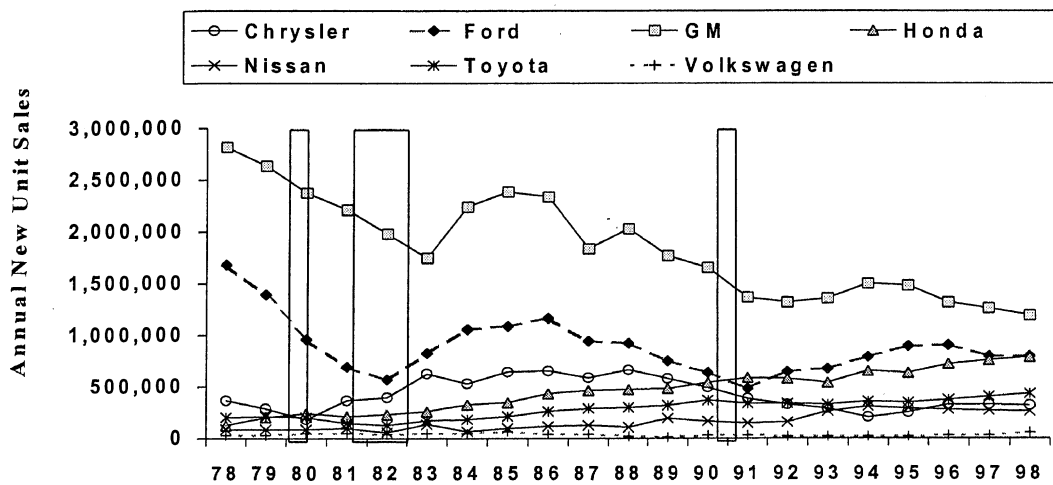
OEM Sales: Midsize Cars

Figure 2-15 displays the sales of midsize cars by the Big 3 and imports. Most notable here is the precipitous decline in market share experienced by the Big 3 after the then-record sales year of 1986. As noted above, Honda's concentration on the midsize segment reflects its view of the importance of this segment to the company. Other Japanese OEMs have also taken aim at this segment, and subsequently, Big 3 share has decreased significantly. This segment is the largest vehicle segment and is currently led by GM and followed by Ford, Honda, Toyota, Chrysler, Nissan, and Volkswagen, as displayed in figure 2-16.



Source: Ward's

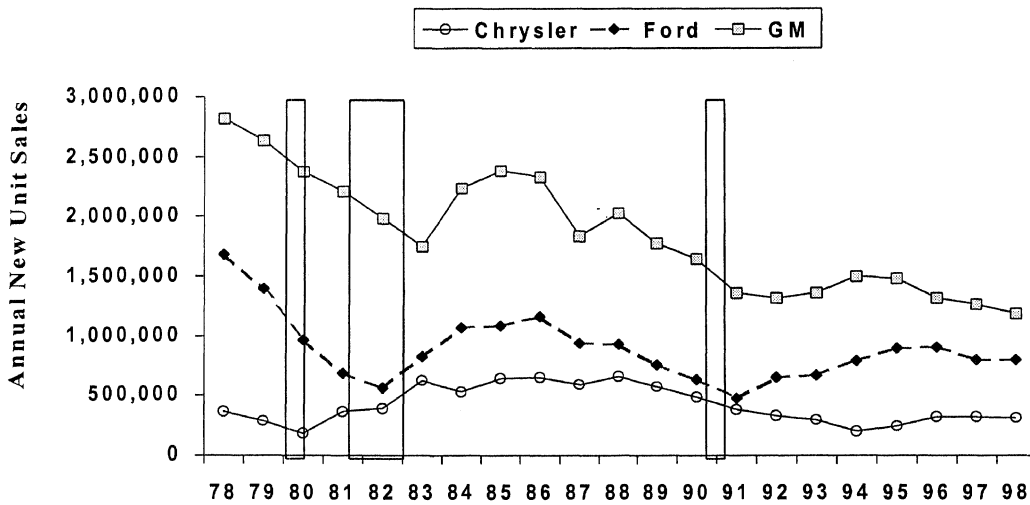
Figure 2-15: Midsize-Car Sales, By Source:1978-1998



Source: Ward's

Figure 2-16: Midsize-Car Sales, By Company: 1978-1998

Figure 2-17 shows that the GM pattern of midsize-car sales in the 1980s was similar to the pattern of its sales of small cars: the years 1984 to 1986 were peak years with sales reaching 2.3 million (though not as high as the 2.8 million of 1978) followed by a fall of nearly 1 million sales by 1992. Also similar to its small-car sales in the 1990s, GM's midsize-car sales then leveled off. Recent years have seen a slower decline in sales, although 1998 sales were at a 21-year low of 1.2 million cars.

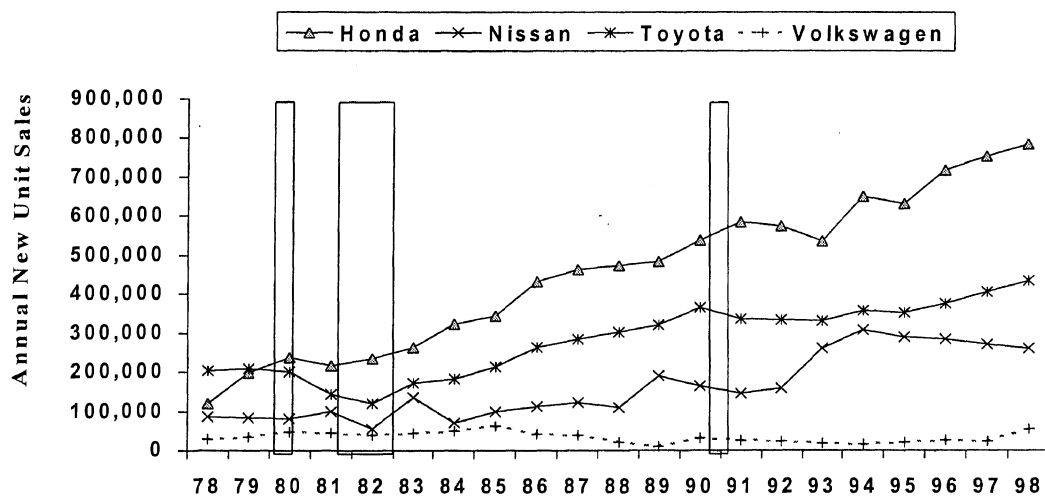


Source: Ward's

Figure 2-17: Big 3 Midsize-Car Sales, By Company: 1978-1998

Ford midsize-car sales in the 1980s replicated GM's sales pattern, but at a lower absolute level of sales. In 1986, Ford midsize cars reached their peak for the decade at 1.2 million sales, following two strong years of 1 million cars sold each year, although none of these years matched 1978's 1.7 million cars. Subsequent years saw a significant decline to a 21-year low of 480,000 cars sold in 1991. However, unlike GM, Ford midsize cars increased in sales from 1991 to 1996 before taking a slight dip in 1997 and 1998 from 900,000 to 800,000 in sales. Chrysler midsize-car sales grew to 620,000 after the recession in 1982 and maintained that level, reaching a 21-year high in 1988 with 660,000 midsize cars sold. A steady drop in sales followed 1988 to a 1990s sales low of 200,000 in 1994. Since then sales have increased slightly and have leveled off at about 320,000.

Figure 2-18 shows that, in contrast to the Big 3, foreign owned OEMs, except for Volkswagen, have seen growth in the midsize segment since the second recession. Honda leads these OEMs with a high of 785,000 midsize cars sold in 1998, capturing second place from Ford, followed by Toyota with 430,000 car sales, and Nissan with 260,000 in sales. Most of Nissan's growth occurred prior to its 1994 peak of 300,000, and sales have since gradually decreased. Volkswagen is only now beginning to recover from years of very low sales in this segment.

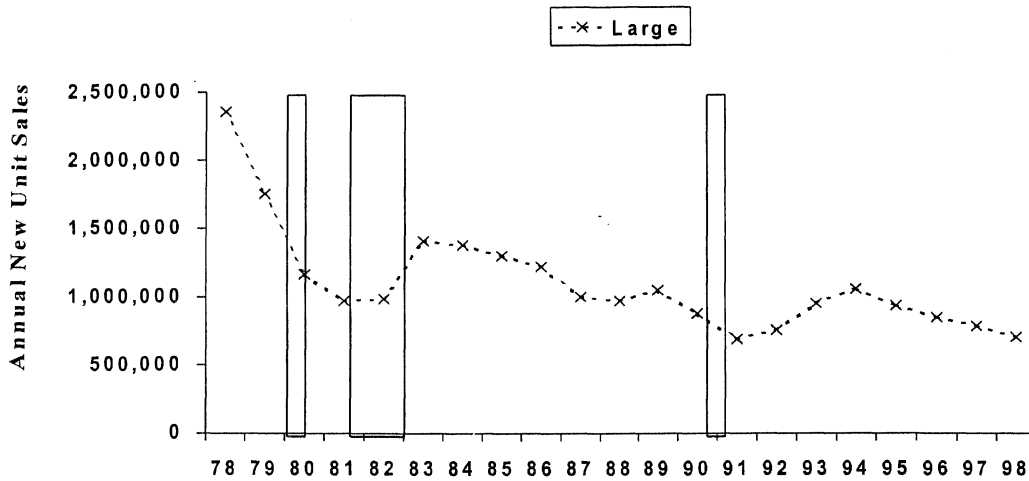


Source: Ward's

Figure 2-18: Import Midsize-Car Sales, By Company: 1978-1998

OEM Sales: Large Cars

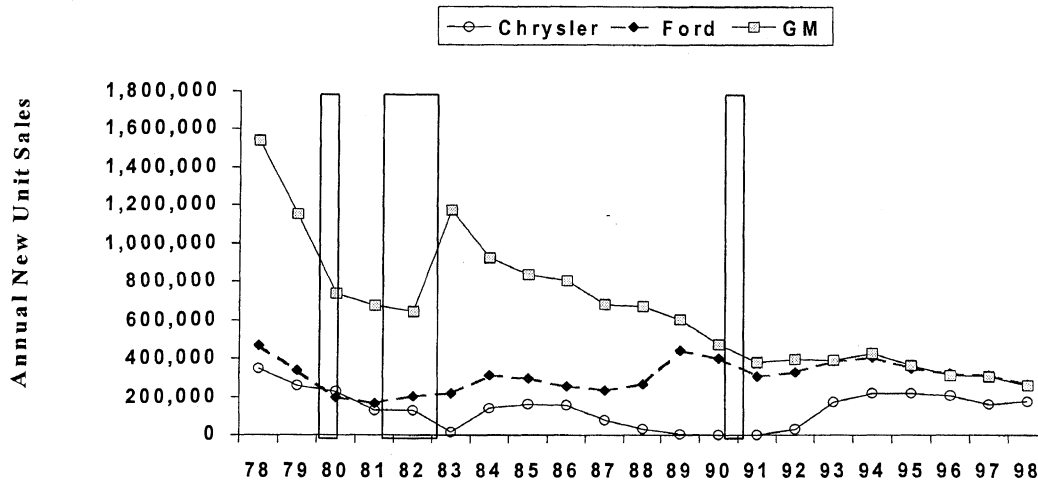
Figure 2-19 displays the pattern of large-car sales over the two decades. Note that there have been no import entries into this once large and important segment. The combination of an oil shock and two recessions at the start of this period seems to have contracted the segment substantially, and only a few unsustained increases have occurred since then.



Source: Ward's

Figure 2-19: Large-Car Sales 1978-1998

Figure 2-20 shows that GM was the leader in the large-car segment through the early 1990s, reaching peaks of 1.5 million sales in 1978 and 1.2 million sales in 1983. However, GM's sales of large cars declined steeply throughout the 1980s and more gradually throughout the 1990s to a low of 266,000 in 1998. Ford started with much lower peak sales years of 470,000 in 1978 and 440,000 in 1989, but followed GM's downward slope in the 1990s to a low of 266,000 in 1998. Chrysler large-car sales have been on a roller coaster ride over the past 21 years, starting with a high of 346,000 in 1978 to low of 15,000 in 1983 to a high of 160,000 in 1985 to selling no large cars in 1990 or 1991. Sales since 1994 have been relatively steady at about 175,000.

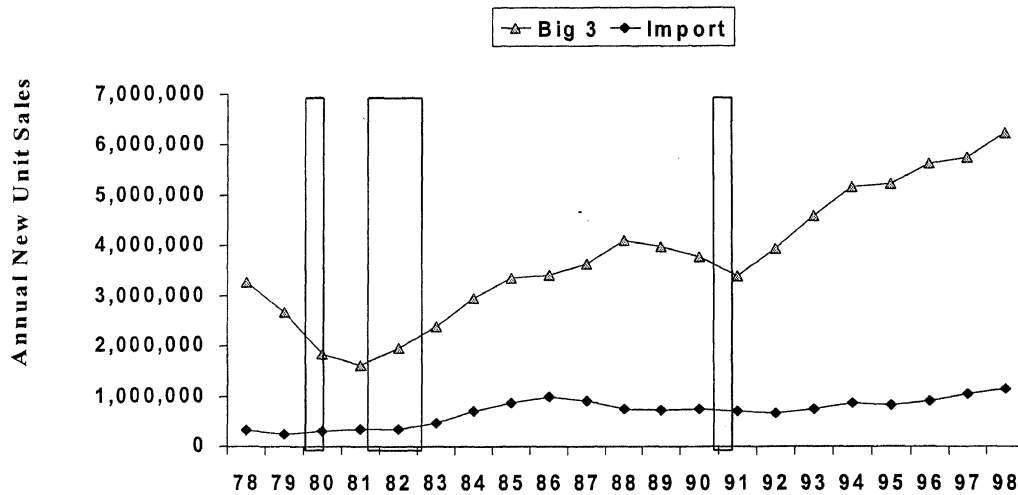


Source: Ward's

Figure 2-20: Large-Car Sales, By Company: 1978-1998

OEM Sales: Light Trucks

LTs, including pickups, vans, and SUVs, have enjoyed tremendous growth since 1978, and the Big 3 have captured the lion's share of that growth, as displayed in figure 2-21. All LTs combined represented 48 percent of U.S. sales in 1998. However, note that they suffered a sharp decline associated with the third recession, although they had been relatively unscathed by the second, deep recession of the early 1980s, perhaps suggesting a changing role in the vehicle market.



Source: Ward's

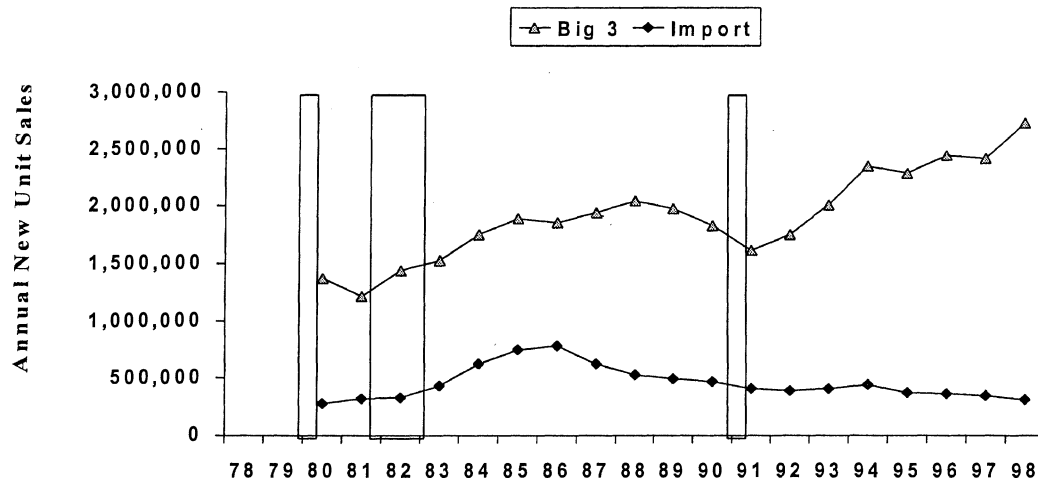
Figure 2-21: Light Truck Sales, By Source: 1978-1998

SUVs, originally meant for rugged off-road use, are an interesting group of vehicles because of the diversity of their uses and styling. Minivans are used primarily as people movers, but many were designed so they could hold a standard 4 X 8 piece of plywood. Pickup trucks traditionally have been used as working vehicles, but today many are designed to hold 4 to 5 people who enter from additional doors added to the truck. Pickups also often have extensive (and expensive) trim packages that make them more luxurious.

Light trucks are dominated by the Big 3, with a 1998 market share of 84 percent. Both the Japanese and German OEMs have been late to enter the light-truck market, most likely because these vehicles play a smaller role in their home and global markets because of their size and low fuel economy. Both import groups probably hoped the light-truck boom would be a passing fad, but the profits from these vehicles are so high and the buying appetite of U.S. consumers for light trucks is so strong that both the Japanese and the German OEMs have entered the segment. Honda has redesigned its small Odyssey minivan to compete with the larger versions built by the Big 3, and rebadged an Isuzu Rodeo SUV just to be able to offer a SUV in its showrooms. Toyota has redesigned its minivan, built two versions of an SUV, and is building its first full-size truck to compete in the light-truck market. Mercedes and BMW both now offer a luxury SUV.

OEM Sales: Pickups

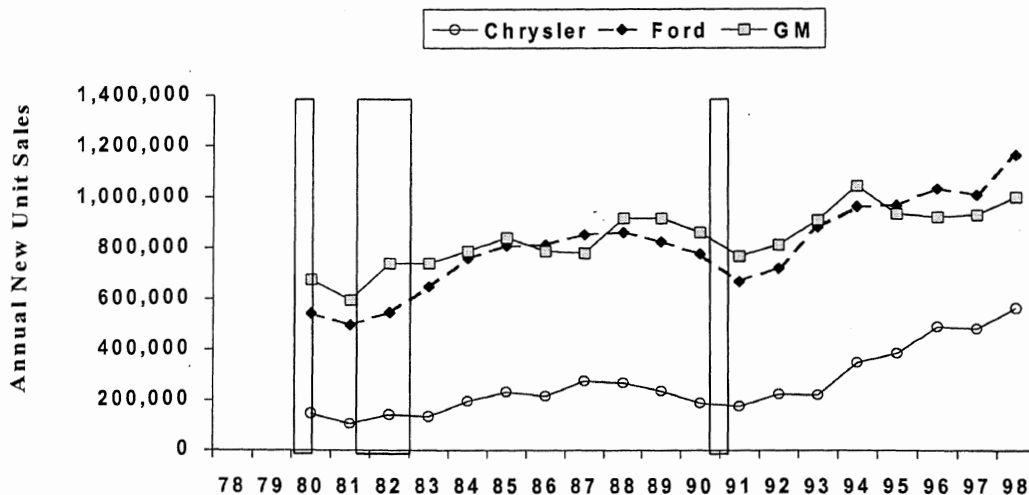
Pickups constitute the second largest vehicle segment, second only to midsize cars, and the Big 3 are especially dominant here, as shown in figure 2-22.



Source: Ward's

Figure 2-22: Pickup Sales, By Source: 1978-1998

Figure 2-23 displays Big 3 sales. GM and Ford have traded the sales leadership position over the past 21 years, with Ford the most recent leader, at 1.2 million sales in 1998, when GM sold 1 million and Chrysler, 560,000 vehicles. In the 1980s, GM (675,000 unit sales) and Ford (540,000) started with strong pickup sales. GM sales grew and peaked in 1989 at 920,000, Ford peaked at 860,000 in 1988, and Chrysler peaked at 277,000 in 1987. All three groups experienced slumping sales before and during the recession of the early 1990s. Sales at each of the Big 3 rose during the 1990s with GM peaking at 1 million pickups in 1994 and Ford and Chrysler continuing to gain share through 1998. All foreign owned OEMs combined reached a peak in 1986 of 775,000 pickups before sales slowly declined to the 1998 level of 300,000.

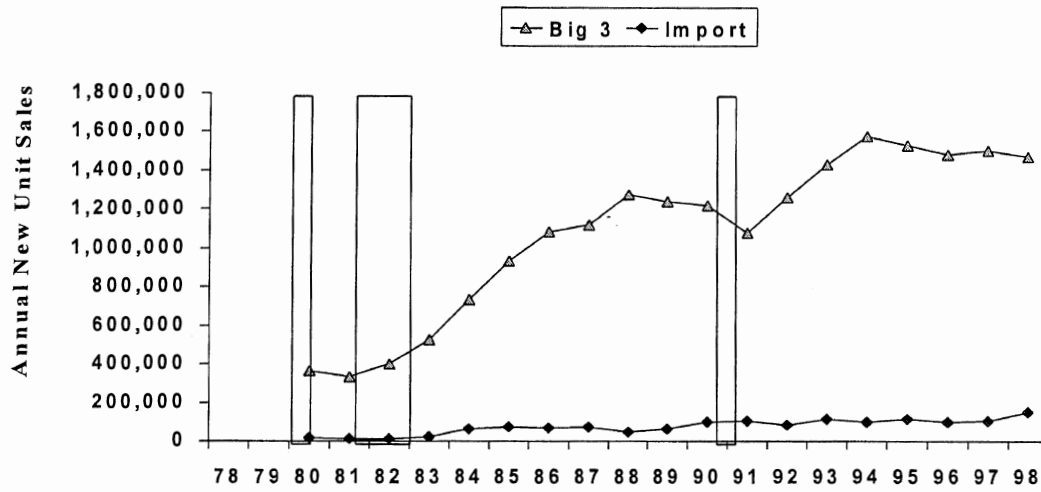


Source: Ward's

Figure 2-23: Big 3 Pickup Sales, By Company: 1978-1998

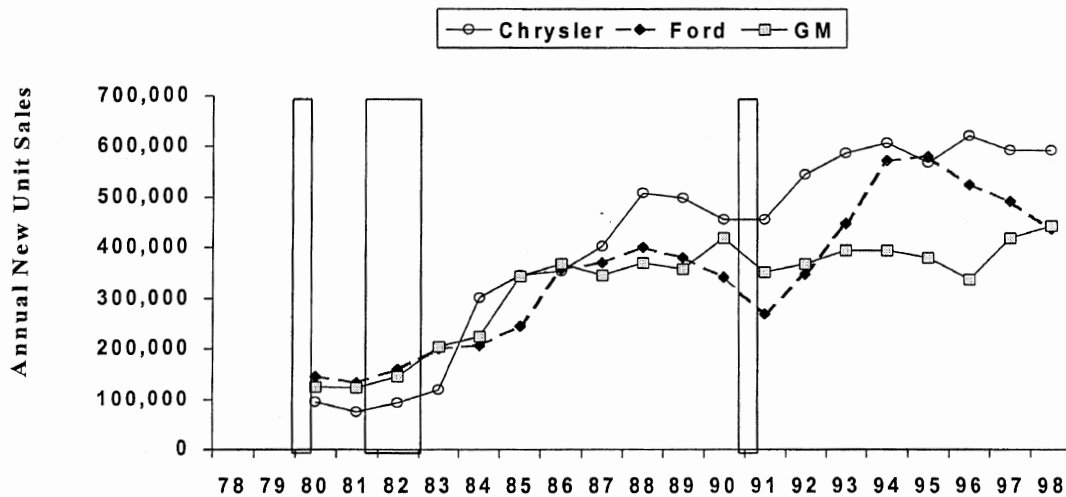
OEM Sales: Vans

Van sales took off as the market began to recover from the second recession. While van sales, shown in figure 2-24, have grown slowly for the foreign-owned OEMs, peaking in 1998 with 150,000 sales for all foreign-owned OEMs combined, van sales were particularly beneficial to the Big 3. The introduction of the minivan by Chrysler in the 1984 model year fueled this growth in vans, as illustrated in figure 2-25. Prior to the minivan introduction, vans sales averaged about 400,000 a year for all OEMs, but by 1988 van sales peaked at 1.1 million for the decade. The recession of the early 1990s dampened sales, but by 1994 van sales peaked at 1.6 million before leveling off.



Source: Ward's

Figure 2-24: Van Sales 1978-1998



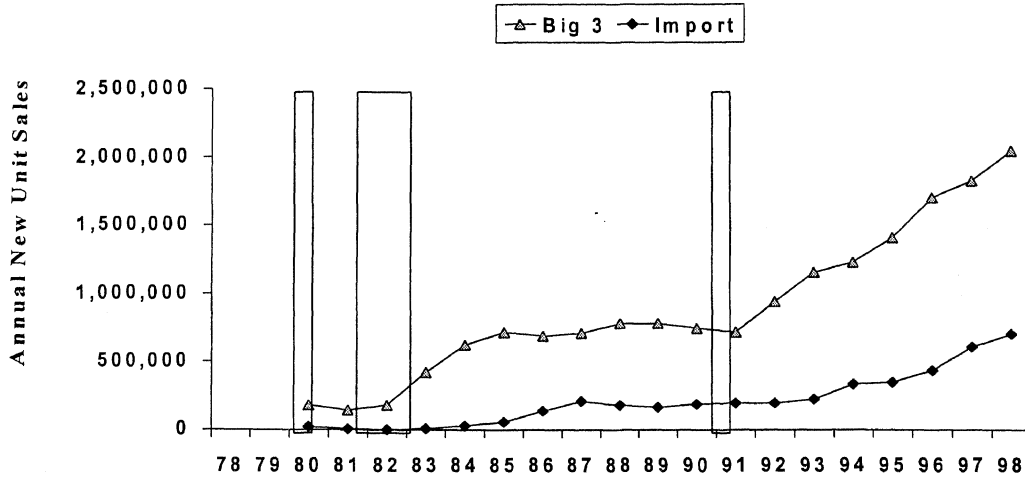
Source: Ward's

Figure 2-25: Big 3 Van Sales, By Company: 1978-1998

Chrysler took the lead in combined full-size van and minivan sales in 1987 and peaked at 500,000 in 1988. Because of their success with minivans, Chrysler has lead this segment for every year from 1987 to 1998, except 1995, peaking in 1996 with sales of 620,000.

OEM Sales: SUVs

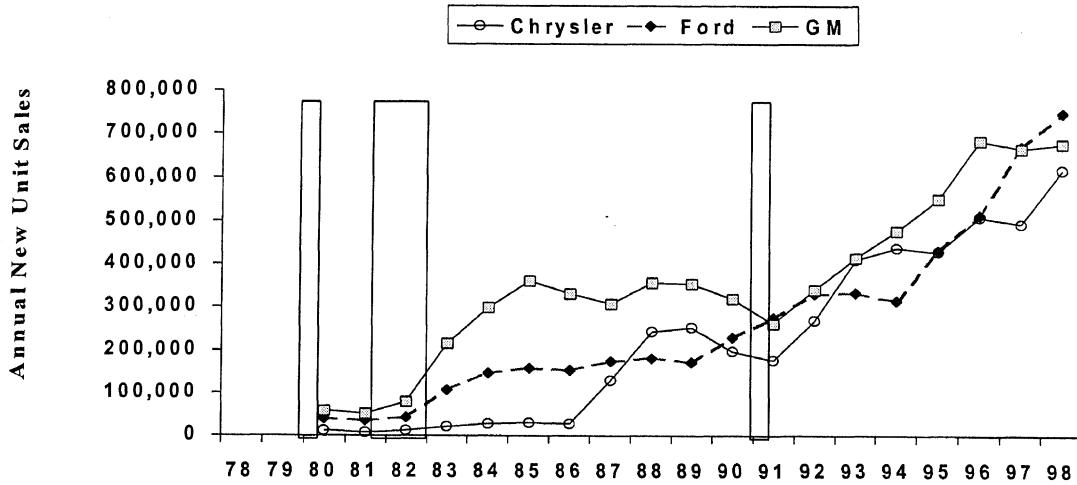
Figure 2-26 displays the sales of SUVs. Like other LTs, SUVs have been important to the Big 3, because of their share dominance and the high profit margins associated with these vehicles.



Source: Ward's

Figure 2-26: SUV Sales, By Source: 1978-1998

Figure 2-27 illustrates the tightened competitive race among the Big 3 in the SUV segment. GM took the lead in SUV sales in the 1980s, selling 360,000 in 1985 and 350,000 in 1988 and 1989. The recession slowed GM's SUV growth in the early 1990s, but the rest of the 1990s saw dramatic growth, peaking in 1996 at 680,000 SUVs.



Source: Ward's

Figure 2-27: Big 3 SUV Sales, By Company: 1978-1998

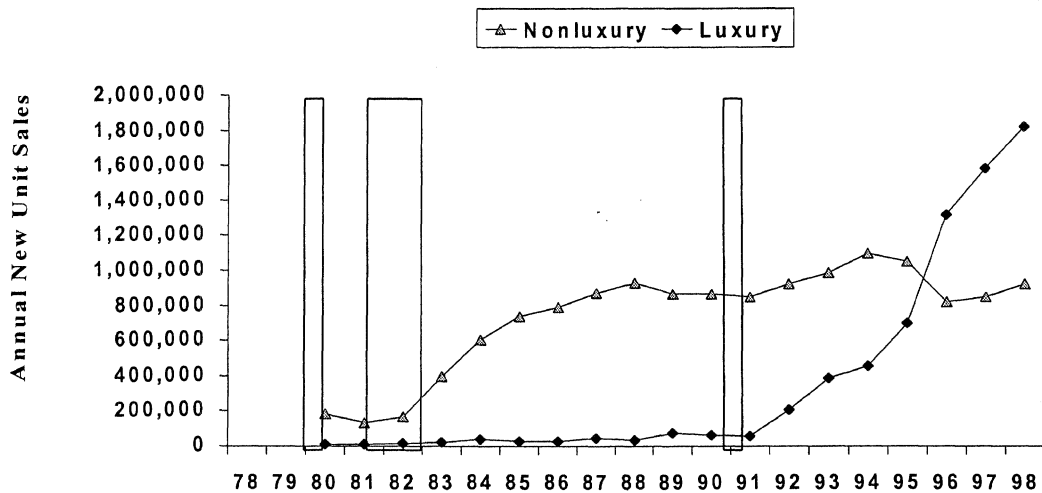
Ford had a slower start than GM in the SUV market in the 1980s, peaking at 180,000 in 1988, but they, like GM and Chrysler, experienced dramatic growth in the 1990s and captured the lead in SUV sales in 1998 with 750,000. Chrysler did not seriously enter the SUV segment until they purchased AMC in 1987 and thus gained its Jeep operations. Within a year they surpassed Ford SUV sales, peaking in 1989 with 250,000 sales. The recession of 1990 seriously affected Chrysler sales until 1992 when dramatic growth began, peaking in 1998 at 615,000 units.

Two aspects of these SUV sales merit comment. First, Ford SUV sales actually increased during the recession in the early 1990s. This is one of few vehicle types overall to accomplish this. The only other groups that were able to maintain or increase slightly during the recession are Ford, Toyota, and Honda small cars; Toyota, Honda, and Volkswagen midsize cars; and Chrysler vans and pickups. What is it about Ford SUV sales during this time that prevented the downturn in sales that occurred in almost all other segments? Undoubtedly it was the introduction of the immediately popular Explorer. The introduction of a hot product can overcome the sales fall expected during a recession, albeit at the expense of its competitors and, in all probability, some shift of sales from other segments.

Second, SUV sales for the Big 3 show a number of brief plateaus along the growth path where sales level off before continuing to climb. We suspect that, as in the case of Ford's Explorer in the third recession, this reflects the product introduction cycle across the OEMs: popular new vehicles fuel segment sales.

SUVs have really stimulated buyers' tastes and opened their pocketbooks. Originally designed to tow loads, carry lots of cargo, and go anywhere, many of these vehicles have been

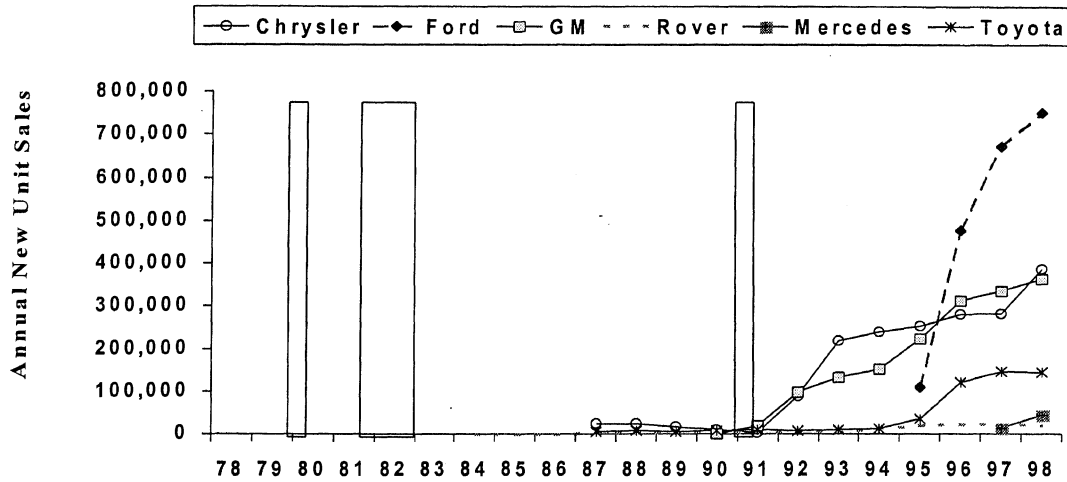
repositioned into a completely new segment, luxury SUVs. These vehicles have all of the typical SUV attributes, but also have luxuriously appointed interiors. These vehicles also come in enlarged versions with the same attributes, making them the largest non-commercial vehicles on the road. The luxury SUV market is basically a creation of the 1990s, as displayed in figure 2-28. In 1996 luxury SUV sales were higher than nonluxury SUV sales, 1.3 million to 820,000, and in 1998 luxury SUV sales reached 1.8 million compared to 920,000 nonluxury SUV sales.



Source: Ward's

Figure 2-28: SUV Sales, By Type: 1978-1998

Ford is the current leader in this luxury sub-segment, selling nearly all its 750,000 SUVs in 1998 as luxury SUVs, shown in figure 2-29. In some ways this is an artifact of segment repositioning because the Ford Explorer and Expedition are both classified as luxury SUVs, thus depleting the numbers of nonluxury SUVs sold. This is important because vehicles in this classification typically have much higher profit margins than do those in the nonluxury segment. Ford dominates this segment, but Chrysler (390,000 unit sales) and GM (360,000) also have offerings in this segment, although they sell only about half as many luxury SUVs as Ford does. Toyota is the other major OEM with significant sales in this segment, selling 145,000 luxury SUVs in 1997.



Source: Ward's

Figure 2-29: Luxury SUV Sales, By Company: 1978-1998

Recession Effects for PCs and LTs

One of the main issues for dealerships in regards to future recessions is whether they have the right mix of new passenger cars and light trucks to maximize their sales and/or profits, and thus survival chances during a downturn. The most recent two recessions are interesting because they show two different segment responses.

The recession that began in 1981, the second, deep recession following the second oil shock of the 1970s, markedly affected the types of new vehicles sold. Large-car and midsize-car sales both significantly decreased during the period of 1979 to 1982. It was not until 1983 that these segments began to increase in sales, but large cars have never approached their prerecession sales levels. Small-car sales rose after the oil shock and dipped slightly during 1982 before rising after the recession, and began to decline in the mid-1980s. Light trucks, including vans, pickups, and sport utility vehicles, all took slight dips during 1981, but stabilized or increased sales slightly during 1982 and 1983, and then began a sharp climb.

The sales during the 1990-1991 recession differed from the previous recession in that only SUV sales were flat and all other segments decreased. In this case the major event that characterized the recession was the brief Gulf War rather than a sustained oil shock. Thus there was no long-term increase in small-car purchases to offset the higher cost of gasoline.

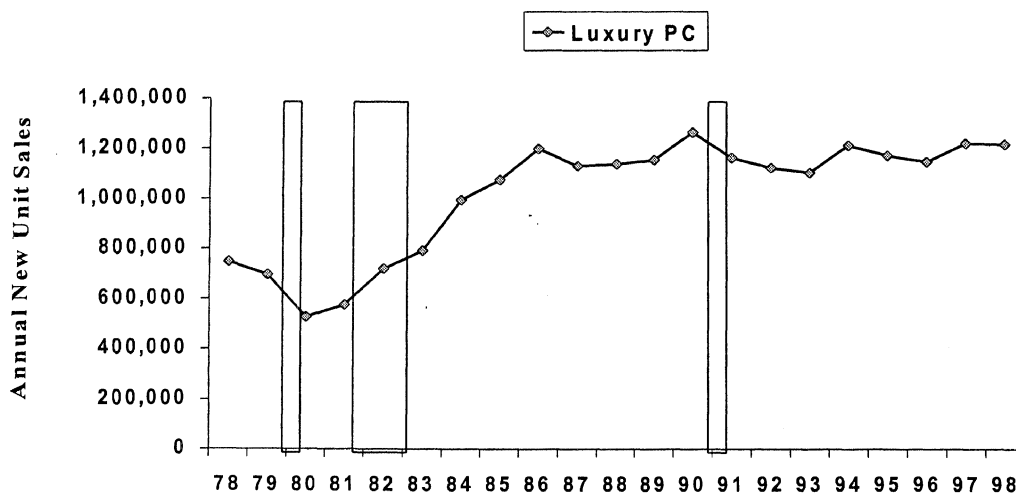
Given these two examples of recession, dealers might need to balance their offerings in a recession based on the cause of the recession or its coincidental events. If the recession is accompanied by an oil shock, small cars, pickups, vans, and luxury vehicles offer the best mix of

vehicles. But the best mix for a recession caused by something other than an oil shock would be to sell vehicles that offer the most profit, whether because of volumes or high margins, because all types of vehicles will suffer sales declines.

OEM Sales: Luxury Vehicles

The difference in sales between large cars and luxury cars illustrates the different strategies OEMs may take in their product development. For the first time in 1987 luxury cars outsold large cars, a trend that continues today. This may have occurred because of the rise in interest in German luxury cars, but probably also reflects the Japanese OEMs' decision to build luxury cars instead of traditional large cars to compete against the Big 3. Their target buyers were foreign-car buyers who were very satisfied with the small and midsize Japanese cars they purchased in the past. This strategy also allowed the Japanese OEMs to sell these midsize luxury cars in Japan and elsewhere around the world, where the price of gasoline and the transportation infrastructure mitigates against large cars. Though U.S. dealerships do not participate in the global automobile market, the vehicles they sell are developed by OEMs who see growth coming from global markets rather than the U.S. market. The decline of the large-car market may reflect product movement by the OEMs to change U.S. consumer taste gradually to cars that better fit the OEMs' global strategy.

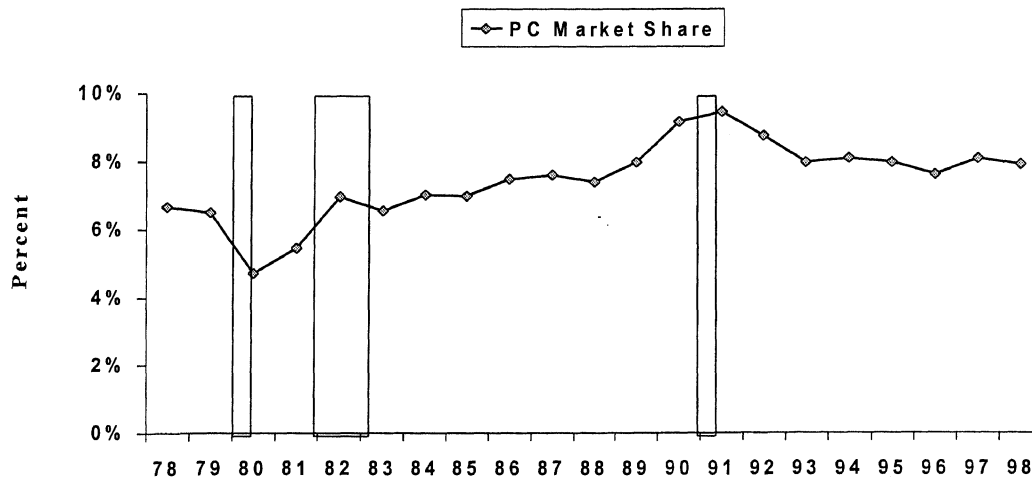
In general, when recessions hit, there is less of an impact on luxury-vehicle sales. As figure 2-30 shows, the oil shock at the close of 1979 caused a relatively sharp decline in luxury-vehicle sales, but sales began to rise in the following year and continued to grow, even during the second recession in 1982. However, the sales of luxury vehicles seem to have slowed down during the third recession period. Many of these luxury PC buyers may have switched into the luxury SUV segment, which has shown substantial growth since the third recession.



Source: Ward's

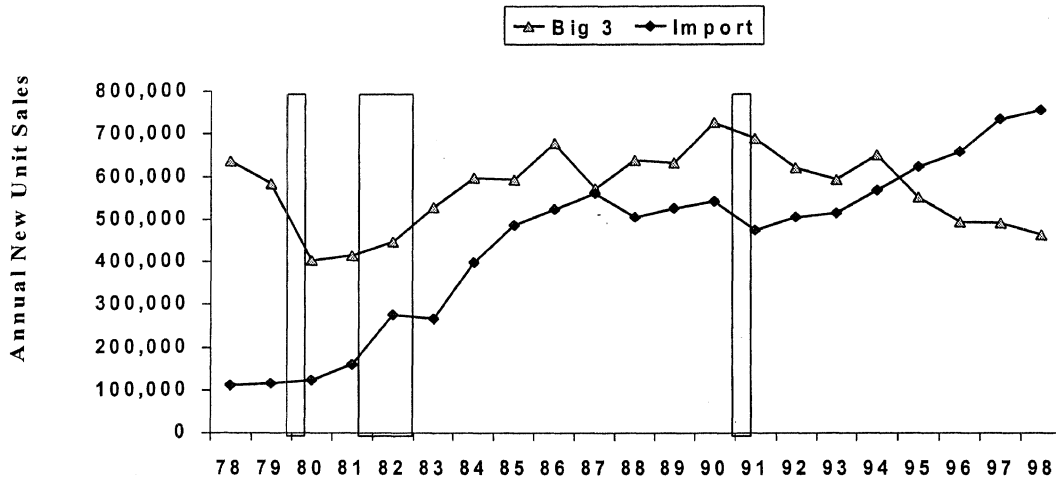
Figure 2-30: Luxury PC Sales 1978-1998

Over the past 21 years, the market share of luxury vehicles has increased, as displayed in figure 2-31. In the late 1980s, the Japanese began to introduce their luxury brands with much lower prices than those of Mercedes and BMW: Acura in 1986, Infiniti and Lexus in 1989. BMW and Mercedes, due to the increased competition with Japanese companies, re-emerged with some less expensive luxury products than they had built in the past. For example, in 1994 Mercedes offered its new models with an across-the-board 10 percent price reduction. Mercedes' C class and BMW's 318ti, 323is, and 323I were priced below \$32,000. In any case, imports have come to dominate the luxury passenger-car market over our study period, as shown in figure 2-32.



Source: Ward's

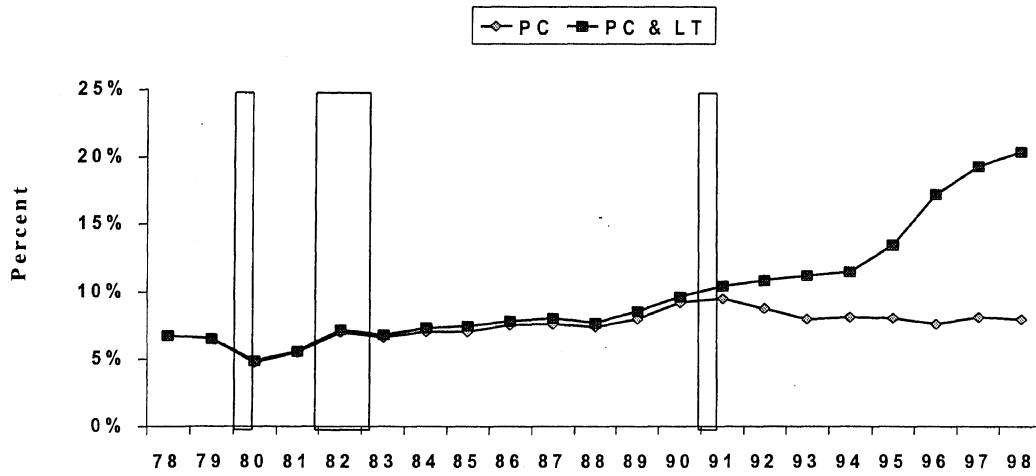
Figure 2-31: Luxury PC Market Share 1978-1998



Source: Ward's

Figure 2-32: Luxury PC Market Share, By Source: 1978-1998

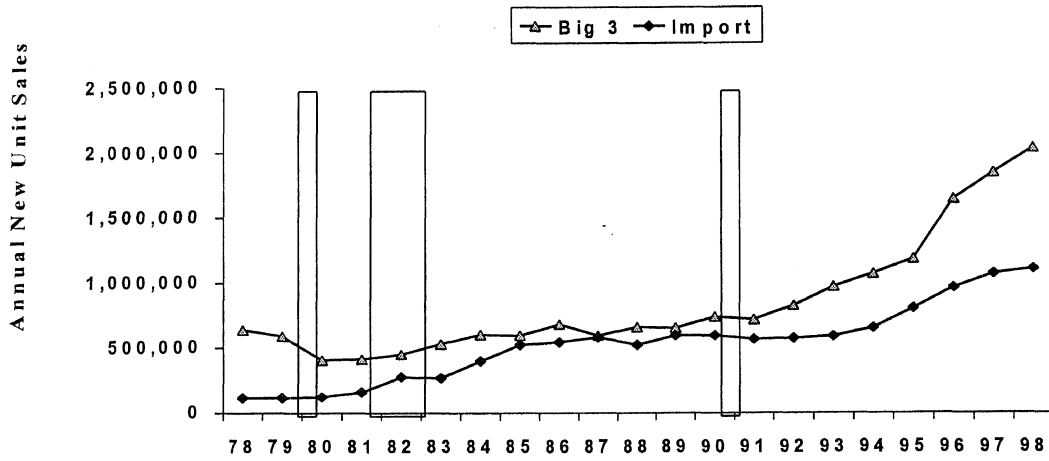
Moreover, as noted earlier, 66 percent of SUVs were classified as luxury vehicles in 1998 and the majority of luxury SUVs are targeted at the entry-level luxury segment. Figure 2-33 shows that most of the increased market share of luxury vehicles is due to luxury light trucks rather than traditional passenger cars. Many consumers could not afford more expensive luxury cars, but could afford these less expensive luxury SUVs. Leasing these vehicles makes them even more affordable. However, if a recession hits in the future, the overall sales of luxury vehicles may be affected, more than in the past, because these new entry-level luxury buyers will probably be more likely to defer purchases until better economic times or move to less expensive vehicles.



Source: Ward's

Figure 2-33: Luxury PC & LT Market Share 1978-1998

Unlike import luxury cars, whose sales have grown rather steadily, shown in figure 2-32, domestic luxury-car sales have fluctuated, and now are even falling. The sales of those cars declined during the first and third recession. However, it seems that some domestic luxury buyers have shifted from cars to light trucks. Including luxury light trucks (mostly SUVs), the Big 3 still have higher luxury sales than imports, as displayed in figure 2-34. The difference between Big 3 and import sales in luxury vehicles has not been large, but has increased in the last 3 years, partly because Ford's Explorer has been reclassified as a luxury vehicle. Thus, overall sales of luxury vehicles, which include cars and light trucks, have declined relatively little during the recession periods.

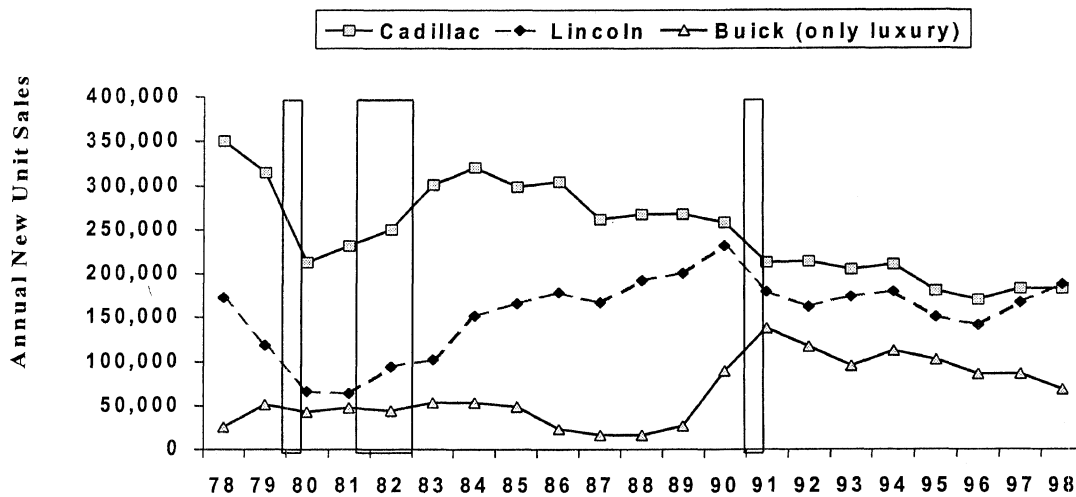


Source: Ward's

Figure 2-34: Luxury PC & LT Sales, By Source: 1978-1998

OEM Sales: Luxury Brands

Figure 2-35 displays the individual sales patterns for three domestic luxury and near-luxury vehicles.



Source: Ward's

Figure 2-35: Big 3 Luxury PC & LT Sales, By Nameplate: 1978-1998

Buick

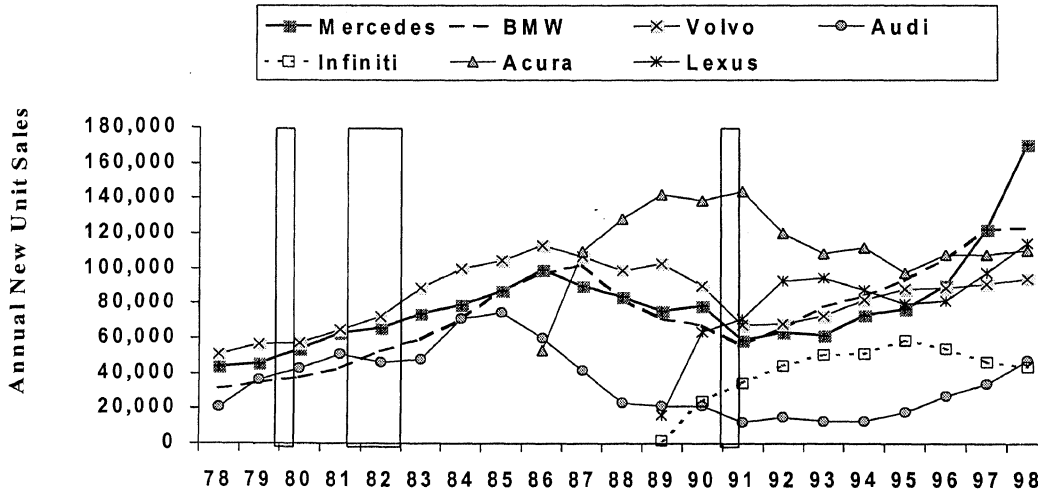
Buick has tried to lead a dual life as a nonluxury and luxury brand, and over the past decade it has found this very difficult. Its luxury sales have not matched those of Cadillac and Lincoln, the two domestic leaders, but they are in the general sales range of Lexus, Acura, and Mercedes. Very low sales in the mid-1980s gave rise to solid increases in sales between 1989 and 1991 (despite a recession), reaching a 21-year-sales high in 1991 of 140,000. However, Buick's sales have declined since 1992. One main reason for this drop is that the import OEMs have also included luxury SUVs in their model lineups, increasing their sales.

Cadillac

Cadillac had been the luxury-car sales leader since the advent of the luxury segment, but from 1978 until 1980 it suffered a steep decline in sales from a 21-year high of 350,000 to 210,000. They recovered in 1981 and sales rose steadily through 1984 to 320,000 before beginning a long slow decline to a 21-year low of 170,000 in 1996. In 1998 Cadillac lost its domestic sales leadership position to Lincoln, which offered a successful SUV, the Navigator, an offering that Cadillac did not match until the fall of 1998. Early sales of the Cadillac SUV, the Escalade, have not been as strong as Navigator sales. Cadillac developed a car, the Catera, built by Opel in Germany to compete against the European and Japanese midsize luxury cars, but its sales suggest that buyers do not see it as equivalent to the import brands.

Lincoln

Lincoln followed the same pattern as Cadillac during the late 1970s and early 1980s, suffering a steep decline in sales from 1978 through 1981 before recovering and steadily increasing sales to reach a 21-year peak of 230,000 in 1990. The 1990s saw Lincoln take another steep decline during and after the recession before arresting the decline with the introduction of the luxury SUV, the Navigator. This allowed Lincoln to stem its sales decline and increase sales enough to overtake Cadillac for North American luxury sales leadership for 1998. Like Cadillac, Lincoln developed a car, the Lincoln LS, to compete with the European and Japanese midsize luxury cars. It has just been released, so it is too early to evaluate its success. Figure 2-36 shows the sales of a range of luxury and near-luxury import vehicles. Again, not all of these vehicles are actually imports.



Source: Ward's

Figure 2-36: Import Luxury PC & LT Sales, By Company: 1978-1998

Mercedes-Benz

Mercedes increased its sales in spite of the recession of the early 1980s, but its sales started to decrease in 1986 after reaching a 21-year sales high of nearly 100,000 cars. The introductions of Acura, Lexus, and Infiniti in the late 1980s contributed to the reduction in sales of Mercedes cars throughout the late 1980s and early 1990s. Other possible reasons include tax law changes and the 1987 stock market crash.

Mercedes emerged with a new strategy in 1994. It introduced new models with a radical pricing adjustment. The M-Class, its first SUV model, was launched in 1997. It has been extremely successful and pushed Mercedes' sales to 170,000 in 1998, only 10,000 behind Lincoln and Cadillac.

Lexus

Lexus was launched in the fall of 1989 with the LS 400 and the ES 250. In 1991, it outsold Mercedes. Lexus continually added new brands with the SC, SC 400, and ES 300. However, the strengthening of the yen forced Lexus to increase prices. This and the German automakers' cost-cutting and repositioning caused Lexus' sales to decline. In 1996, Lexus entered the SUV market with the LX 450, which has contributed substantially to Lexus' success. In March 1998, Lexus launched its second SUV, the RX 300. Because of the success of these SUVs, Lexus reached an all time high in 1998 of 110,000 sales.

Acura

Developed in 1986 as the luxury division of Honda, Acura competed well in the luxury market, reaching a sales peak of 144,000 in 1991. However, since 1991 sales have decreased and leveled

off at about 110,000. Acura is one of the few luxury brands whose sales did not increase substantially with the introduction of an SUV into its lineup.

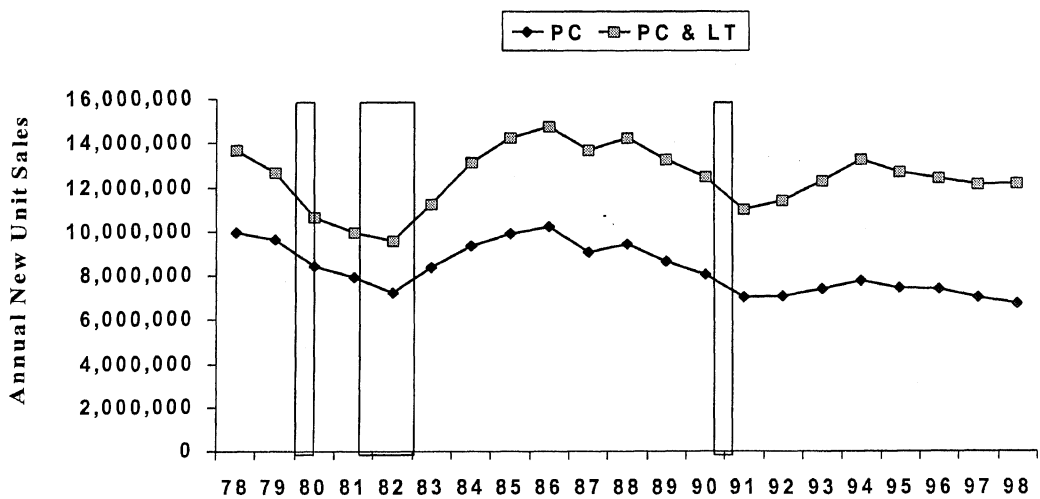
BMW

BMW had 11 strong sales years from 1975 to 1986, when it matched Mercedes' sales. But in the late 1980s and early 1990s, BMW's sales started to decrease. As noted above, BMW and other luxury brands struggled during this time because of the tax law, the 1987 stock market crash, and perhaps most importantly because of serious Japanese competition in the luxury market. BMW emerged with new models in 1991 and has regained its sales growth with a 21-year high of 122,000 in 1997. BMW's SUV was later to market than those of the other luxury brands. Through 1998, BMW probably faced some limits to its sales growth due to this lack of an SUV. BMW introduced its new SUV in late 1999.

As noted above, the development of SUVs for the luxury segment has played a large part in the success of luxury brands in the late 1990s. In 1998, they represent 45 percent of Lexus sales, 26 percent of Lincoln sales, 22 percent of Mercedes sales, and 11 percent of Cadillac sales.

OEM Sales: Nonluxury Vehicles

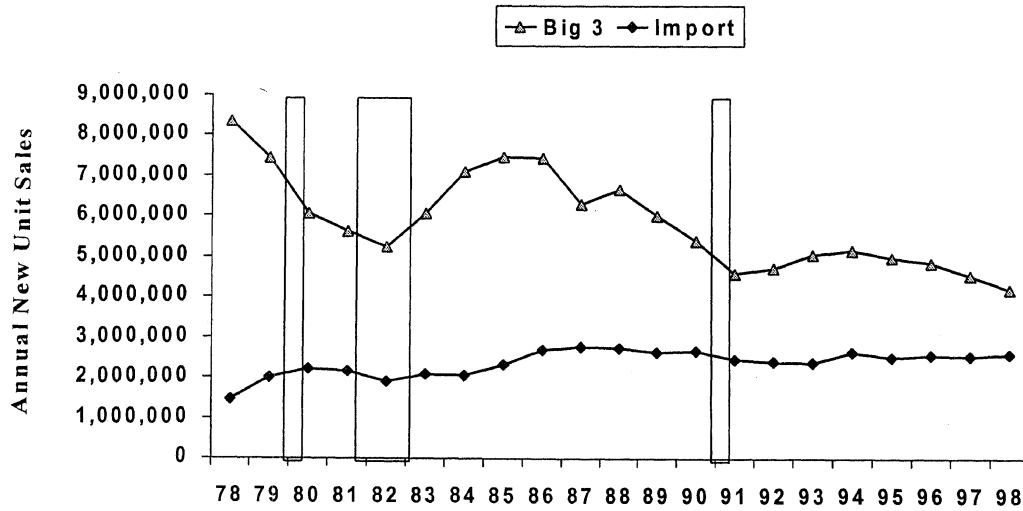
As illustrated in figure 2-37, the sales of nonluxury vehicles are more susceptible to recessions than are sales of luxury vehicles. This probably reflects both their large market share and their consumers, largely drawn from middle and lower income populations that are more likely to be affected by recessions. The sales of nonluxury vehicles over the years are moving in the same direction as the total U.S. vehicle sales, partly because they make up the largest share of total-vehicle sales.



Source: Ward's

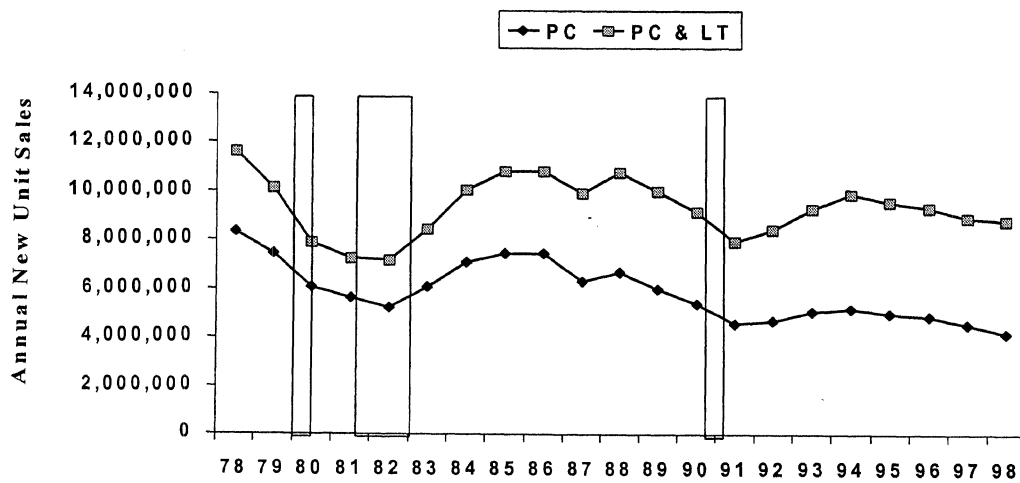
Figure 2-37: Nonluxury PC & LT Sales 1978-1998

The Big 3 own the largest market share in nonluxury vehicles. They are thus relatively more susceptible to changes in economic conditions. In this segment, the Big 3 show strong growth in the truck market and declining sales in the car market, whereas the import OEMs show generally strong growth, and have shown less susceptibility to recessions, as shown in figures 2-38, 2-39, 2-40.



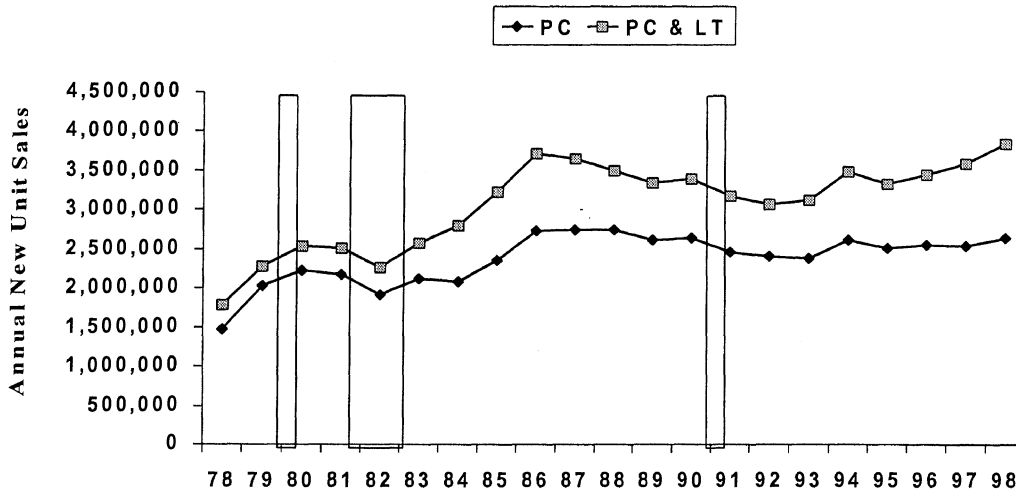
Source: Ward's

Figure 2-38: Nonluxury PC Sales, By Source: 1978-1998



Source: Ward's

Figure 2-39: Big 3 Nonluxury PC & LT Sales 1978-1998



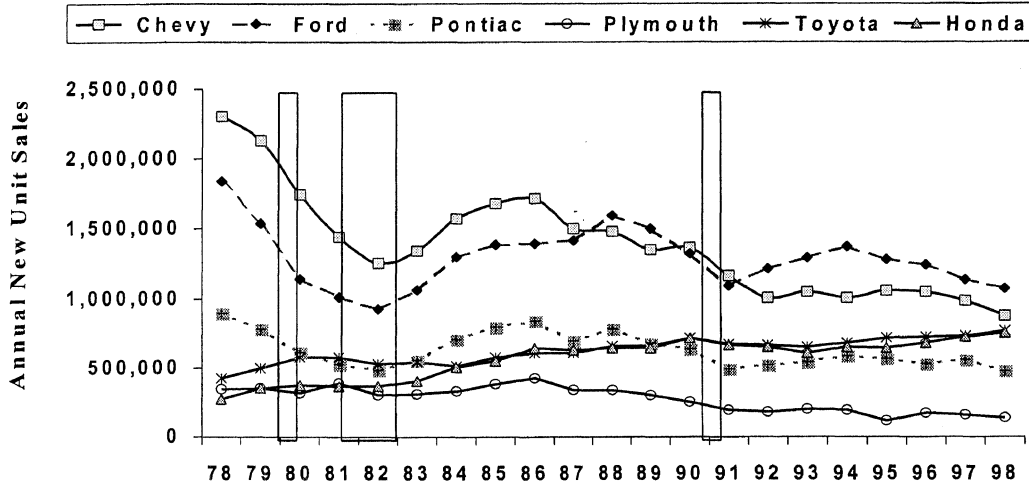
Source: Ward's

Figure 2-40: Import Nonluxury PC & LT Sales 1978-1998

OEM Sales: Nonluxury Brands

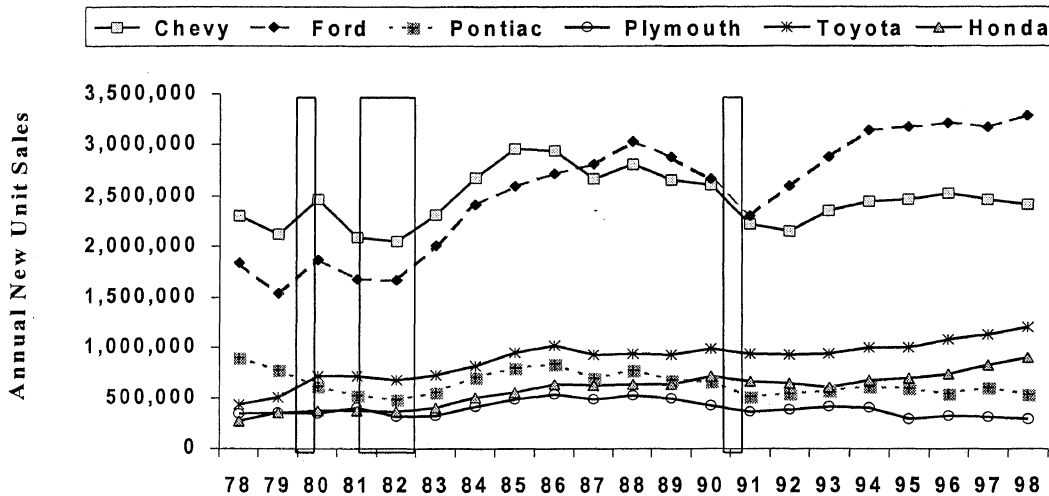
Chevrolet

From 1946 through 1986, Chevrolet outsold Ford every year except two, but in 1987 it lost its passenger-car sales leadership position to Ford because of the introduction of the Taurus, regaining it in only 2 years since, as shown in figure 2-41. Figure 2-42 shows the even stronger performance of Ford in the combined PC and LT markets. Despite this loss, Chevrolet still generates about half of General Motors' unit sales. Chevrolet passenger cars reached a 21-year sales high of 2.3 million in 1978 before experiencing a step decline during the recession of the 1980s, to 1.3 million in 1982. Chevrolet recovered in 1983, reaching a post-recession sales high of 1.7 million in 1986. However, Chevrolet passenger cars have been in a sales decline since 1986, reaching a 21-year low in 1998 with 876,000 cars sold.



Source: Ward's

Figure 2-41: Nonluxury PC Sales, By Brand: 1978-1998



Source: Ward's

Figure 2-42: Nonluxury PC & LT Sales, By Brand: 1978-1998

Including LTs in the sales figures makes Chevrolet look stronger as a division, although it falls further behind Ford. The effects of the recession in the early 1980s are not as negative and the

21-year sales high for all vehicles reaches 2.9 million in 1985. However, not even truck sales helped Chevrolet during the recession of the 1990s as sales declined during 1989 through 1992 before rising and gradually increasing during the rest of the 1990s. Despite these increases Chevrolet lost its sales leadership to Ford in 1987 and the disparity between the two divisions has grown from 1992 to 1998, reaching a difference of nearly 1 million vehicles.

Ford

Since 1987, Ford has kept its dominant position in the nonluxury-vehicle segment, which combines cars and trucks. Ford currently leads in the sale of passenger cars and light trucks, but like Chevrolet, it has seen sales of passenger cars decline considerably from a 1978, 21-year high of 1.8 million and a 1988 high of 1.6 million, to a 21-year low of 1 million in 1998. As with Chevrolet, Ford passenger-car sales were hit hard by all three recessions.

Incorporating light trucks into the sales totals softens the effects of the recessions in the 1980s, as it did for Chevrolet, but it does not help with the decline in sales prior to and during the recession in 1990. The difference between Ford and Chevrolet was that Ford recovered in 1992 and recorded strong sales throughout the rest of the 1990s, reaching a 21-year sales high of 3.3 million in 1998. Ford's success in the 1990s has relied on consistently having five of the top ten selling vehicles, including its F-Series pickup, Taurus, Explorer, Ranger pickup, and Escort. The F-Series pickup is the best-seller among all cars and trucks.

Pontiac

Pontiac set a 21-year sales high in 1978 with sales of nearly 900,000 cars, but since then has fluctuated between 800,000 and 500,000 cars sold. Like other domestic car lines, Pontiac was strongly affected by all three recessions. Since the recession of 1990, it has slightly increased sales, though not to the level of the top sales years of 1978 and 1986 (840,000 cars). Pontiac does not have a pickup truck in its lineup, but it does have a minivan that contributes only slightly to its total sales. Pontiac is the number two sales division at General Motors. The median age of the Pontiac buyer is just 40 years, 21 years younger than that of both Buick and Oldsmobile buyers, and also lower than Chevrolet buyers.

Plymouth

Following the recession of the early 1980s, Plymouth made gains in both cars and light trucks with the introduction of the minivan, reaching a 21-year high of 530,000 vehicles sold in both 1986 and 1988. But the years prior to and during the recession in the 1990s saw steep declines in Plymouth sales with 1995 reaching a 21-year low of slightly less than 300,000. The Voyager minivan represented 177,000 of those sales.

Toyota

When measured against the Big 3 in terms of passenger cars, Toyota matches up very well with sales of 750,000 cars in 1998, a close third to Chevrolet and Ford. But in total nonluxury-vehicle sales, which include light trucks, the gap widens considerably. Toyota sales have not been completely recession resistant, but sales dipped only slightly during the recessions over the past 21 years, while the general trend for Toyota sales has been upward.

Honda

Honda has a trajectory similar to Toyota's, but because of its lack of a strong light truck, its total sales are lower than Toyota's. Like Toyota, Honda was only slightly affected during the recessions. Despite its limited lineup, Honda has consistently shown strong growth in the passenger-car segment. Its midsize car, the Accord, was the best-selling new car in 1989, 1990, and 1991. Honda reached its 21-year sales high in 1998, selling 750,000 passenger cars.

Nonluxury Summary

The sales of total nonluxury, Big 3, and each domestic brand are moving almost in the same direction. Recessions have less impact on import nonluxury vehicles. This may reflect a sectoral growth of Japanese brands in the U.S. market and the small percent of market share of import nonluxury vehicles compared to the Big 3. It might also be that their buyers are drawn from higher income, more recession-resistant groups. The Big 3 and their individual brands are performing much better in the truck market than in the car market.

Summary

Without doubt, the most fundamental shift in the vehicle market over the past two decades has been the continuing move of consumers to LT rather than PC purchases. In spite of this, import competition to the Big 3 has strengthened, and gradually penetrated more and more segments. The current dominance of the Big 3 in the LT segment could well be as precarious as their hold on luxury vehicles has turned out to be. The past decade has seen the emergence of the luxury SUV, a new type of vehicle that most pundits would have scorned just a decade ago.

The luxury market is growing. This may reflect the many near-luxury cars, such as the BMW 3 series and Mercedes C-class, and the growing luxury SUV market. The sales of import luxury cars have already surpassed those of domestic luxury cars. However, if we include light trucks, Big 3 luxury vehicle sales are still a bit higher.

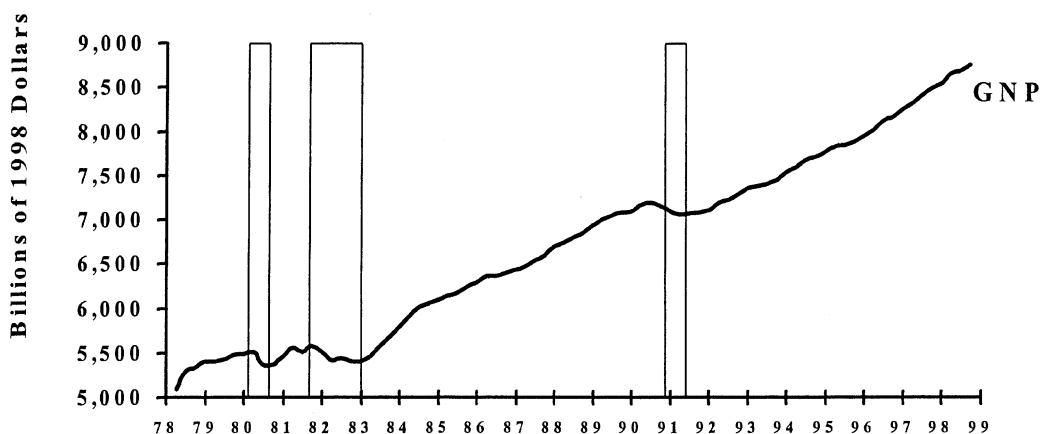
The overall luxury market is not affected dramatically by recessions. However, the traditional U.S. and European luxury PCs lost sales in the third recession, unlike the 1982 plunge. The recession gains of the three Japanese makers may reflect their initial momentum, but also might suggest that they have redefined the passenger-car luxury market.

Chapter Three: Predicting the Next Recession

This project addresses a number of critical questions. Perhaps the most intractable of these questions, partly because it is probably the oldest, is what information is useful for predicting a substantial automotive sales downturn such as would accompany a recession in the broader economy.

The economy of the United States continually cycles through two states of activity: the economy is either rising or falling. To be sure, there are periods of relative stability, but on closer examination, these almost always turn out to be periods of small, but real changes. A number of economic indicators reflect the overall economy as well as particular segments, and are useful for measuring these cycles of activity. Falling economic indicators describe an economy that is contracting, and may signal a recession. Conversely, if economic indicators are rising, the general economy is expanding, and the strength and pattern of the indicators may suggest the duration and strength of the expansion.

By conventional definition, a fall in Gross National Product (GNP) for two consecutive quarters is a recession. Figure 3-1 displays GNP over our sample decades, as it achieved constant dollar growth from approximately \$5,100 billion to \$8,800 billion, an increase of 73 percent. The boxes indicate the three recession periods, of which the second recession lasted the longest and was especially deep in the automotive sector.



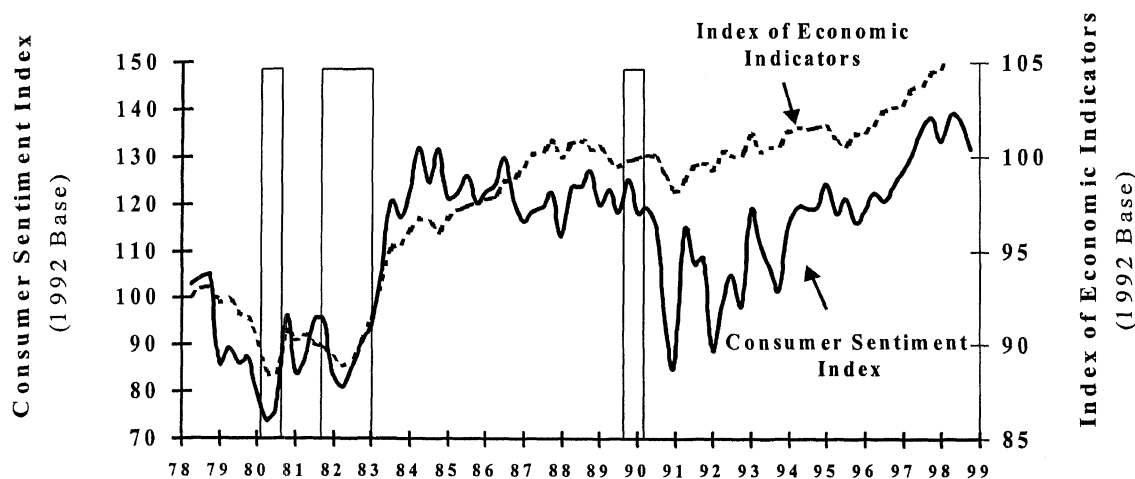
Source: bos.business.uab.edu

Figure 3-1: U.S. Gross National Product

One of the inherent difficulties in predicting recessions is that the many economic indicators do not correlate well with each other or GNP, nor do they move contemporaneously, and they even

sometimes move contrary to overall trends. This makes predicting recessions a difficult task indeed.

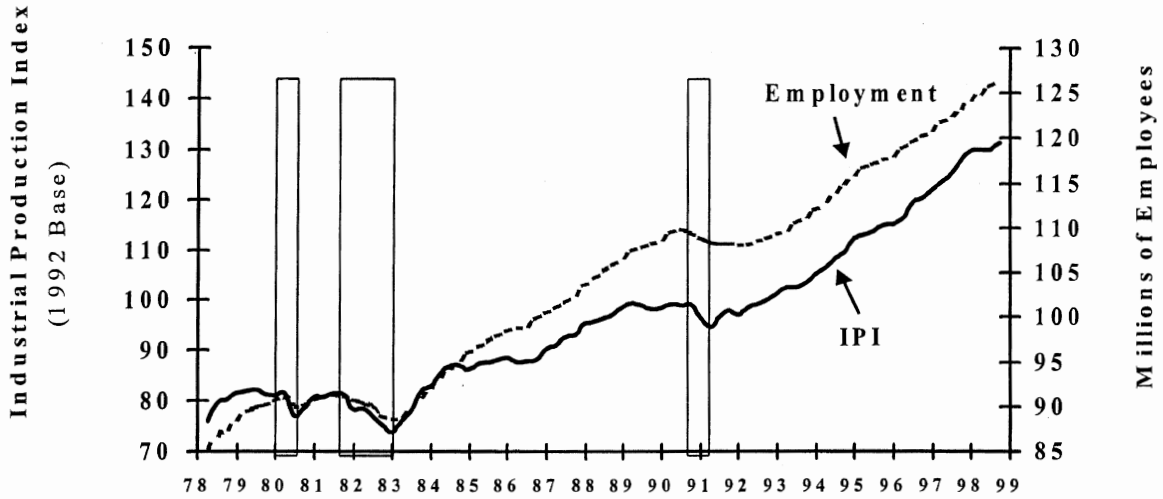
The behavior of economic indicators before, during, and after a recession varies considerably. Some indicators signal economic contraction or expansion much earlier than do others. Economic analysts have, over time, assembled a group of leading economic indicators that, based on historical behavior, can be useful, if fallible, signals of coming change in the overall economy. These *leading* indicators typically change direction before a cyclical turning point of the general economy. Figure 3-2 displays two of these leading indicators—an index made up of such lead signals and an index of consumer sentiment. These two examples illustrate an important point: while they indeed turn down before the recession periods, they also turn down at other times. That is, they send false alarms fairly frequently. (See Appendix 2 for definitions of indicators)



Source: bos.business.uab.edu & rsqe.econ.lsa.umich.edu

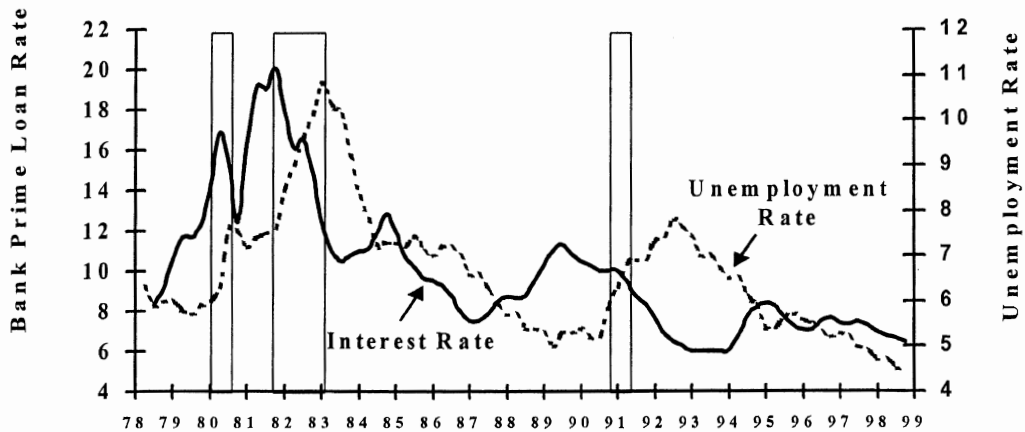
Figure 3-2: Leading Indicators

There are two other sets of indicators as well, and these are useful for different purposes. *Coincidental* indicators, illustrated in figure 3-3, change direction concurrent with a change in the general economy, while *lagging* indicators, displayed in figure 3-4, tend to change direction after the general economy already has. These are an interesting set of indicators, but they have little to offer for developing early warning of a general or even a specifically automotive downturn. Consequently, our analysis focuses on the leading indicators.



Source: bos.business.uab.edu & rsqe.econ.lsa.umich.edu

Figure 3-3: Coincidental Indicators



Source: bos.business.uab.edu

Figure 3-4: Lagging Indicators

Many of the leading economic indicators reflect some element of business commitment and expectations. Indicators in this category include new housing starts, stock prices, consumer confidence indices, manufacturer's orders, average weekly hours worked by manufacturing production workers, average weekly initial claims for unemployment insurance, and so forth. In an economic expansion, most of these indicators will trend upwards, or at least remain level, except for new unemployment claims, which should remain low, reflecting a strong job market.

A particular problem in predicting auto sales is that auto sales are themselves often included in the leading indicators. This is because purchases of this large, discretionary, durable good are usually among the first to drop as money supply tightens and consumers' confidence in the state of the economy drops. Complicating the analytic problem, new light-vehicle sales are often slow to rebound when the economy turns to an expansion mode after a recession. Thus auto sales also behave like a lagging indicator of the economic recovery. From a business point of view, this is the worst of all possible worlds. The automotive downturn starts early, with little warning, and it is of relatively long duration, because it ends late.

Light-vehicle sales, like new housing starts, are good lead indicators of recessions but are less reliable lead indicators of an expansion. Nevertheless, understanding the general economy and the indicators that are used to interpret its present and future condition can help in examining the economic state—and phase—of the automotive industry. What economic factors affect light-vehicle sales, and can any of these indicators predict future sales trends with reasonable accuracy?

Preliminary explorations

To answer these questions, we statistically examine the relationship between the changes in economic conditions and new light vehicle segments. We first developed a data set for auto sales and a wide range of economic variables. Our sales data permit us to look at sales of different types of vehicles, vehicle segments, and manufacturers. The economic data include all the relevant publicly available economic indicators. The data set covers the period from January, 1978, the beginning of a then-record sales year and production year, and December, 1998, the end of the latest available complete year.

Our sample period covers three defined recessions in the general economy. The first lasted 6 months, from January through June of 1980, the second oil-shock recession. The second, from June 1981, through October 1982, lasted 17 months, and hit the auto industry with depression-like force. The third lasted 8 months, and occurred from July 1990, through February 1991. While we emphasize these recession periods, our analysis also takes account of non-recessionary variations in the level of auto sales. Thus we do not ignore the long period of gradually falling sales prior to the third recession.

Our analysis relies on two primary statistical tools, bivariate correlation analysis and multiple regression models. Bivariate correlation analysis examines the simple associations among these variables, considered two variables at a time. Correlations measure how closely or strongly variables move together, that is, the degree to which they are associated or related. Correlations have the desirable property of being intuitively interpretable. They range from +1.0, for a relationship in which the variable values increase or decrease together in lock-step fashion,

through 0.0, when there is absolutely no relationship among the variables' movements, to -1.0 , where the relationship is again lockstep, but the values move in opposite directions.

These correlations thus provide important suggestions or clues about which variables are useful for predicting the chosen outcome variable. For example, we find the correlation between gasoline prices and LT sales is strongly negative, meaning that as the price of gas increases, these sales decrease, within the probability limits indicated by the statistical analysis.

Even these first-line analyses can quickly become quite complicated. For example, when we examine the changes in the Consumer Price Index (CPI) on PCs and LTs, the results are more complex. As the CPI goes up, signaling an increase in the price of a basket of goods purchased every month by the average household, PC sales drop, indicating a sensitivity to these price increases. This is intuitively appealing, since vehicles are a big ticket, deferrable purchase. However, as CPI increases, LT sales also increase! So increases in CPI drive up LT sales, but drive down PC sales. Perhaps this reflects LTs having a larger share of business purchases and more high-income purchasers. Business purchases may be less sensitive to CPI, a household economic measure, and higher income households are less sensitive to CPI increases.

Indeed, LTs and PCs are priced quite differently. If we exclude the luxury vehicles from each category, PC prices average \$19,350, while the average LT price is \$26,696.¹⁵ In view of this, it is not surprising that the buyers of these vehicles, including luxury models, have quite different median household income. PC buyers' household income reaches \$59,900, but LT buyers earn \$68,000, or just about \$8,000 higher.¹⁶

We assessed the basic bivariate correlations among some 30 economic variables and automotive sales, separately for passenger cars, light trucks, and total-vehicle (TV) sales. The more interesting results are reported in the Appendix 1. This initial correlation analysis highlights the differences and similarities between PC and LT sales. TV sales are a combination of the two major vehicle types, and examining only TV sales can mask important differences between PC and LT sales. These differences can be important for understanding the structure of the vehicle market and its relationship to the economy's overall functioning.

These correlations indicate that in general PC sales, especially midsize cars and, to a lesser extent, small cars, are much less tied to changes in the economy, perhaps suggesting that they serve a more basic, somewhat less deferrable transportation need. In today's automotive businesses, sales of LTs have become especially important sources of profit, both for manufacturers and dealers, so it is important to focus on them. Similarly, we examine luxury-car and SUV segment sales in more detail later, because luxury vehicles seem to be emerging as an important segment in themselves, rather than as sub-segments of PC and LT respectively.

Some interesting results emerge from these preliminary analyses of one economic variable at a time with LT and PC sales. These economic variables bear a much stronger relationship to LT sales than they do to PC sales. Higher consumer expectations, CPI changes, disposable income, and employment levels are all associated with stronger LT sales in subsequent periods. On the

¹⁵ J.P. Power and Associates provided this information for us.

¹⁶ American Automobile Manufacturers Association, *Motor Vehicle Facts & Figures*, 1998, p. 61.

other hand, gas prices and interest rates are strongly associated with weaker subsequent LT sales. Appendix 1 displays these analyses.

CPI, employment, and disposable income have moderate, negative correlations with PC sales. These factors have strong positive correlations with LT sales, and that may suggest that there is some shifting of purchases from PC to LT categories as the economy improves. (See Appendix 1).

Such a shift benefits dealers and manufacturers because of the higher profits LT provide. At the same time, the benefits of such a shift depend on the manufacturer. Those manufacturers that enjoy higher shares in the LT than PC markets, notably Chrysler and Ford, benefit doubly from such shifts, as their profits and market share expand. Other manufacturers, notably Toyota and especially Honda, that have a smaller share in the LT than in the PC market, are likely to suffer share loss, although increased profits may compensate for this in Toyota's case because it has a larger share of the upscale market than does Honda. GM shares in the two markets are virtually identical, so such shifts will not affect GM share, although presumably they too would profit from increased LT sales, unless capacity constraints restrict their ability to maintain LT share.

The pattern of stronger effects for LT sales than for PC sales also strengthens our suspicion that LT might be serving a more discretionary end of the vehicle market, while the much weaker effects for PC sales may indicate a less elastic demand, typifying a more basic need. In a sense, then, LT sales may be behaving more like near-luxury purchases, and light-truck consumers may be similar to purchasers of near-luxury and luxury vehicles. We will explore this possibility in analyses reported below.

However, it merits mention here that the correlations between sales of luxury PCs and SUVs (.70), pickups (.80), and vans (.90) are all high, strengthening the suggestion that these are complimentary purchases. Moreover, leases became very popular between 1990 and 1995. Leases allow for lower monthly payments, or "more" vehicle per payment than does buying. Especially high lease rates characterize near-luxury, luxury, and specialty PCs, as well as compact and full-size SUVs, again suggesting some similarity between SUVs and more expensive PCs.¹⁷

A somewhat puzzling observation is that buying patterns in the LT segment are positively correlated with increases in CPI. This might be an artifact rooted in the strong shift to LT sales during the current economic expansion, from 1991 to the present.

This raises an oft-asked question: are we seeing a fundamental change in the economy, or just an especially long expansion? We must consider many of these effects cautiously because we cannot answer that question. The country is in the midst of its longest period of peacetime expansion. We have both low unemployment and low inflation, a combination that has never before been sustained so long. Stock prices, and the percentage of households invested in stocks, are at all-time highs, perhaps creating a feeling of wealth. Consumers seem quite confident about the state of the economy, and have more money than ever to spend. This expansion of the economy, represented in our dataset, combined with the increasing popularity of the light-truck

¹⁷ American Automobile Manufacturers Association, *Motor Vehicle Facts and Figures*, 1998, p. 46.

segment may be distorting the fundamental relationships, rendering any current analysis of the effect of economic expansion on vehicle sales segments extremely tenuous.

Chapter Four: Predictor Models

Our second method of statistical analysis is multivariate rather than bivariate, and is called multiple regression analysis. Multiple regression builds on the underlying fundamentals of correlation analysis, but permits us to examine simultaneously the independent effects of a number of predictor variables upon auto sales. These regressions in effect yield predictive models of how a number of factors jointly influence the sales trends. These analyses essentially yield equations with coefficients that indicate the strength of the relationships between predictor (e.g., CPI, DI) and outcome variables (e.g., TV, LT, or PC sales).

This method also allows us to compare the predictive power of a range of similar models against each other, as well as across different sales measures. A convenient measure, called R^2 , assesses how well the variables in the model account for the variance in sales for each period. This summary measure varies from 0.0 to 1.0, and can be expressed as the percent of variance in the criterion variable, sales, accounted for by the model predictors. It has the desirable property of permitting the direct comparison of the explanatory power of different models, incorporating different predictors and even different versions of our sales variables. R^2 is the basis for selecting among different models.

To be sure, the possible combinations of more than 30 economic variables affecting any individual sales segment are astronomical, and even larger when we explore the effects of different lead times prior to the actual sales. We therefore consider variables that might influence consumers directly or indirectly, and thus might affect their purchase behavior, whether at a conscious or unconscious level. The variables in any one model of a given segment are determined by the combination that yields the highest R^2 value.

We report our models in the form of equations, treating the segment sales variable (TV, PC, LT, etc.) as a function of the predictors included in the model. Each variable in the model is listed in the order of the size of effect it has on the sales outcome, largest first. The variables in the models are standardized so that the effect on sales of, for instance, a rising inflation rate can be directly compared to the effect from a rising Standard & Poor's 500 Index and the effect of a rise in the price of gasoline. So, if the S&P 500 variable is listed before inflation rate, S&P 500 has more effect on sales than does the inflation rate.

A plus or minus sign preceding it indicates whether a predictor in a model has a negative or positive impact on sales. An increase in a negative-signed predictor will have an inverse effect on the sales figure; for instance if CPI is negative, an increase in CPI would result in decreasing sales. A positive-signed variable will impact sales directly, and sales will rise as the predictor rises.

The order of the variables is important for purposes of comparison within individual models, since it indicates the relative effect of the predictors. However, the order of predictors does not necessarily indicate the predictors' relative effects across models. For instance, if gas prices are the first predictor in one model and the third predictor in another, it does not necessarily mean that gas prices are more important in the first model than in the third. That comparison requires directly comparing the coefficients for gas prices in the two models.

A critical issue for analysis is the proper selection of time periods for measuring the differing variables. Since we are particularly interested in predicting vehicle sales, our efforts focus on finding leading indicators, rather than the coincidental or lagging variety. For our initial analysis we chose to examine the effects of economic variables that lead automotive sales by one to four quarters, or conversely, the sales figures are lagged by one to four quarters.

The sales figures in the models presented here are lagged two periods (two quarters or 6 months) after the economic variables, making the economic variables six-month lead predictors of future sales. This is somewhat arbitrary, but reflects two key assumptions and our preliminary results. First, we assume that 6 months is sufficient time for changes in the economy, either a strengthening or weakening, to affect consumer buying patterns. Second, we assume that lead periods of this duration permit some business response to coming changes in sales. Finally, our results suggest that two-quarter lead models are just a bit weaker in predicting sales than one-quarter lead models, and we think the extra 3 months lead time more than compensates for their slightly lower R^2 values.

Dealerships that track these indicators will have sufficient time to alter the mix of vehicles on the lot and in the order-queue in anticipation of changes in consumer buying patterns. Two quarters also allows the dealership to re-check the economic indicators at one-quarter lead to discount or confirm the trend, if, for example, the change in an indicator was just a temporary aberration.

Some models for the entire 21-year sample period have relatively low R^2 values, so we performed additional analysis on the separate "decades," from 1978 to 1988, and from 1989 to 1998. We explored this analysis because of the growing speculation that both the economy and the vehicle market may have fundamentally changed over the course of the last decade. Moreover, each decade has particular characteristics that might explain why the predictor models for the complete 21-year period are somewhat unsatisfactory.

The first decade incorporates the second of the two gas crises of the 1970s, with resulting wide fluctuations in gas prices; two recessions, including an extremely deep recession of 17 months beginning in June 1981; and three record years, production in 1978 and sales in 1978 and again in 1986. The second decade also experienced a recession, although shorter at 8 months and fairly mild; an economic expansion of historic dimensions; relatively stable gas prices, in constant dollars; and a dramatic shift in consumer purchases from new cars to light trucks, most notably sport utility vehicles.

We often describe our modeling results in terms of what consumers are thinking in their new-vehicle purchasing decisions, but we caution that this is technically suspect. Interpreting the abstract notion of simultaneous multiple variable effects on the sales of a particular segment through the thought process of consumers makes the results more accessible and understandable. However, it might also mislead. Some of these economic factors influence behavior in the aggregate and at less than conscious levels.

The data does indeed show us trends, especially in the more powerful models, of consumers' actions as a whole, but these trends are for a minimum 10-year period and the reader must keep in mind that any measurements in particular individual time periods can vary widely. We

therefore caution that the models should not be used to “predict” exact segment sales for the next quarter, or the near future. Rather the models should be used as tools to alert us to the possibility that sales in particular segments may increase or decrease. How much credence to put in these loose forecasts is still a matter for critical business judgement, rather than mechanistic statistical determinism.

PREDICTOR VARIABLES

Our preliminary bivariate correlation analysis, combined with standard expectations for vehicle sales yields a group of 13 predictors that merit careful exploration.¹⁸

Consumer Price Index (CPI) is a measurement of price changes for a fixed basket of goods and services spent by households.

Consumer Sentiment Index (CSI) and **Consumer Confidence Index (CCI)** both reflect consumer confidence and attitude toward the economy and the consumers’ own financial conditions; the CSI specifically measures the attitudes toward buying large durable goods.

Disposable Income (DI), income after all tax and non-tax payments to governments, is a major indicator of consumer purchasing power.

Gas Price (GAS), is adjusted to 1998 dollars. We track the price of a gallon of regular gas.

Gross National Product (GNP) is the total income of all households of the nation, including the income from factors of production used abroad.

Housing Starts (HOUSING), housing newly built by private and public entities, is a good indicator of the overall economy

Index of Economic (or Leading) Indicators (INDEX ECON. INDIC.) is composed of a series of measures, and is one of the main indicators of future business actions.

Inflation Rate (INFL. RATE) is a percentage change in the general level of prices from the previous year.

Interest Rate (INT. RATE) is the cost of borrowing, measured by the Bank Prime Loan Rate.

Money Supply (MONEY) is measured by M2—an expanded measure of liquid funds.

Personal Consumption Expenditures (PCE) represent spending by households for durable and nondurable goods and services.

S&P Index (S&P 500) represents a general measure of economic performance and consumer wealth.

¹⁸ Expanded definitions of predictor variables, along with the method of standardization, if necessary, can be found in Appendix 2.

Unemployment Rate (UNEMP. RATE) is the percentage of the people who are unemployed and out of the labor force.

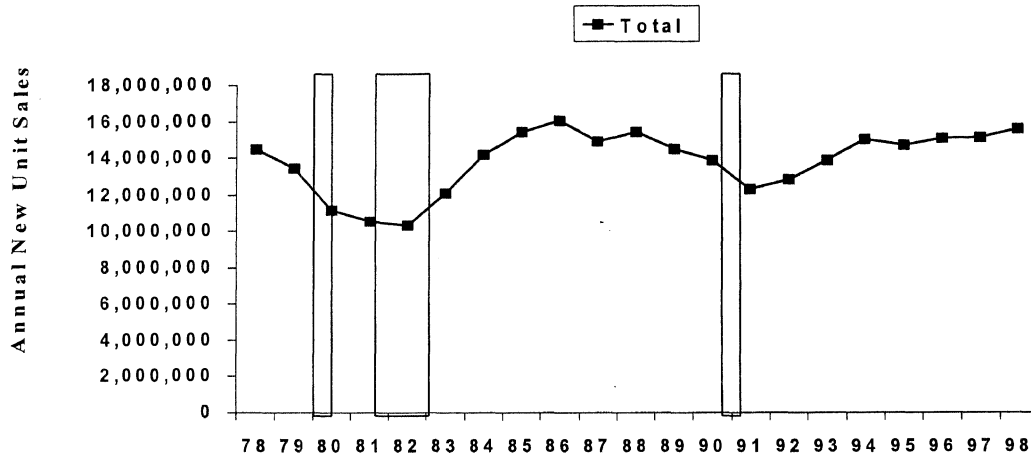
PREDICTOR MODELS

This report lists a number of models that best fit each sales segment, and have the highest predictive power. In some segments, there are alternative models with similar, though usually slightly lower, predictive power that add to the understanding of the forces affecting sales in those segments. These alternative models can be found in Appendix 3, following the main body of the report. However, not all segments had alternative models meriting discussion, either because their predictive power was too low, or the group of variables provided no additional understanding of those segments.

TOTAL VEHICLES

Total-vehicle sales represent all light vehicles sold in the United States in any given year. Beginning in 1978, as shown in figure 4-1, sales were just below 12 million units, dropping down to approximately 10 million during the recession of 1981-82, and then climbing up to the then-record sales year of 1986 when 16 million vehicles were sold. After 1986, sales steadily dropped to 12 million at the end of the recession in 1991, and have since climbed up to the 14-15 million range for the rest of the decade.¹⁹

¹⁹ Followed by 1999 record of approximately 17 million vehicles.



Source: Ward's

Figure 4-1: Total-Vehicle Sales 1978-1998²⁰

Total-Vehicle Sales (78-98):

$$1) \text{ TV} = .52(\text{CSI}) - .5(\text{INT. RATE}) - .32(\text{CPI}) - .17(\text{UNEMP. RATE})$$

$$R^2 = 60\%$$

Model 1 for total-vehicle (TV) sales has a relatively strong R^2 of 60 percent, meaning that 60 percent of the variation in sales over this time period is accounted for by the four variables in the model. The model indicates that sales will decrease as the CPI, the interest rate, or the unemployment rate increases, and TV sales will increase if the index value of consumer sentiment rises. What this means is that consumers, when faced with a rising CPI, interest rates, or unemployment, purchase fewer vehicles, defer new-vehicle purchase, or purchase an alternative such as a used vehicle. An increasingly positive consumer sentiment encourages new-vehicle sales. This model is certainly in line with conventional wisdom. Rising general prices and interest rates depress sales, while consumers confident about the state of the economy drive up sales. CSI, interest rate, and CPI are the important predictors, while the unemployment rate has a smaller effect on overall sales.

We next examined the models appropriate for predicting TV sales separately in each of the two decades. If the relationship between predictors and sales are different between the two decades, this suggests that important changes may have occurred.

²⁰ As in previous chapters, we use rectangular boxes to highlight the three recession periods of our dataset. These occurred from 1/80 through 6/80, 6/81 through 10/82, and 7/90 through 2/91.

Total-Vehicle Sales (78-88):

$$2) \text{ TV} = -.47(\text{INT. RATE}) + .38(\text{Consumer Sentiment Index}) - .20(\text{UNEMP. RATE}) - .02(\text{CPI})^*$$

$$R^2 = 70\%$$

Model 2, which represents the first decade of the dataset, includes the same variables as the full period model 1, and differs only in the order of impact of the variables.²¹ Model 2, however, has a higher R^2 —at 70 percent—indicating it is a better predictor than our best-predicting model—60 percent—for the full time period, model 1.

Total-Vehicle Sales (89-98):

$$3) \text{ TV} = 2.4(\text{GNP}) - 1.2(\text{S\&P 500}) - .56(\text{GAS}) - .36(\text{Housing Starts})^*$$

$$R^2 = 62\%$$

Model 3 for the time period 1989-1998 has an R^2 of 62 percent, similar in predictive power to the 1978-1998 model 1. However, the predictor variables are completely different. This model says that the price of gas has the expected effect on sales: as prices rise, sales fall. However, two general economic indicators—GNP and housing starts—have opposite effects on TV sales, with GNP positively associated with sales, and housing starts negatively related to sales. Moreover, we consider S&P 500 a measure of consumer wealth, and it is also negatively related to sales.

However, S&P 500 and housing starts measure much more specific economic performance than does GNP. In fact, what may be happening here is that these two measures tap uses for consumer money that constitute alternatives to new-vehicle purchases. These results might well indicate that consumers allocate their funds across vehicles, stocks, and housing. Certainly the extended life of vehicles now allows consumers the luxury of such choices, and the returns on equity investments the past few years are attractive. Perhaps this pattern is also consistent with the discussion above about the motor vehicle's falling rank in the consumer hierarchy.

However, these specific results may just be artifacts due to the unusual patterns of this most recent decade. For example, the S&P 500 has been increasing almost nonstop throughout the entire decade, while new-vehicle sales dipped in the early 1990s and have leveled off since recovering. The TV sales trend has hardly mirrored the trend of the S&P 500 until the latest sales years.

These models, and the alternatives contained in Appendix 3, suggest that, over the course of the last two decades, economic performance indicators at a particular time provide reasonable levels of prediction of total-vehicle sales two quarters later. However, we improve the power of our models if we consider the decades separately, and allow different models for each. Moreover,

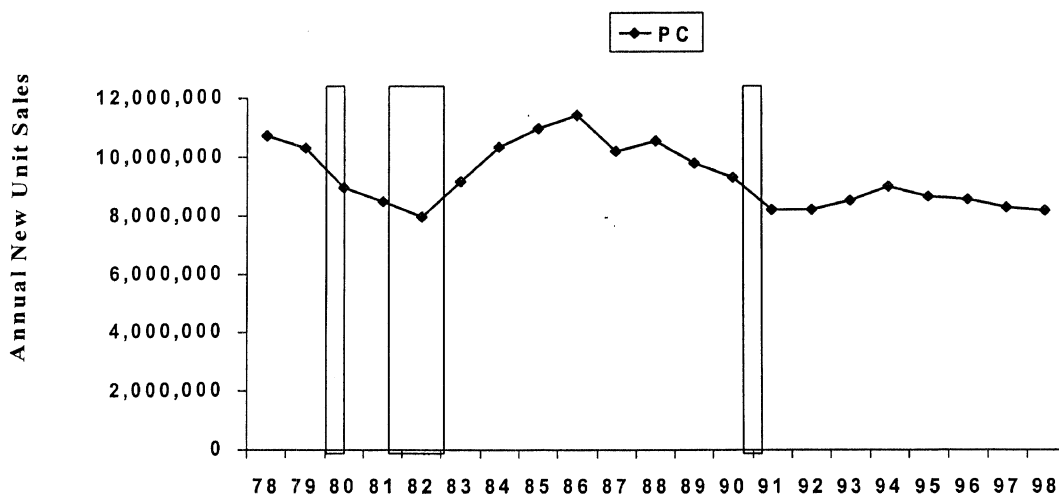
²¹ Please note that in the models, an * indicates a variable in the model, while necessary to the predictive power of the model, is not itself significant at the .05 level. In other words, there is a greater than 5 percent chance that the effect of the variable could be simply a random departure from zero.

slightly different models (see Appendix 3), substituting highly correlated predictors for each other, achieve similar levels of prediction.

The analysis of total-vehicle sales is important, but risks obscuring important differences between different segments. The next step is to look at PC and LT sales separately.

PASSENGER CARS

Sales of PCs, as shown in figure 4-2, declined from the first year of our dataset until the end of the recession in 1982. Coming out of the recession, sales increased at a fairly steep rate until the high sales year of 1986, in which over 11 million passenger cars were sold. From that point on, PC sales have declined to just 8 million units in 1998.



Source: Ward's

Figure 4-2: Passenger-Car Sales 1978-1998

Passenger-Car Sales (78-98):

$$4) \text{ PC} = -1.03(\text{CPI}) + .7(\text{Consumer Sentiment Index}) - .59(\text{INT. RATE}) - .42(\text{S\&P 500}) - .3(\text{Housing Starts}) - .2(\text{UNEMP. RATE})$$

$$R^2 = 63\%$$

Model 4 contains the same four variables as the total-vehicle model 1, as well as negative terms for S&P 500 and new housing starts, as in model 3. These results are again a bit puzzling in that growth in the S&P 500 and new housing starts are usually interpreted as indicators of a strong economy and thus favorable conditions for new-vehicle sales. It should be noted, however that

these two variables are the fourth and fifth predictors and have relatively less effect on sales of passenger cars than the prior three.

Passenger-Car Sales (78-88):

$$5) \text{ PC} = -1.0(\text{CPI}) + .79(\text{DI}) + .64(\text{CSI}) - .53(\text{INT.RATE}) - .29(\text{Housing Starts})^* - .23(\text{S\&P 500})^*$$

$$R^2 = 56\%$$

When we break our passenger-car series into decades, we find that the model predicting PC sales for the first decade is very similar to model 4 for the entire 21 years. Model 5 adds disposable income and drops unemployment rate, but achieves a slightly lower explanatory power than model 4 for the entire period. In this case, the added variable, DI, has a high impact on the outcome, PC sales.

Passenger-Car Sales (89-98):

$$6) \text{ PC} = -2.0(\text{S\&P 500}) - 1.5(\text{UNEMP. RATE}) + 1.1(\text{INDEX ECON. INDIC.}) - 1.0(\text{INT. RATE}) - .73(\text{Housing Starts}) - .6(\text{CPI}) - .30(\text{GAS})^*$$

$$R^2 = 63\%$$

Interestingly, model 6 shows that unemployment rate has a strong negative relationship with sales in the second decade, although it has no discernable effect on the first. Additionally, the model has a negative housing starts variable, and, as the strongest predictor variable, negative S&P 500. Both of these indicators should presage a change in new-vehicle sales and may suggest a shift of buyers into a substitute vehicle or even a change in consumer preference. As we look at subsegments later in this report, this possibility repeatedly surfaces.

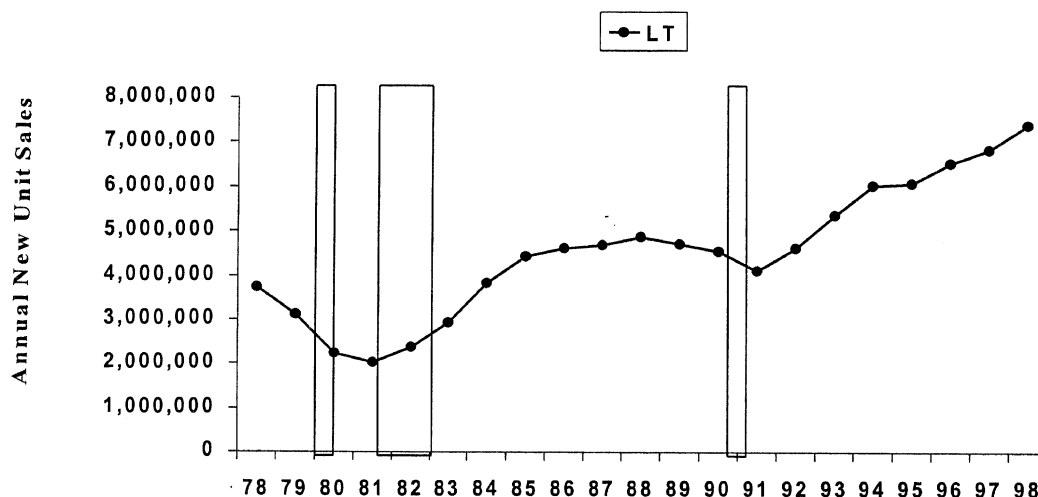
Our models for PC sales behave somewhat differently from the models for TV sales. First, the model for the entire period achieves a bit more power, using six predictors, than does the model for TV sales. However, for the first decade, the PC model explains a fair amount less variance than does the TV model, at 56 percent compared to 70 percent, but about the same variance as the TV model for the second decade, at 63 percent compared to 62 percent.

The puzzling effects—negative relationships between sales and both the level of the S&P 500 and housing starts—are more prevalent in the PC models. We suggest that these may either indicate consumers making alternative expenditures to vehicle purchases, or perhaps a wealth effect, as consumers buy higher-priced vehicles, such as SUVs, outside the PC segment.

Let us turn now to LT models.

LIGHT TRUCKS

LT sales from 1978 through 1998, as shown in figure 4-3, reveal an inverse pattern to PC sales during the same period. After experiencing a dip following the first recession in 1980, LT sales recover, and continue to increase through the deep recession of 1981-82. Perhaps this strong recovery is partly due to light trucks—then primarily a work vehicle with few luxury appointments—serving as a cheaper, basic transportation alternative to the passenger car. LT sales reached a plateau during the period of the middles 1980s, took a dip in the recession of the early 1990s, and have since experienced a steep climb in sales, to near parity with new passenger-car sales in 1998. This post-1991 increase in sales coincides with improved ride and numerous additional options, moving many LTs more upscale, especially with the introduction of the luxury SUV.



Source: Ward's

Figure 4-3: Light Truck Sales 1978-1998

Light Trucks (78-98):

$$7) \text{ LT} = .78(\text{DI}) - .44(\text{MONEY}) + .28(\text{Consumer Sentiment Index}) - .28(\text{GAS}) - .15(\text{INT. RATE})$$

$$R^2 = 92\%$$

LT model 7, with an extremely high R^2 of 92 percent, is much more powerful than any of the PC or TV models. The high R^2 indicates that the model's predictive power for LT sales is much greater than are the comparable models for PC or TV sales. There are no real surprises with these variables, except the negative relationship between sales and money supply.

A negative money supply is at first perplexing. In fact, though, money supply is a negative variable in almost every segment model in which it is included. Money supply (M2 in this analysis) is defined as highly liquid funds. It is the sum of money in circulation, demand deposits, small denomination time deposits, and savings. Money supply, up until the most recent economic expansion, was seen as a predictor of rising inflation, but it seems that relationship no longer exists. In fact, the chairman of the Federal Reserve Board stated as far back in July, 1993 that, "The historical relationship between money and income and between money and the price level have largely broken down."²²

In the past, as the money supply rose, consumers were expected to be more willing to invest in large durable goods. As demand for these durable goods grew, producers were pressed to capacity limits, supply dropped below demand, and the result was higher costs, and rising inflation. But during the recent economic expansion, many investors have placed their funds in the stock market to take advantage of its higher potential returns. This money does not show up in the money supply and in fact has caused the money supply, when measured in 1998 dollars, to level off. What this may mean is that during the economic expansion of the 1990s, a low money supply does not necessarily imply consumers have less money to spend on consumer goods. Indeed, what a decreasing money supply during an economic expansion could mean is that an ever-increasing number of people are investing in the stock market, and, as we argued above, this may represent an alternative to purchasing a motor vehicle.

The negative gas effect is reassuring because it indicates that LT consumers are sensitive to gas prices, as experience and economic theory suggest should be the case. If the cost of gas should rise significantly for more than a brief period, LT sales could suffer as consumers look for more fuel-efficient vehicles. However, our research indicates that the luxury SUV segment, with a more upscale clientele, is less sensitive to swings in the price of gasoline.

Light Trucks (78-88):

$$8) \text{ LT} = -.52(\text{INFL. RATE}) - .32(\text{UNEMP. RATE}) + .29(\text{DI}) - .16(\text{INT. RATE})^* \\ R^2 = 89\%$$

Looking at the LT segment in the first decade yields a powerful model 8, with an R^2 of 89 percent. The model suggests that purchasers of light trucks in the first decade were sensitive to the rates of inflation, unemployment, and interest. All of these are negative predictors, meaning sales will decrease as any of these variables rise.

Consumers in this first decade were witness to inflation rates approaching 15 percent and interest rates that topped 20 percent, understandably making them nervous about future inflation, and reluctant to borrow money for an expensive purchase while interest rates remained high. A negative unemployment rate suggests that consumers are cautious about investing in large durable goods as job security lessens. Consumers did not feel so comfortable in their jobs that they were willing to overlook the unemployment rate. Indeed, the first decade contains the

²² Alan Greenspan, chairman, Federal Reserve Bank, testimony before the Senate Banking, Housing, and Urban Affairs Subcommittee, July 22, 1993.

longest and deepest recession in our data. Consumers were justifiably cautious in investing in a vehicle. There is also a positive predictor, disposable income, or income after taxes. As disposable income rises, so do light-truck sales. The final predictor in the model is a negative one—interest rate—which deters consumers from purchasing light trucks, just as it does in the TV and PC models for the first decade.

Light Trucks (89-98):

$$9) \text{ LT} = .75(\text{DI}) - .22(\text{GAS}) - .12(\text{MONEY}) + .07(\text{Consumer Sentiment Index})^* - .04(\text{INT. RATE})^*$$

$$R^2 = 90\%$$

Model 9, with a strong R^2 of 90 percent, is another model in the LT segment with robust predictive powers. What is particularly interesting about this model is that the most powerful predictor is disposable income, with a coefficient much higher than in model 8, where it was not the most powerful. This suggests that increased disposable income now has a much stronger influence on buyers, while it had less effect in the prior decade, when inflation may have muted its role.

Consumers in this segment are much more aware and sensitive to increased wealth than they were a decade ago when they worried about losing the source of their wealth. Gas prices, a negative sales predictor, will influence buyers in this segment, resulting in lower sales if the pump price of fuel climbs too high for too long.

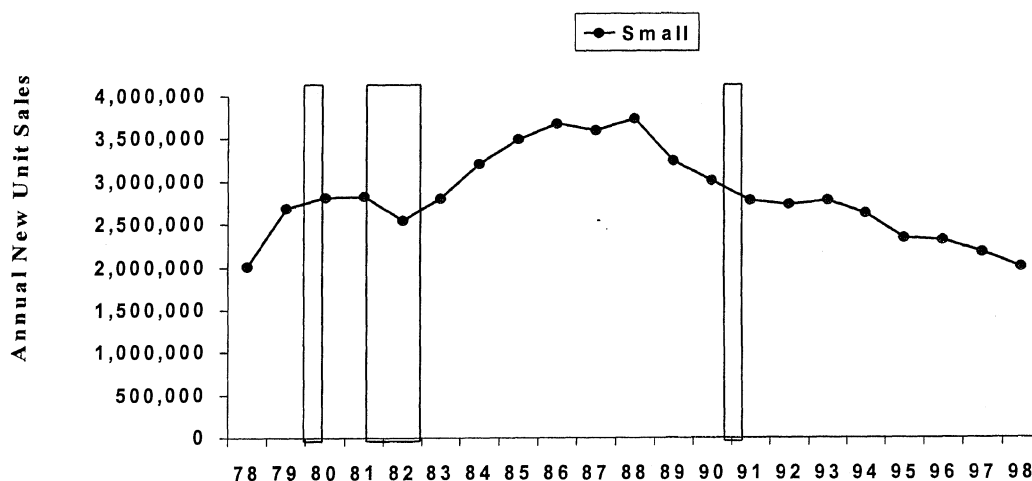
It is interesting to review the shift in predictors for the two decades. Comparing model 9 to 8, we see that inflation rate and unemployment rate drop out of model 9. Consumers, aware that the inflation rate and unemployment rate have been gradually dropping throughout the second decade, are probably less concerned with these factors. On the other hand, gas prices are a factor in the second decade, but not the first, even though it was the earlier decade that experienced an oil shock and fuel price fluctuation.

We turn now to passenger cars.

PASSENGER-CAR SEGMENTS

Small Cars

Small cars, as shown in figure 4-4, experienced a steep increase in sales in 1979 and 1980, probably due to the lingering effects of the two gas crises of the 1970s and the first recession in 1980. Small cars, for the most part, were fuel efficient and inexpensive, answering the needs of worried consumers. Even these positive attributes were not enough to prevent a slippage in sales during the strong recession of 1981-82, though sales did not fall below the gains made before the 1980 recession. Sales continued to climb until 1988 then began to fall steadily, and have not recovered. The decline in small car sales occurred at the same time that passenger cars in general began their steady decline. It also appears that during the first decade, the light-truck segment offered a reasonable alternative to consumers looking for inexpensive transportation, with fairly stable gas prices allaying the fear of consumers who previously bought more fuel-efficient passenger cars.



Source: Ward's

Figure 4-4: Small Passenger-Car Sales 1978-1998

Small Passenger Car (78-98):

$$10) \text{SMALL PC} = -.86(\text{GNP}) + .65(\text{MONEY}) - .46(\text{Housing Starts}) + .22(\text{Consumer Sentiment Index})$$

$$R^2 = 34\%$$

The small-car segment can be viewed as the segment of inexpensive transportation, where consumers have limited budgets and/or are interested in basic transportation. If however at the time of purchase, such consumers have just received raises, some might be more inclined to buy

a car with more features, of a larger size, or be less concerned about operating costs. If the economy were strong, this would reduce the sales of small cars as consumers would be more confident of the economy in general and shift their purchases. For these reasons, the negative GNP variable in model 10 seems reasonable. The models in this segment tend to reflect such a decision process.

However, this model for the entire period is fairly weak, with an R^2 of less than 35 percent. An R^2 this low indicates that the predictive power of this model, in comparison to others, is extremely low. Separate models for the first and second decades yield much greater predictive power.

Small Passenger Car (78-88):

$$11) \text{ SMALL PC} = 1.1(\text{GAS}) - 1.6(\text{MONEY}) \\ R^2 = 69\%$$

Model 11 with a higher R^2 of 69 percent, is straightforward, but elegant in its simplicity. It does confirm the importance of gas prices and the resultant expectation of increased sales of small passenger cars in the first decade. During the first decade of our analysis, gas prices were a concern to the average driver. Gas shortages had occurred twice in the decade of the 1970s, raising the concern that there would not be an unlimited supply of cheap fuel into the foreseeable future. This realization caused consumers, in response, to buy higher-mpg vehicles. This explains the positive gas variable in the model. We assume that the negative effect of money supply represents some shifting of sales into other segments.

Small Passenger Car (89-98):

$$12) \text{ SMALL PC} = -.80(\text{Personal Consumption Expenditures}) - .51(\text{Housing Starts}) - .28 \\ (\text{GAS}) - .23(\text{UNEMP. RATE}) \\ R^2 = 77\%$$

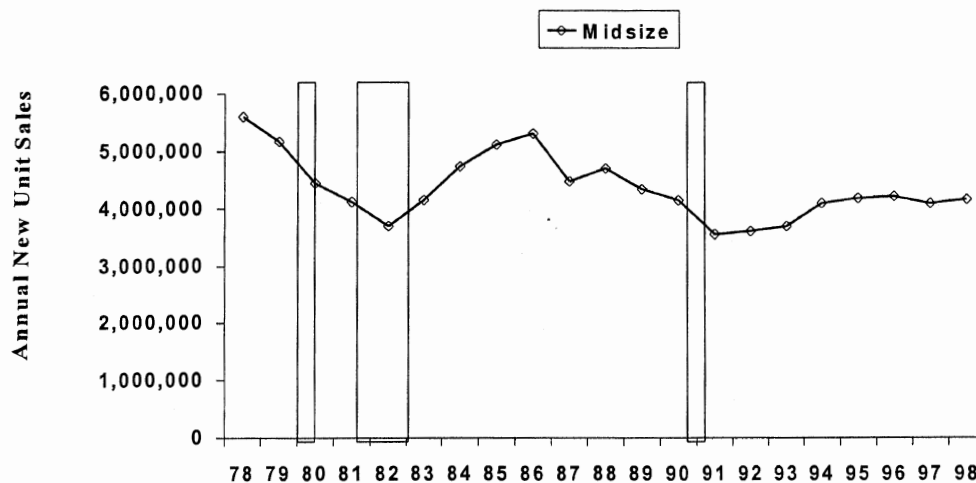
The decade of 1989-98 was witness to a small recession, but since then the economy has been expanding, and continues to expand, perhaps leaving all concerns about high gas prices, unemployment and interest rates relegated to an increasingly distant past. This fading memory of economic hard times may be profoundly changing consumer buying habits. This is indicated by model 12 which shows consumers buying fewer small cars as personal consumption expenditures, new housing starts, gas prices, and unemployment rates all rise.

Personal consumption expenditures and new housing starts are negative predictors, so there will be lower sales in the small passenger-car segment as they rise. During the second decade, except for a dip in annual sales in 1990-91, total-vehicle sales have been trending up or, at worst, staying essentially level. If total sales have generally been increasing, it is safe to assume that decreased sales in one segment lead to increased sales in another. So, if consumers are not buying small cars when their expenditures are rising and an indicator of the health of the general

economy, housing starts, is rising, what segment is the recipient of the sales? Throughout this analysis, we have noticed a decrease in sales in one segment related to the action of an economic variable only to see an increase in sales in another segment, related to the action of the same variable. Is this a signal of the shift from one segment to another? This possibility will be further explored as other segment models are discussed.

Midsize Cars

The midsize passenger-car segment, as shown in figure 4-5, is perhaps the most cyclical of the segments analyzed in this study. Starting at approximately 5.5 million sales in 1978, sales dropped through the first two recessions in the early 1980s, losing almost 2 million units, then gaining almost all of them back by the record industry sales year of 1986, only to lose 2 million sales again, after the third recession. Sales increased slightly after the recession and have hovered around 4 million annual sales ever since.



Source: Ward's

Figure 4-5: Midsize Passenger-Car Sales 1978-1998

Midsized Passenger Cars (78-98):

$$13) \text{ MIDSIZED PC} = -1.0(\text{DI}) + .51(\text{Consumer Sentiment Index}) - .35(\text{INT. RATE}) - .31(\text{UNEMP. RATE})$$

$$R^2 = 34\%$$

Midsized Passenger Cars (78-88):

$$14) \text{ MIDSIZED PC} = 1.14(\text{INDEX ECON. INDC.}) - .79(\text{S\&P 500})$$

$$R^2 = 24\%$$

Midsized Passenger Cars (89-98):

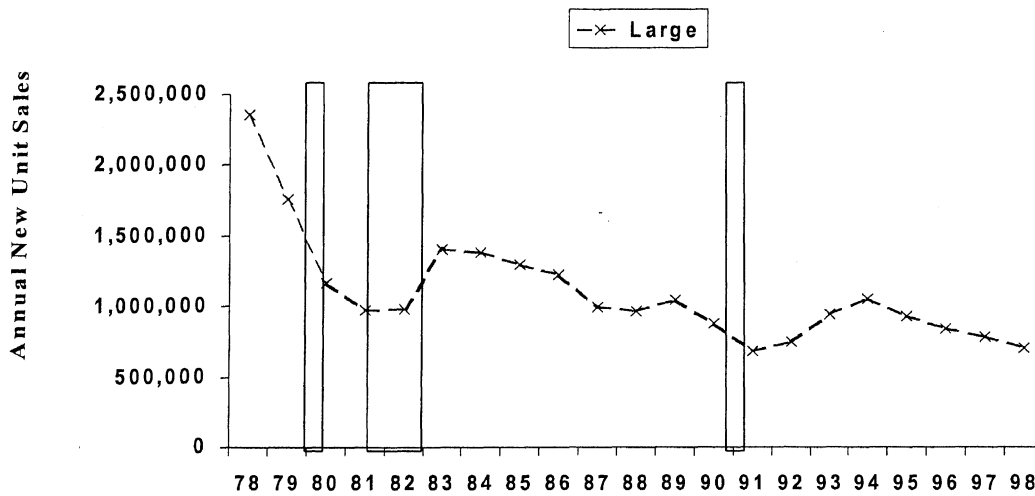
$$15) \text{ MIDSIZED PC} = -.81(\text{UNEMP. RATE}) - .48(\text{GAS}) - .4(\text{Housing Starts}) - .4(\text{MONEY})$$

$$R^2 = 59\%$$

Model 15 for the second decade, with an R^2 of 59 percent, is reasonably predictive, but models 13 and 14 in the midsized passenger-car segment are quite weak. There has been some discussion about whether this segment now partially fulfills the need for basic transportation. Two important variables, negative unemployment rate and negative gas, indicate this segment's purchasers are sensitive to the same pressures as buyers of small cars in the second decade, model 12. Increases in these two variables should result in decreased sales in the segment, as in model 12.

Large Cars

Sales in the large PC segment, as shown in figure 4-6, drop more steeply than any other segment analyzed. Beginning with approximately 2.5 million sales in 1978, sales fell and bottomed out at 1 million units by 1981. After the recession in 1981-82, sales recovered by one-half million units in 1983, but the decline began again after that, although not as steep. Except for a brief recovery in 1991-94, sales declined steadily to 1998's low of approximately three-quarters of a million units. Large passenger cars have faced a steady onslaught from the emergence of the minivan in the mid-1980s, SUVs in the early 1990s, and even the acceptance of the pickup truck as roomy, comfortable transportation. Traditionally, consumers of large passenger cars were 50 years of age and older. However, many consumers in this age cohort are purchasing alternative vehicles such as SUVs, minivans, and luxury or near luxury PCs, contributing to the decline in sales.



Source: Ward's

Figure 4-6: Large Passenger-Car Sales 1978-1998

Large Passenger Cars (78-98):

$$16) \text{ LARGE PC} = -.97(\text{MONEY}) - .87(\text{DI}) - .68(\text{GAS}) + .38(\text{Consumer Sentiment Index}) - .37(\text{INT. RATE})$$

$$R^2 = 71\%$$

Model 16, has a moderately strong R^2 of 71 percent. A negative disposable income variable in our analyses suggests that a wealth-effect shift in purchase decisions may be occurring. The additional wealth that consumers feel they possess is contributing to their increased confidence in the strength of the economy. Consumers feel wealthy and they are acting on their feelings. Presumably, this feeling of wealth is shifting them into other purchases. Given the sectoral decline in large car sales, this would not be surprising.

The other variables in the model are fairly clear. A negative gas price variable implies that consumers of large passenger cars are sensitive to a rising fuel price which would drive up the operating costs of the vehicle over its life. Positive consumer sentiment and negative interest rate are expected results.

Large Passenger Cars (78-88):

$$17) \text{LARGE PC} = - 2.5(\text{MONEY}) - .87(\text{GAS}) - .71(\text{INT. RATE}) + .65(\text{Consumer Sentiment Index}) + .44(\text{GNP})^*$$
$$R^2 = 71\%$$

There is nothing startling about the variables contained in this model. Negative gas prices and interest rates suggest consumers may worry about the monthly costs of owning a large passenger car, while positive Consumer Sentiment Index and GNP suggest that if consumers generally feel the economy is strong, they would be willing to purchase a large car.

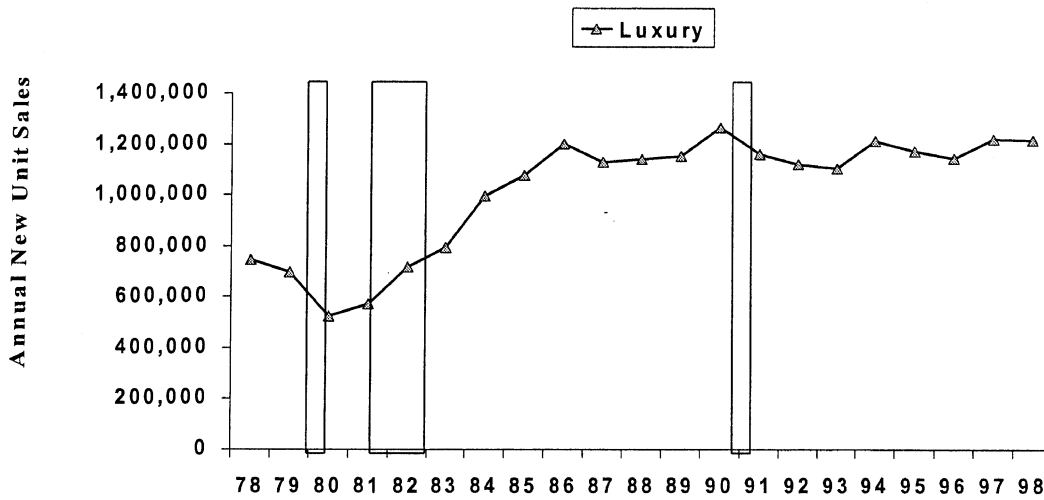
Large Passenger Cars (89-98):

$$18) \text{LARGE PC} = - 2.4(\text{S\&P 500}) + .95(\text{Personal Consumption Expenditures}) + .92 (\text{INDEX ECON. INDIC.}) - .36(\text{GAS}) - .27(\text{INT. RATE})$$
$$R^2 = 63\%$$

Model 18 shows that the stock market has a major influence on large passenger-car sales—in a negative sense, for as the S&P 500 rises, sales in this segment drop precipitously. This model supports the argument that consumers move to another segment as they feel more wealthy. Interestingly, though, as consumers spend more on personal consumption, sales in this segment increase, perhaps as a result of consumers moving up to this segment from something else, such as midsize passenger cars.

Luxury Cars

Luxury cars, as shown in figure 4-7, came into their own following the first recession of 1980, starting at around one-half million annual sales and climbing through the recession of 1981-82 up to 1.2 million by 1986. Sales have stayed in this range ever since. There has been speculation that many large passenger-car consumers moved up to the expanded luxury-car segment, liked what they were able to purchase, and have not returned.



Source: Ward's

Figure 4-7: Luxury Passenger-Car Sales 1978-1998

Luxury Passenger Cars (78-98):

$$19) \text{ LUXURY PC} = .4(\text{DI}) - .38(\text{INFL. RATE}) + .15(\text{Consumer Sentiment Index})^*$$

$$R^2 = 68\%$$

The model for luxury passenger cars, model 19, has a relatively strong R^2 of 68 percent. The highest impact predictor is disposable income. Our model 16 shows that as disposable income increases, sales of large cars decrease, but when disposable income is included in model 19 for luxury passenger cars, disposable income is positive, meaning it increases sales of this segment. This is the clearest evidence of consumers moving up a segment.

As discussed previously, an increasing disposable income may be driving a wealth effect, as more consumers purchase luxury passenger cars. Consumers in this segment are still sensitive to the effects of inflation and the negative coefficient implies that sales will drop if inflation goes up. In times of increasing consumer sentiment, sales will rise, which is a logical outcome because as consumers are more confident in the economy, they are also more confident in their ability to afford a higher-priced vehicle.

Luxury Passenger Cars (78-88):

$$20) \text{ LUXURY PC} = .49(\text{DI}) - .36(\text{INFL. RATE}) + .20(\text{Consumer Sentiment Index})$$

$$R^2 = 92\%$$

This model, with a higher R^2 of 92%, indicates that consumers during the first decade were willing to purchase a luxury car if their confidence in the economy was strong, their disposable income was rising and as long as interest rates weren't also rising. This indicates a rational consumer behaving as could be expected.

Luxury Passenger Cars (89-98):

$$21) \text{ LUXURY PC} = .85 (\text{INDEX ECON. INDIC.}) + .82(\text{INT. RATE}) - .55(\text{Housing Starts}) - .50(\text{GAS})$$

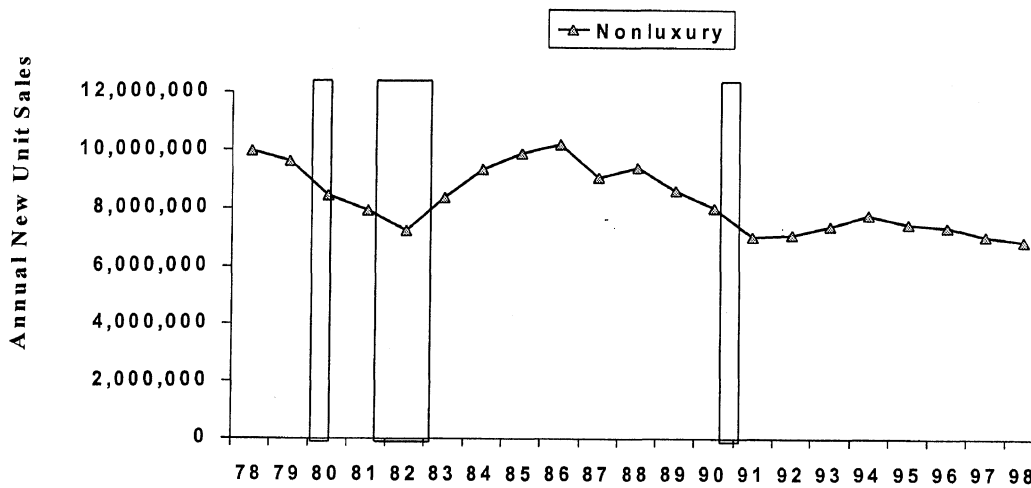
$$R^2 = 72\%$$

Model 21, with an R^2 of 72% indicates that as the economy in general is growing, then sales will increase as indicated by a positive index of economic indicators. Interestingly, as the interest rate climbs, consumers continue to purchase in this segment, perhaps because they are more likely to purchase via cash, or the monthly payments are a less significant portion of their monthly income. However, disposable income is not an element in this model.

Next we look at nonluxury passenger cars as a group.

Nonluxury Cars

The sales trend for nonluxury passenger cars, as shown in figure 4-8, closely resembles that of midsize passenger cars. This is not surprising since the midsize passenger-car sub-segment is the largest in terms of annual sales. Nonluxury passenger-car sales have been falling steadily since the peak sales year of 1986. This segment encompasses small, midsize, and large cars, all of which have declined since 1986. The emergence of the minivan, SUV, and pickup truck as alternative forms of transportation, perhaps more exciting to consumers than the passenger car, has slowly eroded the passenger-car market for anything short of luxury cars.



Source: Ward's

Figure 4-8: Nonluxury Passenger-Car Sales 1978-1998

Nonluxury Passenger Cars (78-98):

$$22) \text{NONLUXURY PC} = - .85(\text{CPI}) + .78(\text{INDEX ECON. INDIC.}) - .47(\text{S\&P 500}) - .34(\text{Housing Starts}) + .33(\text{Consumer Sentiment Index})$$

$$R^2 = 36\%$$

Nonluxury Passenger Cars (78-88):

$$23) \text{NONLUXURY PC} = - .58(\text{INT. RATE}) + .57(\text{DI}) + .48(\text{GAS})$$

$$R^2 = 34\%$$

Nonluxury passenger-car model 22 for the full period, along with model 23 from the first decade exhibit weak R^2 s, of less than 37 percent. These time periods have proven extremely difficult to model for PC sales, and with almost 65 percent of the variance in sales unexplained by the models, extreme caution must be exercised in extrapolating any trends.

Nonluxury Passenger Cars (89-98):

$$24) \text{NONLUXURY PC} = -1.4(\text{S\&P 500}) - 1.2(\text{UNEMP. RATE}) - .7(\text{INT. RATE}) - .56(\text{Housing Starts}) - .4(\text{GAS})$$

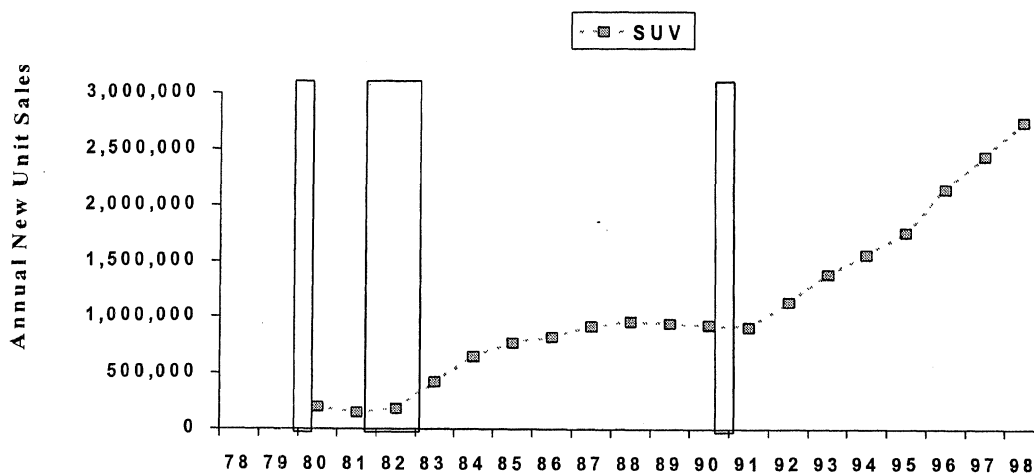
$$R^2 = 52\%$$

Model 24 indicates that second-decade sales in this segment are sensitive to unemployment rates, interest rates, housing starts, and gas prices. However, the possible individual wealth indicator, S&P 500 is also negative, leading to the assumption that in good times, consumers will purchase elsewhere. A critical issue is the extent to which such purchases are elsewhere in the automotive market, or elsewhere in the economy.

LIGHT-TRUCK SEGMENTS

SUV

SUV sales, as shown in figure 4-9, became important in the period following the second recession, 1981-82. During this period Jeep Cherokees and Ford Broncos were becoming popular. Sales increased from two hundred thousand to nearly 1 million by 1987. After dipping slightly during the third recession, sales took off, driven by the introduction of the Ford Explorer, the continued popularity of the Jeeps, and the introduction by most manufacturers of competing vehicles. In the period from 1991-98, sales increased steadily reaching almost 3 million units annually. A strong economy and fairly stable gas prices, along with the feeling of safety these vehicles convey, contributed to the sales surge in the 1990s.



Source: Ward's

Figure 4-9: Sport Utility Vehicle Sales 1978-1998

SUV (78-98):

$$25) \text{ SUV} = .58(\text{S\&P 500}) + .35(\text{Personal Consumption Expenditures}) + .08(\text{Consumer Sentiment Index})$$

$$R^2 = 91\%$$

Model 25 has a strong R^2 of 91%. Personal consumption expenditures, S&P 500, and consumer sentiment are all positive. Generally, consumers in this segment seem driven by what can be called a psychological wealth effect—consumers feeling that they are better off financially now than at an earlier time. This model illustrates that when consumers feel good about the strength of the economy, the stock market is rising, and expenditures increase, this segment's sales will benefit.

SUV (78-88):

$$26) \text{ SUV} = .65 (\text{INDEX ECON. INDIC.}) + .61(\text{MONEY}) - .28(\text{S\&P 500})$$

$$R^2 = 97\%$$

This model, with a strong R^2 of 97%, contains an indicator of the general economy, a positive index of economic indicators, as its highest impact variable, and is one of the few models we tested in which we saw a positive money supply variable. Both of these variables are indicators of a healthy economy (remember, money supply was a good indicator until the early 1990s). SUVs were a fairly new commodity in the first decade and sales did not really begin to take off until after the recession of 1990 and many manufacturers began building this new type of vehicle to meet increasing consumer demand.

SUV (89-98):

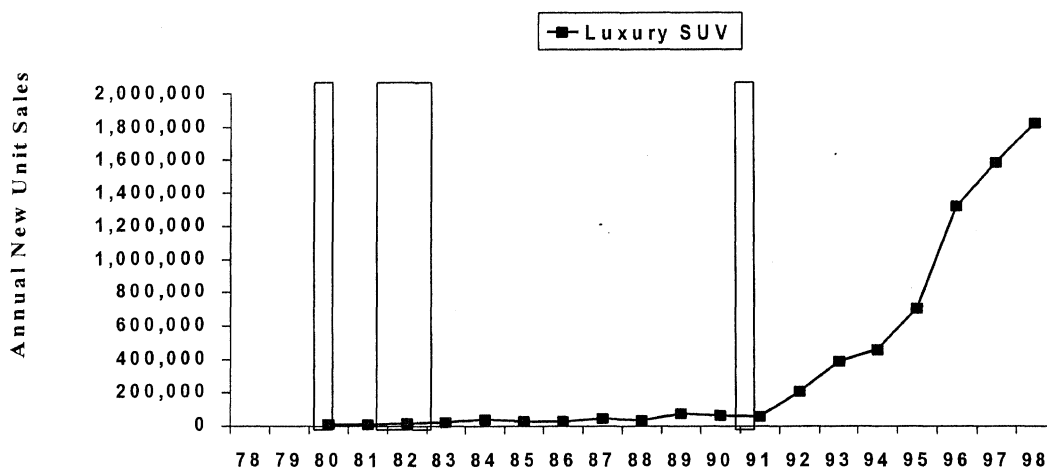
$$27) \text{ SUV} = 1.0(\text{S\&P 500}) - .30(\text{MONEY}) + .08 (\text{INDEX ECON. INDIC.})^*$$

$$R^2 = 98\%$$

In the second decade, the model is even stronger, and what is more surprising is the movement of the S&P 500 variable from being a negative third impact variable in the first decade model to a positive first impact variable in the second decade. As SUVs became desirable status vehicles, the cost of the vehicles rose, and consumers felt wealthier, perhaps as a result of the strong stock market, sales rose. Consumers whose feelings of wealth were linked to the performance of the stock market were likely to buy SUVs as long as the stock market was strong and rising.

Luxury SUV

As can be seen in figure 4-10, luxury SUV sales were practically non-existent until after the last recession. Two events contributed to this rise in sales: the introduction of the Ford Expedition/Lincoln Navigator, and the reclassification of the Ford Explorer to the luxury bracket. Other luxury brands such as Mercedes and Lexus built their own luxury models. Luxury SUVs now account for approximately two-thirds of all SUV sales annually.



Source: Ward's

Figure 4-10: Luxury SUV Sales 1978-1998

Luxury SUV (78-88):

The luxury SUV segment contained too few sales during the first decade for reliable analysis. Modeling consumer behavior revealed models for the first decade and the full two-decade dataset with little predictive power, and we do not report them.

Luxury SUV (89-98):

$$28) \text{ LUXURY SUV} = .98(\text{S\&P 500}) - .16(\text{MONEY}) + .15(\text{Housing Starts})$$

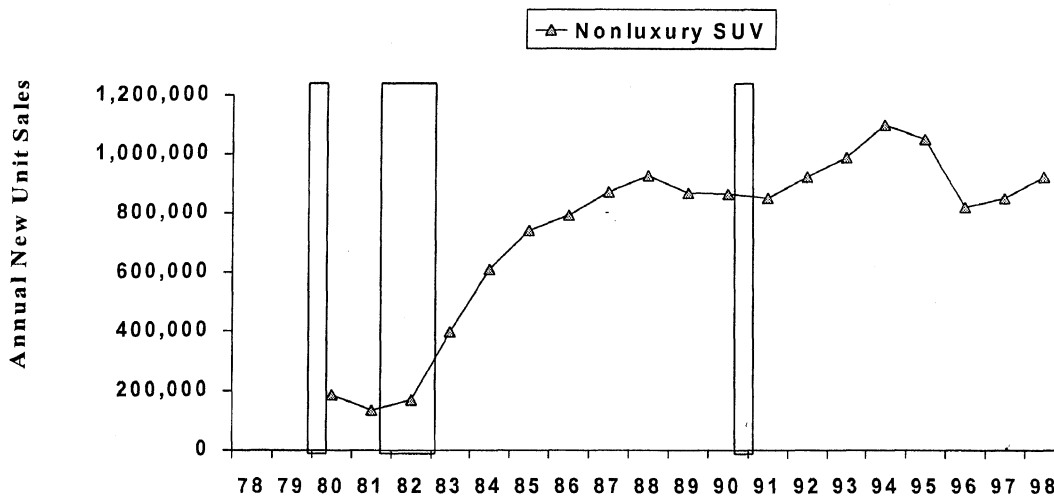
$$R^2 = 89\%$$

Luxury SUVs became a major segment after the recession in the early part of the second decade with almost two-thirds of the SUV segment categorized as luxury. In model 28, S&P 500 is the highest impact variable and the impact of the other two variables pale in comparison. Clearly consumers who feel wealthy are highly likely to choose a luxury SUV when they are purchasing a new-vehicle. Evidence of the psychological wealth effect surfaces in this segment analysis in

the positive S&P 500 variable. Whether consumers would leave this segment if the S&P 500 dropped is unclear, although the model says they will.

Nonluxury SUV

The interesting area of the sales graph, figure 4-11, is the period following the last recession. The sales graph indicates that nonluxury SUV sales began to drop following the 1994 sales year, continued for 2 years, and has since begun to climb again. The reclassification of some SUV brands as luxury, notably Ford Explorers, has contributed to the decline in nonluxury sales and the increase in luxury SUV sales. Manufacturers, ever aware of the need to fill a niche, again began producing more affordable SUVs in the past few years.



Source: Ward's

Figure 4-11: Nonluxury SUV Sales 1978-1998

Nonluxury SUV (78-98):

$$29) \text{NONLUXURY SUV} = 1.29(\text{INDEX ECON. INDIC.}) - .39(\text{S\&P 500}) - .2 (\text{Consumer Confidence Index})$$

$$R^2 = 84\%$$

In contrast to the luxury SUV segment, the nonluxury segment probably contains more purchasers who have moved into the segment tenuously, suggested by the most powerful predictor in model 29, the positive index of economic indicators. As the economy goes, so go the sales of this segment. A negative S&P 500 variable could forecast a consumer shift up to a higher-priced segment.

Nonluxury SUV (78-88):

$$30) \text{ NONLUXURY SUV} = .87(\text{INDEX ECON. INDIC.}) - .23 (\text{GAS}) - .19(\text{S\&P 500})^* + .07(\text{CPI})^*$$

$$R^2 = 95\%$$

Model 30, with an $R^2 = 95\%$, of nonluxury SUV sales during the first decade has very strong predictive power. The model relies heavily on the index of leading economic indicators which has a large impact on sales, compared to the other two variables. Sales increased dramatically after the second recession of the decade, in 1982, coinciding with the expansion of the economy. Whether these sales are a result of consumers feeling better about the economy (Consumer Price Index impact is insignificant) or merely coincidence with a strengthening economy is difficult to say. Additionally, as indicated by the negative gas variable, consumers in this decade will decrease their purchases in the face of rising gas prices. This is not surprising given the recent memory of oil embargoes and the fact that SUVs have never had high mpg ratings.

Nonluxury SUV (89-98):

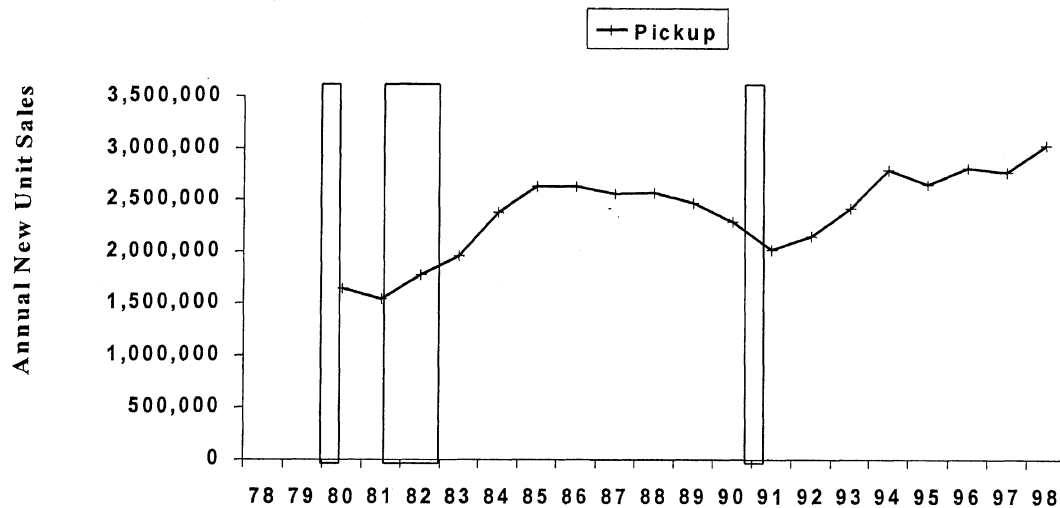
$$31) \text{ NONLUXURY SUV} = - 1.7(\text{S\&P 500}) + 1.4(\text{INDEX ECON. INDIC.}) + .51(\text{DI})^* - .49(\text{Housing Starts})$$

$$R^2 = 26\%$$

Model 31 has quite low predictive powers compared to model 30 from the first decade, perhaps indicative of the changing character of the economy and the SUV segment in the second decade. Since the early part of the 1990s the economy has been expanding, and sales in the SUV segment in general, and the luxury SUV segment in particular have been growing. However, sales in the nonluxury SUV segment have actually been dropping. This inverse movement of economy and nonluxury SUV sales makes it difficult to model the segment with any great power of predictability.

PICKUPS

Pickups have led a strange life. In the early years pickups were the work vehicle of choice, but all of that seemed to change following the first recession in 1980, as shown in figure 4-12. Pickup truck sales actually increased during the second recession, perhaps because they were more affordable than other vehicles. Sales increased until 1987 and then dropped slightly through the last recession, but then began to increase again and reached their highest sales year in 1998. Sales of pickups were probably influenced by the same forces that affected SUV sales, while the price of a pickup truck was still attractive compared to an SUV.



Source: Ward's

Figure 4-12: Pickup Truck Sales 1978-1998

Pickups (78-98):

$$32) \text{ PICKUP} = - .69(\text{INFL. RATE}) - .62(\text{MONEY}) - .57(\text{UNEMP. RATE}) - .3 (\text{INT. RATE})^*$$

$$R^2 = 71\%$$

Model 32, with a negative inflation rate, unemployment rate, and interest rate, suggests consumers of pickups are concerned about the cost of borrowing money, how much their income will buy, and if their income stream is secure. Buyers in this segment are likely to look elsewhere if the economy weakens significantly.

Pickups (78-88):

$$33) \text{ PICKUP} = - 1.0(\text{INFL. RATE}) - .68(\text{UNEMP. RATE}) - .57(\text{MONEY})^* - .29 (\text{INT. RATE})^*$$

$$R^2 = 78\%$$

Model 33, with a slightly higher R^2 of 78% than the full model 32, reveals that consumers are reluctant to buy pickups if the inflation rate and/or the unemployment rate increase. A rise in either of these two variables leads to lower sales in the segment.

Pickups (89-98):

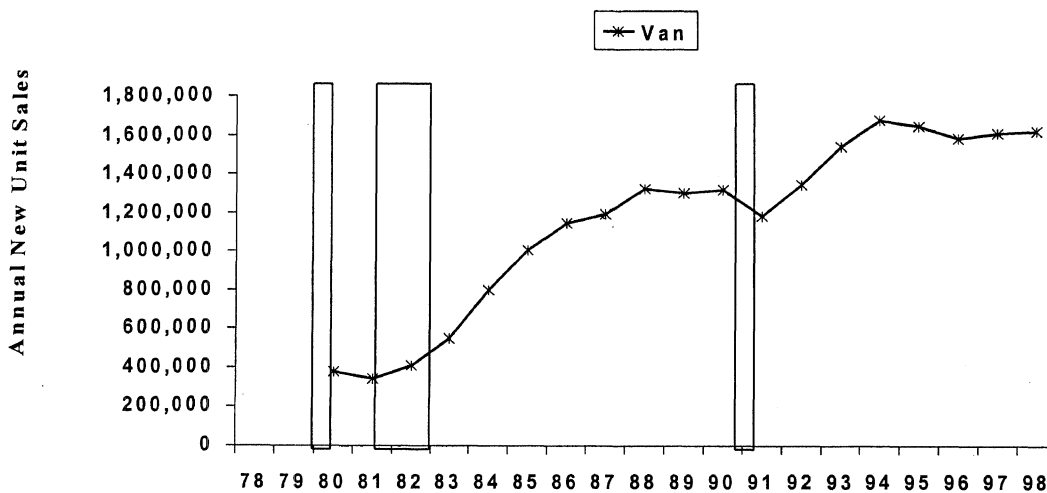
$$34) \text{ PICKUP} = - .64(\text{UNEMP. RATE}) - .40 (\text{INT. RATE}) - .33(\text{INFL. RATE})^* - .20(\text{MONEY})$$

$$R^2 = 68\%$$

This model is the same as the full-scale model 32, except that unemployment rate has moved to the highest impact variable position, although its coefficient is only slightly higher. Interest rate has also moved to a higher impact position, but the weight of its impact has not increased dramatically either. Money supply and inflation rate have less impact on sales in the second decade than in the first.

VANS

Van sales increased following the second recession and, as shown in figure 4-13, have been largely driven by the introduction of the minivan by Chrysler in 1984. Since then, sales have escalated, dipping for the last recession, and then leveling off in the last 4 years. There is speculation that the market for vans is saturated and that may indeed be the case.



Source: Ward's

Figure 4-13: Van Sales 1978-1998

Vans (78-98):

$$35) \text{ VANS} = .63(\text{INDEX ECON. INDIC.}) + .6(\text{CPI}) - .33(\text{S\&P 500}) - .11(\text{Housing Starts})$$
$$R^2 = 88\%$$

Model 35 has a strong R^2 of 88 percent, but it is a little difficult to interpret. This undoubtedly has something to do with who this segment targets. It is fulfilling some basic transportation needs for families, while it also appeals to people who want a vehicle with lots of interior space for travelling or transporting goods. As a result, it is difficult to assess the economic stratification of the buyers.

Vans (78-88):

$$36) \text{ VANS} = .48(\text{INDEX ECON. INDIC.}) + .47(\text{CPI}) - .10(\text{Housing Starts})^* - .06(\text{S\&P 500})^*$$
$$R^2 = 88\%$$

This model is identical to model 35 for the full period, with the last two variables in reversed order. The impact of both the index of economic indicators and CPI are reduced.

Vans (89-98):

$$37) \text{ VANS} = .61(\text{GNP}) - .43(\text{MONEY}) - .35(\text{GAS}) - .26(\text{New Housing})$$
$$R^2 = 54\%$$

In the last decade, this segment becomes much harder to model with a high level of predictive power. As noted, sales in this segment are perhaps saturated, even though the economy continues to grow. This is interesting as the model shows that the segment sales should increase when GNP increases. If indeed this is a basic transportation segment, it may not see increased sales until gas prices fall and consumers are willing to buy a vehicle to fit their basic needs, not something more glamorous.

Implications

We have examined many sub-segments of the total-vehicle market and discovered some interesting relationships. In particular, this analysis has given us a tool to look at the new-vehicle buying process and to conjecture about how that process will be altered by changes in the general economy.

The biggest question raised by this analysis is what will happen to segment sales during the next recession. First, a word of caution. We have looked at sales of light vehicles over the past 21 years, and also during the first and second decades of the time period. The two decades differ in ways important to the dynamics of automotive sales.

We doubt that the current economic expansion can continue unabated but, like others, we wonder

whether the economy may have undergone some fundamental structural changes that are as yet not completely clear. The shifts in the predictors in our models for these two decades suggest it may have. In particular, the negative relationship between sales and some of the traditional predictors may indicate that automotive sales patterns are changing. Perhaps the market for basic transportation has shifted from the small car to the light truck. Similarly, perhaps there is some shift in the luxury market from cars to SUVs. It is important to recognize that the predictors of auto sales change across these two decades.

However, our models are not any more useful for predicting recessions than for predicting any other portion of the economic cycle. That is, they reasonably account for the general ebb and flow of sales, but have no added power for predicting periodic sharp and steep declines. This again may reflect the fact that the economy is changing.

Before the economy begins its fall into recession, new housing starts decrease, as do automobile sales. What precipitates the drop in these economic indicators typically is decreasing consumer confidence in the economy. As consumers become less confident about the strength of the economy, perhaps because they sense it is not growing at a healthy rate, they defer buying goods, first large expensive durable goods, then, if their confidence continues to fall, even smaller discretionary items. People begin to conserve money and that slows down the economy. Factories produce fewer goods, workers are laid off and in turn find it increasingly difficult to purchase anything other than essential items. This in turn leads to even lower consumer confidence and the economy can fall into a full-blown recession.

To determine how a recession could affect new-vehicle sales, we need to examine those segment models where the constituent economic variables are most affected by a recession. These include unemployment rate, personal consumption expenditures, housing starts, consumer confidence, and consumer sentiment. Examples of segment sales that would likely be especially affected by a recession include small passenger cars, which could see a loss of sales as the unemployment rate increases, and large passenger-car sales, which could suffer if consumers lower their personal consumption expenditures. We see luxury passenger-car sales as at risk if the strength of the general economy falters. In the popular SUV segment, general SUV sales increase as the stock market index increases, especially in the luxury SUV segment, where an increasing stock market index seems to move consumers up from the nonluxury segment. A sharp decline in the stock market index could lead to a collapse of luxury SUV sales. Pickup sales could drop in the face of rising unemployment rate, interest rate, or inflation rate.

Consumer sentiment or consumer confidence is included in many of the models. Unemployment rate, inflation rate, and interest rate play an important role in models of the basic transportation segments, such as small and midsize passenger cars, pickups and vans. However, in our analysis, these factors were more important in the first decade than in the second decade. This was probably because of the deep recession that occurred during the first decade, but might also reflect some fundamental change in the economy in the second decade.

The luxury segment is mainly composed of luxury PCs and SUVs. The prominent predictors for luxury PCs and SUVs are disposable income and S&P 500, respectively. Luxury PCs have been relatively recession-resistant in the past, although growing sales of near-luxury PCs may alter

this in the future. Many luxury SUVs are in the near-luxury category, and have expanded sales as the economy, especially the stock market, has expanded over the past 10 years. These near-luxury SUVs may be more susceptible to recession than luxury PCs have been in the past.

These models do contain the suggestion that vehicle purchases may increasingly become alternative choices rather than requirements, and that situation may be changing their relationships to many other aspects of the economy and of consumer behavior.

Most of these segment models achieve a moderate level of predictive power. However, for numerous reasons, some clearer than others, some segments can be modeled with a high level of predictive power, while other segments seem to defy the modeling process. In general, greater modeling difficulty exists for the second decade (1989-1998) and in the segments that are experiencing stagnating or waning sales. These include, but are not limited to, midsize and large passenger cars, nonluxury SUVs, and vans.

The second decade has witnessed two events that make it unlike the previous decade, or for that matter, other earlier decades. Those two events—a record-length economic expansion coupled with low inflation, and second, the swift rise in popularity of SUVs, especially in the luxury-SUV segment—contribute to the difficulty of modeling less popular segments since they are moving against the general economic trend. Conversely, segments that are experiencing growth, such as luxury SUVs and pickups, mirror the trend of the general economic variables.

In the first decade, with a fluctuating economy and sales, we find some powerful segment models. Conventional wisdom would suggest that this is because the economy was behaving “normally” and most segments in the auto industry experienced “normal” cycles. In the second decade, it is difficult to ascertain whether effectively modeled segments are simply tracking the economy, or whether this is merely a coincidental occurrence.

The 10 million dollar question is what will happen to total and segment sales if the economy falters? Will the increasing popularity of the higher-priced, high-profit SUVs continue, or will a faltering economy bring down sales? We think that sales will track the economy, but we caution that this is speculative because the second decade lacks a severe economic downturn for analysis of any effects on luxury SUV sales.

The quantitative analysis of historic sales trends produces some clues as to how future sales may be affected by cycles of the general economy. We also interviewed dealers and manufacturers for their opinions about how their operations would be affected. This qualitative analysis provides quite a bit of support for the modeling analysis, but also yields some differing points of view. Taken together, these analyses provide a rich source of possible ways sales will trend in future periods of economic expansion and recession. We turn now to these dealer and manufacturer interviews.

Chapter Five: Industry Interviews

As part of our investigation, we gathered information from a small sample of dealerships. We also discussed just a few issues with some manufacturers. The dealer sample was purposive, rather than exactly representative of all outlets in the United States. We tried to identify a dozen dealerships that varied in size and also in their main vehicle franchise.

The dealer interviews contained a number of closed-ended questions as well as some open-ended items. Most of the closed-ended questions took the form of five-point Likert scales, the familiar “strongly agree ... strongly disagree” series. For one short set of questions, we asked respondents to reply in terms of a scale anchored from not at all important to extremely important.

For each dealership, we tried to locate an individual who had been in automotive retailing for a number of years, preferably long enough that the person had firsthand experience of at least the last recession. At the same time, we sought individuals who had management responsibilities and consequently were likely to possess a broad overview of the automotive retail business, as well as considerable in-depth knowledge. Thus we interviewed dealer principals, general managers, controllers, and in some cases, sales managers. Interviews were conducted in person or over the telephone. In this report, we refer to all respondents as “dealers” for convenience.

Are there too many dealerships in the United States?

The number of dealerships in this country has declined from about 46,000 in 1948 to approximately 22,000 in 1998, as discussed in chapter one. Nonetheless, our respondents generally felt there currently are still too many dealerships. In general, our respondents suggest that the U.S. market may be a bit overdealered, perhaps on the order of 10 to 15 percent, although a few dealers report a much higher level.

In response to our query about what nameplates, if any, have too many dealers at the present time, most answers fell into one of three types. First, dealers tended to identify some of the nameplates that both have modest sales and are perceived to be in a weakened condition, such as Kia, Hyundai, and Nissan. Second, they named Chevrolet and Ford, the nameplates that have the most dealers at present. Finally, a few dealers did identify some nameplates that probably are “overdealered” for their present sales levels, such as Oldsmobile and Cadillac.

Many of the questions in the interview fell into one of two broad categories. One category consisted of questions regarding likely impacts on dealerships in the event an automotive downturn or recession occurs. The other category of questions focused on comparisons of larger to smaller dealerships.

Impact on dealerships of an automotive downturn or recession

Which types of vehicles are especially likely to experience falling sales in a recession? We asked dealers to make forecasts for nine different types of vehicles. Here there was little consensus. However, there was a relative tendency for dealers to see full-sized pickups as more likely to resist a sales drop. By contrast, they see sales of sport utility vehicles, sports cars, and compact pickups as likely to fall, while their opinions on luxury cars are divided.

One dealer noted an important difference between luxury cars and sport utility vehicles. Some luxury cars are “captive,” in the sense that certain people must buy Cadillacs or Lincolns, because of their jobs. Moreover, professional people (lawyers, doctors) also buy luxury cars. The income of all these people is less likely to be adversely affected by recession, so sales of these luxury cars may not decline much in a recession. By contrast, purchasers of sport utilities are more often people with variable incomes, and hence this dealer expected sport utility sales to fall more in a recession.²³

Finally, there was some expectation, though not unanimous, that small cars would resist a sales drop. If we expect people to move down the price hierarchy, this makes sense. Whether this assumption holds in a market that values the nearly-new, off-lease vehicles now available may be open to question.²⁴

How will a recession affect the value of dealerships? Most dealers had strong opinions about the effect of the economic cycle on the value of dealerships, and, not surprisingly, all see the sales price of a dealership falling during a recession. However, virtually all see the price falling quite a bit. Dealer comments here are useful. One dealer said that you always get the value of the assets out. But it is the intangibles, the blue sky, that will vary a lot. Another dealer pointed out that the size of the price fall will be related both to the general value of the franchise itself and to the profit history of the particular dealership. A good profit history or a desirable franchise will mitigate the fall in price. More attractive dealerships will command lower prices in a recession, but they will still command a relative premium: there will not be fire sales for good dealerships.

Will a recession affect the sources of dealership revenue? Most dealers are confident they can develop more revenue from parts and service operations, and are just a little less sure that they can raise more revenue from body shop operations. Clearly, dealers believe that they can generate profits from these activities to compensate for losses due to sales declines. However, one dealer issued a caution, pointing to the consolidation going on in body shops. He thinks that independent, non-dealer shops can do such work more cheaply. In a recession, this would especially work against body shop repair becoming significant as a source of dealer revenue.

²³Actual sales data does suggest that luxury cars were largely recession-resistant in the first two, but not the third, recession between 1978 and 1998. On the other hand, SUVs seem to have resisted the third recession, suggesting the possibility that they now behave like entries in the traditional luxury market. However, SUV resistance to the third recession may simply have been the popularity of the just-introduced Ford Explorer. All of which may mean that the timing of new product introductions may seriously affect sales during, and prior to, a recession.

²⁴Indeed, the sales data from the last two recessions and the analysis of chapter four suggest that small cars may fall in a recession. Small car sales are more related to fuel prices than to the general economy.

Will the trend to public companies accelerate in a recession? Dealers rather think not on average. Two dealers were quite certain about this. They expressed skepticism regarding the ability of public companies to earn profits, pointing to the “fact” that such companies are not generating high profits in this, a time of strong vehicle sales. One dealer sees the manufacturers moving aggressively to counter the public companies by re-establishing their own control over sales outlets. They are doing this by purchasing outlets, for example. He also thinks that, under those circumstances, the company-owned outlets would be allocated the most saleable vehicles, whereas the public companies, like other non-manufacturer-owned outlets, would receive fewer popular vehicles. We suspect that the larger public groups would come in a clear second in such a situation, rather than tied with other non-manufacturer groups simply because of the volume opportunities they could offer.

Other dealers voiced doubts about the overall financial structure of the public companies. The dealers suggested that the public companies are just surviving in good financial times, but that their stock valuation would plummet in a recession, and that would damage them. A number of dealers were vociferous in their statements about the need to control costs tightly in their dealerships, even in good times, to be prepared for recessions. Some dealers suggested that public companies have problematic cost structures.

Will a recession foster more multiple-outlet groups? Dealers somewhat agreed that the trend to multiple-outlet groups will indeed accelerate if there is a recession. One nay-sayer expressed doubts that the big players would have the cash to buy up dealerships. On the other side, one dealer felt that a recession would be the point at which a manufacturer could purchase dealerships cheaply, and in effect set up a manufacturer-owned multiple outlet structure, consolidating the dealerships by closing some of them. It is not clear why dealers think that the manufacturers can follow such a large-scale coordination and consolidation strategy, but also think companies such as AutoNation cannot follow similar strategies themselves. However, one dealer did point to the manufacturers’ current large profits as a source of funds for such future purchases.

Will urban and rural dealerships have different survival rates? There was some sentiment that dealerships in urban areas are a little less likely to survive a recession than dealerships in rural areas. However, dealers offered different reasons for this expectation. One sentiment was that dealers in rural areas would simply accept much lower profits in order to stay in business, thus negating any size or locational disadvantage. Another sentiment was that dealers in rural areas have better ties to customers, and this would help them weather a recession through service visits or even some vehicle purchases.

Recession resistance

What factors will make a dealership more likely to survive a recession? Dealers agree that there are a number of factors that can help a dealership outlast the next downturn. Dealerships that carry vehicles from a number of manufacturers are more likely to survive. Moreover, multiple nameplates, even if from the same manufacturer, increase the odds of survival.

How will age influence dealer exit decisions during a recession? The age of the dealer principal is often mentioned as a factor in decisions to stay the course or divest in the next recession. The consolidation that is underway in the automotive retail industry—either through public dealer groups or through manufacturer programs—offers an exit strategy for an aging dealer population, providing liquidity to the dealer. Perhaps the aging owner will not be followed into the business by a family member or has failed to plan for succession, and is looking to retire and leave the business.

This is quite plausible, and would be compounded by the dealership's fall in value during a recession. Concern for capital preservation may well accelerate with age. Moreover, an older dealer actually can expect fewer good years to follow the bad years, and that changes the calculus as to when to exit. Moreover, the low profitability of dealers even in these good times constrains their ability to reinvest, and some older dealers may well delay investment, hoping their successor will do it.

Our dealers do somewhat agree that younger dealers are less likely to sell in a recession, confirming this assumption. However, our dealers estimate the average age of dealers at about 51 years, well below the 55 to 60 range often quoted in the industry press.

A corollary argument suggesting dealer exit at the next recession rests on the reported difficulty of recruiting new dealers from the traditional sources: family and employees. Dealers, like other operating entrepreneurs often find their children do not want to follow them into the business. The increased price of dealerships, as consolidation has increased their size, makes it difficult for employees to buy into the business. Here again our dealers are unwilling either to challenge or accept the conventional wisdom, reporting they are unsure whether these two recruitment channels are substantially less available today than they were in the past.

What resources will help a dealership survive a recession? We asked dealers to evaluate five items as to their importance in dealership survival.

Dealers gave the lowest ranking to support from the local banking community. By way of explanation, one dealer pointed out that most dealers today are players in national financial markets, and that the local banking community therefore is not of much immediate importance.

We asked dealers to evaluate four other factors, including the dealership's own good reputation, the good reputation of the manufacturer(s) whose cars the dealer sells, the brand image of the dealer's vehicles, and support from the manufacturer. Dealers indicated all these factors were important; differences in average rankings between the factors were very small. However, it is not surprising that the dealership's own good reputation garnered the highest ranking.

Economic aspects of the automotive industry

Are we due for a downturn in the auto industry, even if the U.S. economy stays healthy?

Opinion ranged widely on this item, and there certainly was no consensus.

Do high rates of fleet sales and individual leases threaten car sales? Responding dealers see no threat whatsoever in today's large proportion of leased cars and fleet sales.

Would manufacturers selling vehicles directly to customers be a real financial threat to dealers, and will they do it? This question generated a unanimous, strongly agree response from the dealers. And one dealer thinks this is not a remote hypothetical, but a very real threat. He anticipates that his manufacturer will scoop up many dealerships at bargain prices at the next recession, and as a consequence place the rest of its dealers under real pressure.

Another dealer sees a distinction among manufacturers. He believes Ford and GM are curious about the possibility of retailing vehicles, as well as manufacturing them. On the other hand, he believes Chrysler has backed away from retailing, and Honda also has no interest in engaging in retail. This dealer thinks that direct selling is much more likely with Ford and GM, much less likely with other OEMs. His own view is that manufacturing and retailing are quite different disciplines, and he is skeptical that a firm could do both well.

One dealer spoke at length about the likely consequences, from his point of view, of widespread manufacturer ownership of retail outlets. He believes that if the manufacturers owned the outlets, and rationalized the supply chain, we could have 12- to 14-day cycle times, as in Europe, for certain vehicles. He pointed out the very large amounts of capital tied up in the industry, given the present system of often having vehicles in inventory for 2 or 3 months.

He also said, "if I (as a manufacturer) owned the stores, I wouldn't fight the dealers." Dealers are individualists, he added, implying this cultural difference leads to opposition between the manufacturers and the dealers. He pointed to GM's recent strategy to take greater control of ads. This manufacturer intervention, he felt, was done to eliminate some idiotic ad campaigns by individual dealers. But he thought that GM, overall, has no clear-cut direction. That is, while this one intervention may have made sense, GM's other actions do not add up to something systematic. "So GM loses share."

Another dealer bluntly said that Ford's attempts to consolidate and form local dealership collections has been a failure. He believes that dealers tend to be entrepreneurial and independent. He thinks that Ford could buy a partial interest in some dealerships, but that it would not work well, because, given dealers' entrepreneurial spirit, "you can't tell them what to do."

Economies of scale

What, if any, scale effects exist in the dealership? Are there advantages, in general, whether there is a recession or not, to being a larger dealer? We asked a series of questions identifying the impact or advantages dealership size has on business operations.

Dealers report there indeed are some important scale advantages in the dealership or group. First, larger dealerships can more effectively sell vehicles by having a larger inventory—on average, these dealers agreed. However, one dealer felt size of inventory was not necessarily an advantage; he believed he has done better as a dealer in recent years by learning to manage his inventory more effectively. Second, dealers somewhat agreed that large dealerships can borrow at lower rates. Third, dealers agreed that larger dealerships can secure more profit because they can offer more attractive customer finance and insurance terms. Fourth, there was mild agreement that larger dealerships can obtain lower rates for advertising. Finally, there was slight agreement that larger dealerships more effectively use information technology (IT), both to attract customers, and also for internal dealership operations.

There have been a few important developments involving both inventory and IT since these interviews were conducted. The development of on-line shopping suggests that dealers will capture customers from a wide area. The emergence of a number of Internet referral services holds out the promise that inventory may become virtual, as dealers draw on a huge network of other dealers to find exactly the car a customer wants. Each of these developments has met with skepticism on the part of many dealers, who believe customers will want to touch the vehicle before buying it and question how the referral services can avoid raising the price or cutting into the dealer's profit. Of course, if large dealer groups themselves act as Internet referrals, these objections, even if valid, become much less serious.

It is somewhat surprising that none of the dealers reported economies of scale or advantages for large dealerships in the human resources arena. It certainly seems that larger dealerships should be well positioned to support training and work conditions that will provide them more professional, lower-turnover workforces. Indeed, groups or public companies with many dispersed dealerships may even be able to offer career lines to their employees more traditionally provided in large manufacturing companies: a career ladder and the possibility of geographic mobility.

However, dealers also report some operations where there may in fact be diseconomies of scale. First, dealers somewhat disagree that larger dealerships have more efficient and therefore more profitable repair and parts operations, and they also disagree that larger dealerships have more efficient and therefore more profitable body shop operations. Thus, some diseconomies of scale may exist here. Second, dealers disagree with the statement that larger dealerships have a high proportion of repeat customers, so smaller dealers have the advantage here. One dealer felt that smaller dealerships, in general, have better customer relations. He argued that customers during a recession will defer the cost of replacing a vehicle and repair their existing one. Under these circumstances, he indicates, smaller dealerships will be advantaged, because their better customer relations will lead to stronger volumes of repair orders. Third, dealers slightly disagree that larger dealerships have lower overhead/administrative costs.

Finally, there are operations where there may be neither economies nor diseconomies of scale, where scale is not necessarily related to performance. First, dealers were unsure whether larger dealerships are easier to sell. Second, dealers are nearly neutral on whether larger dealerships can more quickly put into practice new ideas for sales and service. Third, dealers neither agree nor disagree that larger dealerships maintain a better relationship with the OEM, from the dealer's point of view.

Challenges and issues facing dealers during the next recession

What will be the three biggest challenges facing dealers when the next economic recession occurs? We put this open-ended question at the end of the interview, and these generated extended comments from some of our respondents.

Dealing with the manufacturer as a direct competitor is an important issue. One dealer fears that, as his manufacturer takes over some dealerships, he will be faced with unfair competition. He feels the manufacturer-owned dealerships will be favored (in allocation of popular vehicle models, for example) at his expense. Other dealers believe this kind of initiative simply will not work. These views range from the statement that manufacturing and retailing are such different activities that the manufacturers will not be able to do both (echoing comments detailed above), to statements that GM's entire retail brand strategy is wrong and cannot be made right.

Cost issues loom large, especially in the context of a recession. If the manufacturers have extreme troubles in the down portion of the business cycle, so do dealers. The major cost challenges mentioned include cash flow problems, controlling inventory, controlling expenses, and floor plan costs. One long-term dealer warned against the tendency to keep all employees because the recession will be short. Moreover, when the recession ends, the dealer must continue to get by with as few people as possible, and avoid loading up on employees. It merits mentions that GM, but not Chrysler and Ford, fell into this trap in the early 1980s, being slow to layoff and quick to call back employees, especially in management. Some analysts see the roots of GM's lengthy problems in productivity and labor relations in these events.

Some dealers spoke of the costs to upgrade their facilities imposed on them by the manufacturers. They felt these are substantial. One dealer said when times are good, these costs can be covered, but it will be very difficult during a recession. Another dealer notes that many dealers have spent a lot of money to upgrade their physical facilities, whether required by the manufacturers or not, and it will be very hard to cover these costs when the next recession hits.

Another challenge will be to increase profits on vehicle sales. One dealer believes dealers are now generating profits from parts and service, finance and insurance, as well as vehicle sales to a lesser degree. And these are good times! But in a recession, revenues from parts and service and from finance and insurance will not be sufficient to sustain a dealership. Dealers need to learn how to make more profit on vehicle sales, so they will be able to make at least some money on vehicle sales during recession. Clearly, the challenge of profiting from new-vehicle sales is an important one, and a business model that achieves higher vehicle profits promises an important competitive advantage.

Still another challenge will be modernizing information technology in automotive retailing. One dealer spoke extensively on this. He mentioned that this effort will involve hardware, software, and also the retraining of employees. He believes that customer expectations, derived from shopping experiences for other kinds of goods, will push automotive retailing in the direction of e-commerce. He also thinks the manufacturers will push automotive retailing in this direction. He expressed disdain for the two major system providers at this time which he believes are deriving lots of revenue from the status quo, and therefore have not been motivated to update automotive information technology from transactional to relational file structures. In straightforward language, the dealer said, with exasperation, "You can't get into a dealership through the web!"

What other issues face automotive dealers in a recession?

Price and profit pressures are much on the minds of these dealers. Some dealers noted that more information continues to be available to customers via the Internet, making it harder to negotiate with the customer. One dealer said that a recession would put even more pressure on dealers to offer favorable prices to customers, so the dealers would have to sell even more vehicles to maintain a given level of profit as unit profits fall. Of course, this is difficult in a recession.

One dealer spoke at length about the difficulty of making a profit in selling new cars due to manufacturer discounts. Such discounts are available to employees, their relatives, and people who work for suppliers, and the term suppliers has come to be defined extremely broadly. Furthermore, the discounts apply to all vehicles, whether ordered or in inventory. This dealer said with some exasperation that if he sells a vehicle that has been in inventory for 2 to 3 months with a supplier discount, he makes hardly any money on the transaction. This problem, as distinct from rebates and customer incentives, is probably peculiar to a few geographic regions with concentrated automotive employment. These include southeast Michigan (DaimlerChrysler, Ford, and GM), Cleveland (Ford), Dayton (GM), and Lexington (Toyota), as well as other similar pockets of automotive activity.

Several dealers spoke of problems hiring and retaining skilled employees, as employees jump to other dealerships. There was a division of opinion as to whether a recession would ease this situation by dampening labor demand. One dealer thought so, another dealer did not think even a recession would alleviate this difficulty. Another dealer pointed to the problems of attracting young people to jobs as technicians. He feels the pay is actually good, but that the jobs are not seen as exciting, and the fact that you get dirty doing them is a negative.

Nine of the dealers mentioned the issue of public companies, and their comments spanned a wide range of views and issues. The media have tended to portray these public companies very favorably, but what is their business plan? Some of the literature of these companies suggests they want to become the only dealer in a given city. If such companies became dominant, and attain a monopoly position, the customer would not benefit at all—prices for vehicles would be higher. The competition that small dealers create would be gone. Another dealer spoke of the need for closeness in a dealership, meaning both strong customer relations and closer ties between the dealership's owners and employees. He pointed to the latter as problematic for large,

multi-group structures. He noted that in some instances where dealers had sold their businesses to public companies, and been hired back as managers, the former dealers had kind of retired in their own minds, and did not work as hard or manage as strongly as previously.

However, in light of our earlier discussions on the advantages/disadvantages of large dealers, it is our impression that the dealer body today may underestimate the seriousness of the threat to them posed by large public companies. Their critiques are very much rooted in the current dealership model, and if in fact the public companies manage to alter that model, much of the critique becomes less relevant. In some ways, today's dealers sound a bit like the Big Three as they initially faced Japanese competition: people will not like their cars, and, even if they do, we do not need them as customers.

Manufacturer views of the retail sector

In other interviews we asked two of the Big Three economists to comment on their thinking on the public companies at the retail end of the industry.

One strongly believes that the public companies are languishing, and that the independent franchised dealer is still the successful model. Entrepreneurial operation is simply better than corporate steering. He says that there is some dissatisfaction with sales efforts, and that there will be some important changes in the retail distribution system, such as in the warehousing/distribution of parts and vehicle delivery time. Still, he notes that there are many off-lot sales. How far is it worth pushing delivery times: is 2 weeks really better than 4?

The other economist sees it as a direct principal/agency problem. Complex transactions are simply not susceptible to management at a distance. You could try one price, but there are too many places to hide prices, such as in the terms for finance, service, etc. Interestingly, he did not mention trade-in as a ready "hiding" place for price. When queried about the effects of the Internet, he argued that you really do not find one price, because you have to look at the entire package. Like personal computer sales on the Internet, the price is the same, but the features offered differ. How can a remote manager control this? He commented that AutoNation said they would do it through information, but that still does not work. The weakness of this argument is that so many successful dealers today are hardly hands-on, and operate groups of dealerships much as a public company would.

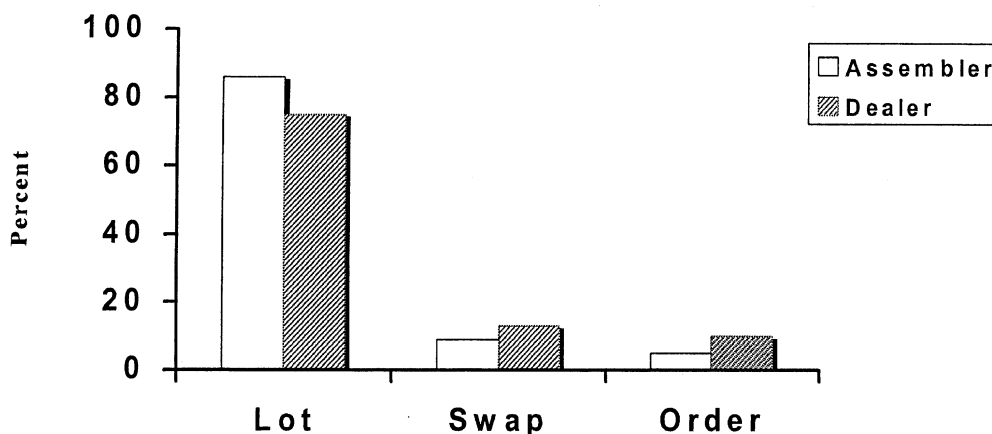
He allowed that a professional sales force might work, but then the problem is how to align their incentives with OEM interests: if pressure is on volume sales agents will ignore price; if pressure is on price, they will ignore volume. GM and Ford will learn a costly lesson from their attempts to enter the retail end of the business. If the opportunity to add value really is there, the Japanese OEMs would move in that direction, since they have experience owning outlets in Japan.

When asked about how public dealerships will influence the power position of OEMs and dealers, he commented that dealers have power through the fact that many individuals hold franchises and have standing in the local community. If the large public dealerships survive and prosper, the dealer net loses that local power base, although it may gain economic power. If consolidation is inevitable, this executive's view is that the OEMs should let public dealer

groups do it, then acquire them. But he cautions that all should remember that megadealers were going to sweep other dealers away, but that has not materialized.

Finally, a third executive made a telling comment in a discussion on other retail issues. He noted that maybe public companies were a good thing because they attracted so much ire from traditional dealers, soaking up energy and anger that otherwise might be directed at the OEMs!

There is little question that manufacturers are putting pressure on dealers to change. The manufacturers have quite different views of the demands and preferences of their retail customers than do the dealers. Manufacturers see customers as less satisfied, less tied to negotiating prices, and less willing to compromise their preferences to buy from stock than do dealers.²⁵ Indeed, Figure 5-1 shows the high proportion of buyers who buy from stock. Dealers tend to see this as preference, manufacturers are beginning to interpret this as evidence of an inefficient and vulnerable order-to-delivery system.



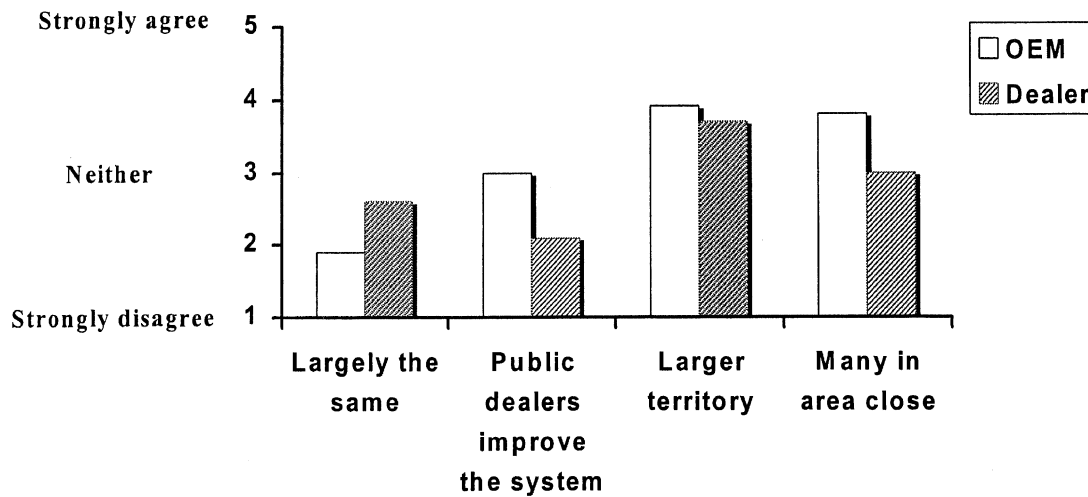
Source: *Competing for Customers: the Future of Auto Retailing*

Figure 5-1: OEM-Dealer Reports: Source for Filling Customer Orders

Overall, manufacturers do expect more change in the distribution system through 2008 than do dealers, as suggested in Figure 5-2. We asked dealers and OEMs to comment on aspects of the future system, such as whether it will remain the same, if publicly owned dealerships will improve it, if the size of the sales territory will increase, and if many more dealerships will close. It merits comment that many dealers seem to view the system as working fine, if only the manufacturers would listen to them. In fact, these attitudes are somewhat reminiscent of the initial reactions of the Big Three to Japanese competition: nothing new, just a passing fad.

²⁵ Flynn, Michael S., Mateyka, James A., et al. *Competing for Customers: The Future of Auto Retailing*, Office for the Study of Automotive Transportation (OSAT), August 2000, p.58.

Dealers may prove as shortsighted today as were the manufacturers two decades ago.²⁶



Source: Competing for Customers: the Future of Auto Retailing

Figure 5-2: Distribution System in 2008, By Respondent Status

How do dealers view the value of their activity, and how does this compare to the views held by their supplying manufacturers? The OEMs feel that dealerships are better investments than do the dealers, and the gap widens as we look ahead in time to 2008. On the other hand, the dealers think they are more important to their local economies than the manufacturers believe. Dealers are certainly committed to their businesses, reporting that it is hard to imagine a better one, although their enthusiasm has waned a bit over the past decade.²⁷

Summary

Dealers see a recession as a critical time for dealership survival, and suspect that prices will fall, although not to the point of bargain basement prices for good outlets. With the manufacturers, they are skeptical about the capability of large public companies to manage automotive retail outlets effectively. At the same time, dealers do agree, if a bit grudgingly, with many of the elements of the strategies that some public companies are following.

Dealer views on scale economies in dealership operations are decidedly cautious: they see some, but are not persuaded they are particularly large; they also see some diseconomies of scale in

²⁶ Ibid.

²⁷ Flynn, Michael S., Mateyka, James A., et al. *Divergent Views on the Future of Automotive Retailing*. Office for the Study of Automotive Transportation (OSAT), March 1999.

dealer operations. Some dealers, like Professor Harold Hill in the play *The Music Man*, insist that you have to know the territory, and large, remotely managed, high turnover operations cannot achieve that.

OEMs generally subscribe to the model of the independent, hands-on entrepreneur as the only way to manage the disparate, fast-changing market that is automotive retail.

Chapter Six: Conclusions

The retail revolution in the automotive industry is upon us. The past two decades have witnessed enormous change in the entire enterprise of producing and retailing automobiles, substantial change in the vehicles themselves, and we seem to be on the verge of a sea-change in customers' views of their vehicles.

Retail Structure

There are more manufacturers but fewer retailers in today's automotive market. Especially large dealer groups are forming, and these groups hold many franchises across most of the manufacturers. These large dealer groups are now selling substantial portions of the total sales volume. Moreover, these groups may be able to muster competitive resources akin to those traditionally held by the manufacturers in the automotive chain. These include the possibility of developing a broad-market brand identity and value, reaping economies of scale in some, if not all, portions of their operations, and targeting human resources and e-commerce strategies not available to the traditional one-store dealer on automotive retailing.

These circumstances are, and will be changing the relative power balance between the manufacturers and the dealers. This development will itself force further significant adjustments and structural changes in the ways automobiles are retailed. Indeed, a number of manufacturers are now experimenting with a variety of ways of participating in retail activities, from e-commerce to ownership stakes in traditional dealer outlets.

Retailers now sell more vehicles, handle more makes and types of vehicles, serve a more demanding and heterogeneous customer base, and face a more competitive marketplace. Dealer operations and marketing efforts are complicated by the advent of leasing as a major alternative in the private transportation market, altering the historic market relationship between new and used vehicles. Dealer returns are down, especially for new-vehicle sales, while investment demands keep rising, and an aging dealer body finds itself with fewer exit options. Many dealers see further consolidation ahead, and are resistant to the changes that the manufacturers and most analysts see sweeping the industry.

The automotive market has changed dramatically, as the traditional U.S. manufacturers have lost share to numerous importers, some of whom now have substantial production operations here. This market fragmentation has been accompanied by three important shifts in the composition of the market: passenger-car sales, especially small and large cars, are shrinking; light-truck sales, especially SUVs, are expanding; and luxury vehicles in the light-truck segment are rapidly growing. Manufacturers, and therefore their dealers, have different success across these segments, so any shift likely to result from a downturn has important competitive and survival implications.

Predicting Total Sales

The factors that drive and shape the automotive market are complex and are also changing. While some set of measures of the performance of the general economy remain useful predictors of automotive sales at a later time, they bear complex relationships to each other and to automotive sales. Most importantly, how well these measures predict sales has changed over time, and the utility of specific predictors depends on the exact segment of the market under consideration.

Indeed, the past two decades provide us with time samples of the automotive market that have quite different characteristics. The first “decade,” from 1978 to 1988, encompassed the second oil shock, two recessions, the record production year, two record sales years, and the introduction of the minivan. The second decade witnessed one recession, a record economic expansion, stable fuel prices, and the swift rise in popularity of SUVs.

When we examine the total-vehicle market, the volume of all new-vehicle sales across the 21 sample years, we find a model that reasonably predicts sales levels, and is intuitively appealing. It tells us that higher disposable income and positive consumer sentiment predict higher sales, while CPI increases and higher interest rates depress them.

However, when we examine the two decades separately, we find different predictor models are appropriate. For the first decade, a somewhat altered version of the basic model works. But in the second decade, the model changes fundamentally: overall economic performance, measured by GNP, becomes important, and so do fuel prices. Most surprisingly, rises in S&P 500 and increased housing starts, two measures that conventional analysis tells us should be drivers of higher auto sales, in fact depress sales. Rather than auto sales benefiting from a general “wealthy consumer” effect, it seems that investments in equity stocks and housing stock may be acting as alternatives to investments in motor vehicle purchases. So something has fundamentally changed over these two decades: the old models of sales work less well in this possibly new economy.

Predicting Segment Changes

When we examine passenger-car segment sales, our model for the entire time period combines the traditional four predictors that worked for total-vehicle sales with the two alternative investment predictors. This model reaches a level of prediction similar to the model for total-vehicle sales. This passenger-car model also works for the first decade, but not quite as well as it does for the entire period. A rather different model, one that incorporates fuel prices, works better for the second decade, but still at a level no better than the total period model. Again, this is evidence of some change in the determinants of sales.

The light-truck models work exceptionally well, being driven by, among other factors, fuel prices. Investments in housing starts and the stock market bear no relationship to light-truck sales. While the models differ for the two decades, they are not markedly different, and reach

very high levels of predictability. Here again we find some inversion of the conventional analysis, as increases in money supply and consumer sentiment depress rather than spur sales.

Extremely wide disparity in the power of the predictor models exists when we examine different types of vehicles within the passenger-car segment and within the light-truck segment. For example, at the extremes, our best model accounts for just about one-third of the variation in nonluxury passenger-car sales across the two decades, while our best model accounts for 96 percent of the variation in SUV sales.

Changing Markets

These results suggest a number of important possibilities. First, the automotive market seems to have undergone a fundamental change in its relationship to the performance of the economy. In the case of motor vehicles, the rising economic tide does not lift all types of vehicle sales equally, and, in fact, there are substantial differences.

Second, it appears that the rising ratio of light trucks in total sales reflects less a style or faddish preference for just another hot vehicle, and perhaps more a restructuring of the vehicle market into two quite distinct sectors. As vehicles have become a necessity, it appears that passenger cars by and large now serve the basic transportation market need: their sales are less tightly related to the performance of the general economy, and, in fact, seem to be depressed by alternative investments in housing and equities. Light-truck sales, on the other hand, seem to be more discretionary and deferrable: their sales are quite tightly related to economic performance and fuel prices. Indeed, a parallel result occurs within the passenger-car segment, as luxury sales tightly reflect the performance of the economy, while nonluxury cars do so to a much weaker degree.

Third, the danger of a downturn to the existing dealer base may be accentuated compared to the past. This is because their often dangerously thin new-vehicle margins are especially dependent on light-truck sales. Our analysis strongly suggests that it is the sales of these quite profitable light trucks that are likely to be at greater risk of collapse as the economy turns down.

Future Automotive Retailing

Market conditions, technical developments, and customer demands are prompting sweeping changes throughout retailing, and it is now clear that many if not all of these forces will affect the retailing of automobiles. In such an environment new business models are certain to emerge. It is difficult to believe that some models based on e-commerce and some based on expanding and integrating traditional dealer services across makes and on a wide geographical basis will not succeed in redefining the retail landscape, as has happened in other industries.

There is little question that in today's automotive market, more brands, more franchises, and more locations mean lower dealer risk. Dealers must view their franchises and outlets as portfolio investments, and spread their risks. The changes in the automotive market described

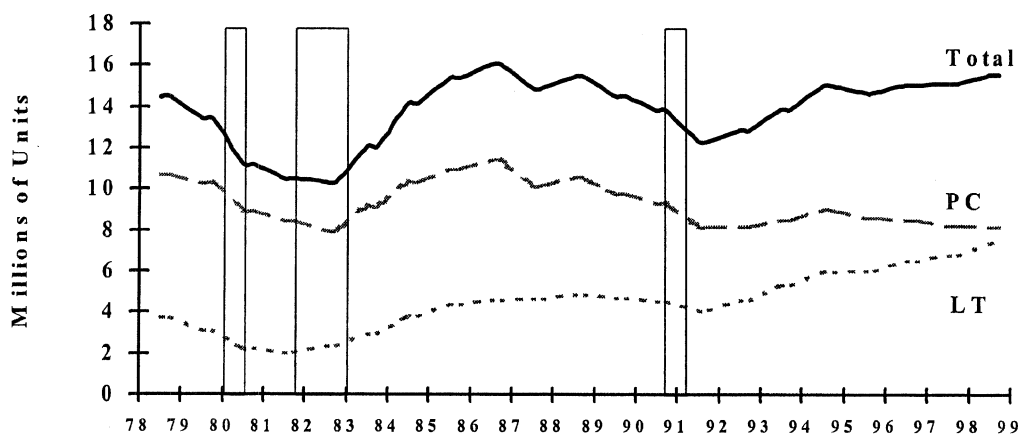
above seem to suggest that these statements are becoming more, rather than less accurate. However, the rapid development and deployment of Internet retailing may lead to a fundamental restructuring that turns these current assets into liabilities, and thoroughly changes the competitive landscape.

A downturn in the automotive market will accelerate many of these changes, perhaps most notably the further consolidation of retail, the power of large dealer groups, and the demise of many dealers reluctant or unable to change. When that downturn will come is a difficult question to answer, but there are some important considerations that suggest it may be a few years off.

Moreover, while the exact timing of a recession is difficult to predict, there will be one. Indeed, 1999's record sales might suggest that we are due for a downturn in automotive sales soon. After all, we may be borrowing future sales because of the robust economy. Our vehicle stock is now the oldest it has ever been. However, this is probably the case because the fleet is the highest quality it has ever been, rather than because we are accumulating deferred purchases. When that downturn happens, an aging dealer group will look for exit options, and large public companies with resources will find opportunities to acquire good-value outlets and franchises at reasonable, if not distress, prices.

Appendix 1: Single Factor Predictions of Sales

We assessed the basic bivariate correlations among some 30 economic variables and automotive sales, separately for passenger cars, light trucks, and total-vehicle (TV) sales. PC, LT, and TV sales across our sample decades are displayed in Figure A-1.

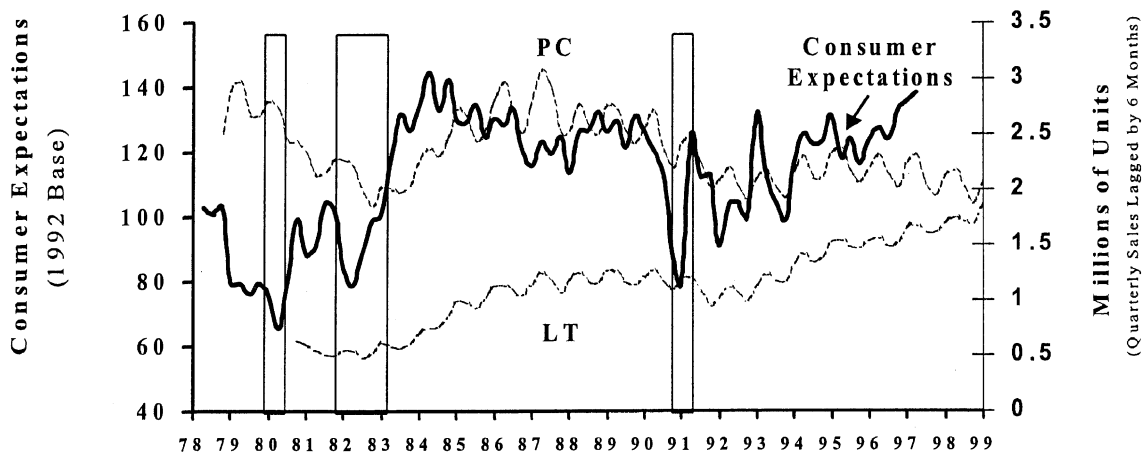


Source: Ward's

Figure A-1: Passenger-Car, Light-Truck, and Total-Vehicle Sales

We examined the relationship of PC, LT, and TV sales variables to economic variables at the same period, as well as 2, 4, and 6 months earlier. For example, July PC sales are analyzed for any relationship to the CPI of July and the prior May, March, and January. The sales figures in the correlations presented here are “lagged” after the economic variables, or conversely, the economic predictors are measured at earlier points of time than the sales figures in order to determine if a predictive relationship exists between the economic variable and the lagged sales figure. If a relationship is established, it means the economic variable can, to some degree, predict future sales.

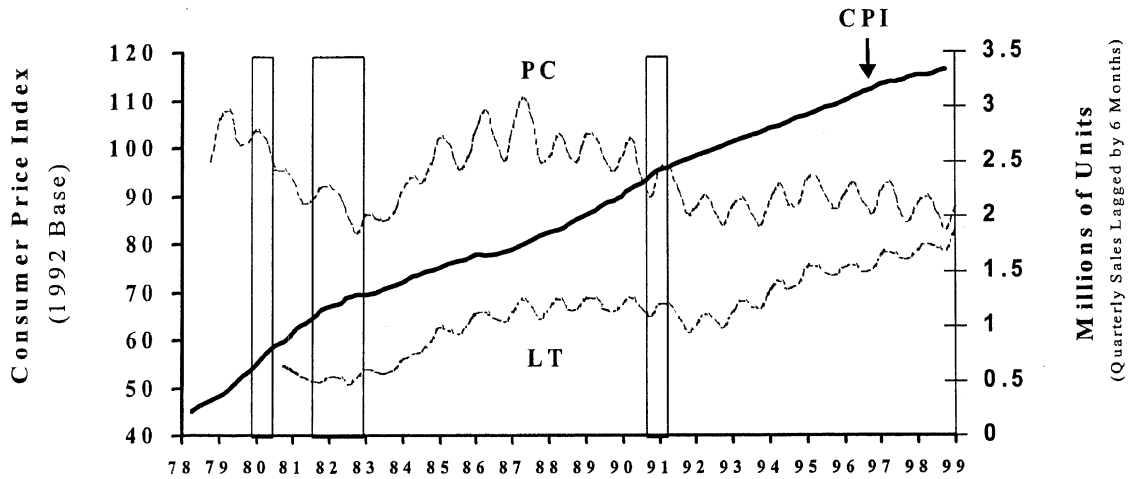
Consumer expectations, displayed in Figure A-2. When we examine consumer expectations and LT sales together during the same period, and then lag sales 2, 4, and 6 months, we see a fairly high correlation (.60) across all time periods. PC and consumer expectations show a low correlation when measured concurrently (.07), although the correlation increases when the sales variable is measured 6 months after consumer expectations (.18). The relationship of these expectations to sales is much stronger in the case of LT than PC. This may suggest that if consumer expectations of the economy's performance are high, consumers are willing to purchase more than just basic transportation, such as an LT, a segment that increasingly includes vehicles in the near-luxury category.



Source: econ.lsa.umich.edu & Ward's

Figure A-2: Consumer Expectations with Lagged Passenger-Car, Light-Truck, and Total-Vehicle Sales

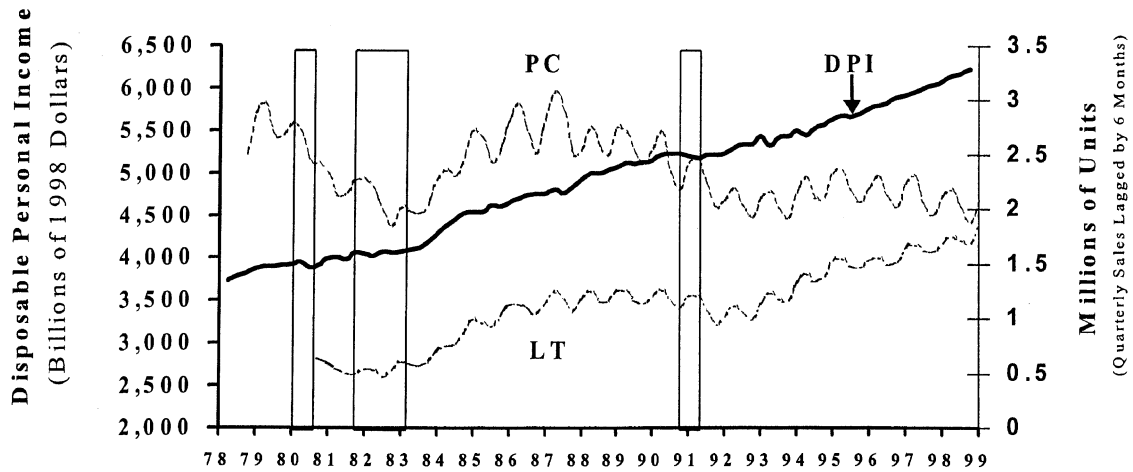
CPI, displayed in figure A-3. Consumer Price Index (CPI) is an indicator of the relative cost of a basket of goods bought by an average household. A rise in this index indicates that some goods have increased in cost compared to the previous period. There is a strong positive correlation (.80) with CPI and LT sales concurrently, and when sales are lagged 2, 4, and 6 months, indicating that increases in CPI are likely to increase, rather than decrease, sales of LTs. If the purchasers of LT vehicles are indeed more affluent, then overall CPI should have less impact on them, and these vehicles may constitute a near-luxury segment. However, it is difficult to understand why the relationship should be a strong positive one, indicating that rises in CPI are associated with rises in LT sales. PCs, on the other hand, have a lower and negative correlation with CPI (-.40 current, -.35- 6 months prior) indicating that consumers of PCs, generally a less costly vehicle than LTs, are less sensitive to changes in CPI.



Source: bos.business.uab.edu & Ward's

Figure A-3: Consumer Price Index with Lagged Passenger-Car, Light-Truck, and Total-Vehicle Sales

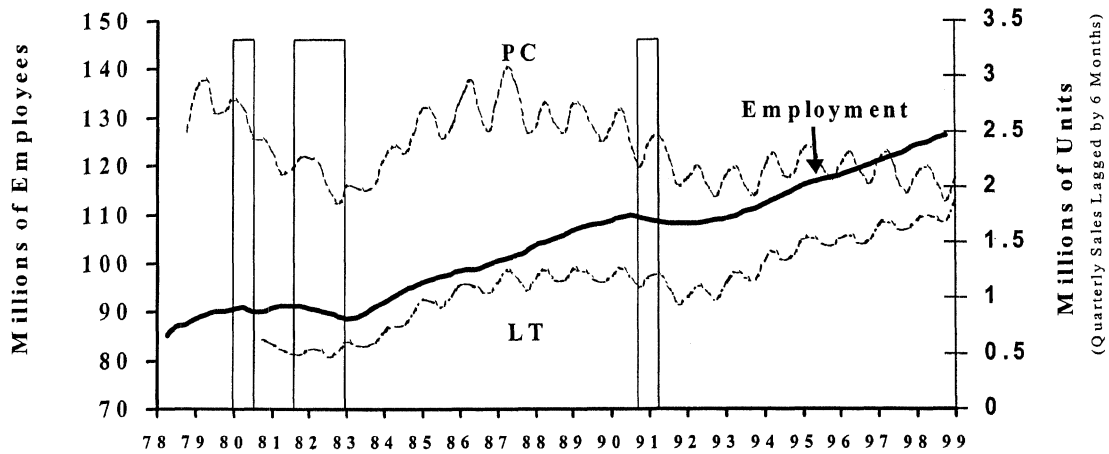
Disposable (personal) income (DI), displayed in Figure A-4. There is a very strong correlation (.88 all periods) between LT and DPI, as would be expected. As DPI goes up, there is a corresponding increase in LT sales. Interestingly though, there is a negative correlation (-.20 all periods) between PCs and DI, perhaps indicating that the extra disposable income is being used to move the consumer into a more expensive category, such as LTs. To be sure, it is also just as likely the consumer is using the additional disposable income to purchase a new house, or some other big-ticket durable good, that serves as an alternative to a new vehicle.



Source: econ.lsa.umich.edu & Ward's

Figure A-4: Disposable Income with Lagged Passenger-Car, Light-Truck, and Total-Vehicle Sales

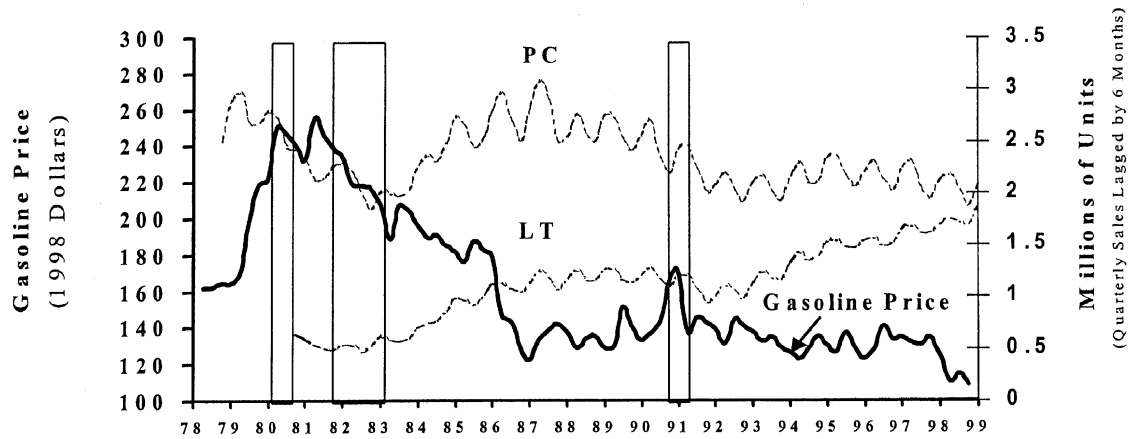
Employment, displayed in Figure A-5. These correlations follow patterns similar to the above analysis of DI. There is a high positive correlation (.87 all periods) between LT sales and employment levels, but a moderate and negative correlation (-.30 all periods) between employment levels and PC sales. Again, in good times, perhaps people seem to shift their buys from PCs to the more expensive LT.



Source: econ.lsa.umich.edu & Ward's

Figure A-5: Employment with Lagged Passenger-Car, Light-Truck, and Total-Vehicle Sales

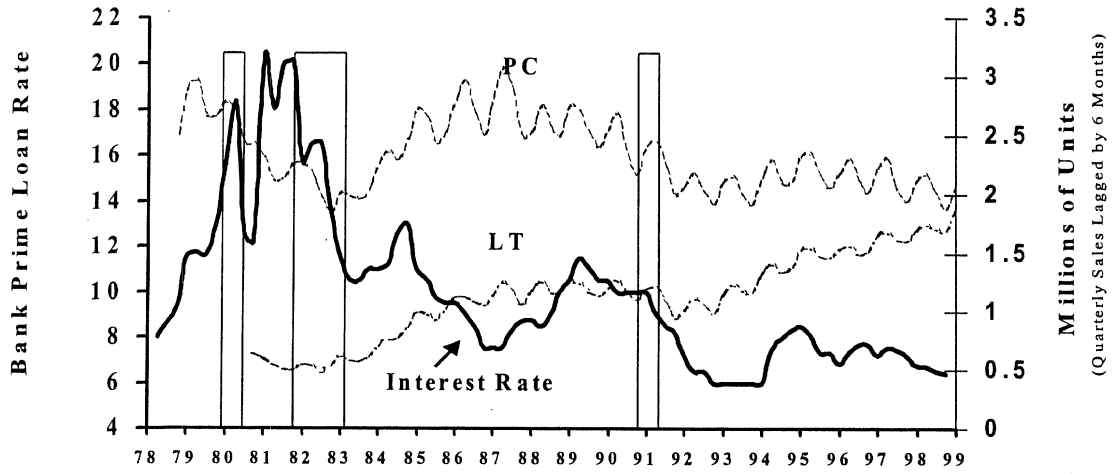
Gasoline price, displayed in figure A-6. As would be expected, LT sales are strongly and negatively correlated (-.80 all periods) with gas prices. This data set encompasses wide variation in gas prices over its 20-year period. It is reassuring that very high gas prices will affect sales of less fuel-efficient LTs. If gas prices were to rise as much as they did in the early 1980s, LT sales would probably be adversely affected. PC sales are not correlated with gas prices at all (less than .05), again confirming their more basic role. It is interesting that if high gas prices depress LT sales, they do not increase PC sales, so there is not a direct substitution effect. Rather, gas prices simply depress total sales, with the major effect anchored in the LT category. Perhaps private buyers simply defer their purchases, waiting for lower gas prices.



Source: econ.lsa.umich.edu & Ward's

Figure A-6: Gasoline Price (1998 dollars) with Lagged Passenger-Car, Light-Truck, and Total-Vehicle Sales

Interest rates (prime rate), displayed in figure A-7. TV sales reveal a fairly strong negative correlation with interest rates (-.5 across all periods). Recall that people seem willing to spend extra disposable income on LTs, and larger changes in CPI are even likely to increase LT sales. However, a rise in interest rates—indicating the cost of borrowing money is going up—has a strong and negative correlation (-.75 all periods) with LT sales. PC sales, on the other hand, have very little correlation with simultaneous interest rates (.007), and, even though the correlation increases ten-fold in the negative direction (-.07) with interest rates 6 months earlier, it remains very low. So total-vehicle sales will drop as interest rates climb, but almost all of the loss occurs in the LT segment.



Source: bos.business.uab.edu & Ward's

Figure A-7: Interest Rates with Lagged Passenger-Car, Light-Truck, and Total-Vehicle Sales

Appendix 2: List of Variables

We obtained economic indicator data from these sources: The University of Michigan Department of Economics, the St. Louis Branch of the Federal Reserve, and University of Alabama. Since these data have different base years, we have converted them into dollars or indexes with the same base year.

- (1) **Consumer Price Index (CPI)** is a measurement of price changes for a fixed basket of goods and services spent by households. The CPI is based on the 1982-84 period and represents all urban households. For data consistencies, we converted it into 1992 base.
- (2) **Consumer Sentiment Index (CSI)** and **Consumer Confidence Index (CCI)** both reflect consumer attitude toward the economy and their own financial conditions. However, the methodologies and concepts are slightly different. The CSI measures the perceptions about buying big durable goods, while the CCI doesn't. Also, the CSI focuses on the national economy and a long-term period, but the CCI does on the local economy and a short-term period. The CSI and CCI are currently based on 1966 and 1985. We again converted into 1992 basis as we did for the CPI.
- (3) **Disposable Income (DI)** is income after all taxes and non-tax payments to governments. It is a major indicator of consumer purchasing power. The U of M Research Seminar in Quantitative Economics (RSQE) provided DI in billions of chained 1992 dollars, and we converted into 1998 dollars for our analysis, using the change in CPI during the corresponding time periods.
- (4) **Gas Price (GAS)** also influences the purchasing behaviors of buyers. We transformed the gas prices in current dollars into 1998 dollars as we did for DI.
- (5) **Gross National Product (GNP)** is the total income of all households of the nation, including the income from factors of production used abroad. The GNP provides the overall framework for predicating economic trends. The GNP was also provided in 1992 dollars and needed to be changed into 1998 dollars.
- (6) **Housing Starts (HOUSING)** figures are housing numbers newly built by private and public entities. It is considered a good indicator to represent the overall economy because new housing construction stimulates the economy positively. It reduces unemployment and increases productions of construction materials and household appliances. In general, when interest rates are low and incomes are rising, housing starts increase. No conversion was needed.
- (7) **Index of Economic (or Leading) Indicators (INDEX ECON. INDIC.)** is composed of average weekly hours of work of manufacturing production workers, average weekly initial claims for unemployment insurance, manufacturers new orders for consumer goods and materials industries, vendor performance, contracts and orders for plant and equipment, new private housing building permits, manufacturers unfilled orders for durable goods industries, prices of crude and intermediate materials, stock prices of 500

common stocks, money supply (M2), and index of consumer expectations. In general, these indicators in the economic index change direction before a cyclical turning point in the economy. Thus, the index is one of the main indicators to predict future business actions. The base year of the index is 1987. We again converted the data into 1992 basis.

- (8) **Inflation Rate (INFL. RATE)** is a percentage change in the general level of prices from the previous year. The rate is created based upon changes in the CPI index data from the previous year.
- (9) **Interest Rate (INT. RATE)** is the cost of borrowing money. There are different kinds of interest rates such as U.S. Treasury Three-Month Bills or Federal Reserve Discount Rate. The interest rate we used for our analysis is Bank Prime Loan Rate. No conversion was required.
- (10) **Money Supply (MONEY)**, in general, means currency plus demand deposits. There are different measures of the money supply and M2 was used for analysis. M2 is currency, demand deposits, travelers checks, checkable deposits, overnight repurchase agreements, Eurodollars, money market deposit accounts, money market mutual fund shares, and savings and small time deposits. The data of Money Supply is available in 1992 dollar base and was converted into 1998 dollars.
- (11) **Personal Consumption Expenditures (PCE)** represent spending by households for durable and nondurable goods and services. Currently, the PCE is available in 1992 dollars. It was transformed to 1998 dollars.
- (12) **S&P Index (S&P 500)** represents prices of 500 companies listed on the New York Stock Exchange, American Stock Exchange, and the Over-the-Counter market. No conversion was needed.
- (13) **Unemployment Rate (UNEMP. RATE)** is the percentage of the people who are unemployed in the labor force. It is a major indicator that measures the degree of economic conditions. In general, it behaves opposite to the economy. No conversion was needed.

Appendix 3: Alternative Predictor Models

The main body of the report listed a number of models that best fit and predicted the various automotive sales segment. In some segments, we felt there were also alternative models with similar, although usually slightly lower, predictive power that added to the understanding of the forces that affect sales in those segments. However, not all segments had an alternative model that merited mention and discussion, either because its predictive power was low, or its constituent variables added little or no additional value to understanding those segments. In order to provide complete results, we list these alternative models here.

TOTAL VEHICLES

Total-Vehicle Sales (78-98):

$$38) TV = - 1.11(CPI) + .48(CSI) - .43(INT. RATE) \\ R^2 = 56\%$$

The alternative model for total-vehicle (TV) sales has a relatively strong R^2 of 56 percent. The model indicates that sales will decrease as the CPI or the interest rate increases, and sales will increase if the index value of consumer sentiment rises. What this implies is that consumers, when faced with a rising CPI or interest rate of great enough magnitude, may defer a new-vehicle purchase or purchase an alternative such as a used vehicle, while an increasingly positive consumer sentiment will encourage new-vehicle sales. This model is certainly in line with conventional wisdom. Rising general prices and interest rates depress sales, while consumers confident about the state of the economy will drive up sales.

Total-Vehicle Sales (78-88):

$$39) TV = - .55(CPI) + .37(CSI) - .36(INT. RATE) \\ R^2 = 63\%$$

Alternative model 2, representing the first decade of the data set, includes the same variables as the full period model 1, and differs only in the order of impact of the variables. Model 2, however, has a higher R^2 —at 63 percent—indicating it is a better predictor for the first decade than is model 1, above, our best-predicting alternative model—56 percent—for the full time period.

Total-Vehicle Sales (89-98):

$$40) TV = 1.2(PCE) - .74(S\&P 500) - .42(GAS) - .22(Housing Starts) \\ R^2 = 57\%$$

Alternative model 3 substitutes personal consumption expenditures for GNP, decreasing R^2 slightly, but maintaining the variables' impact order. Where GNP is an indicator of the strength

of the economy at a macro level, PCE is a measure of the economy at the consumer level. These two variables are highly correlated with each other, accounting for their shared relationship to the strength of the economy. It merits comment that here rising gas prices do depress sales; we traditionally expect such a decline, as well as some shifting of sales among the segments.

PASSENGER CARS

Passenger-Car Sales (78-98):

$$41) PC = -1.95(CPI) + .65(CSI) - .5(INT. RATE) - .49 (S\&P 500) - .29(HOUSING) \\ R^2 = 59\%$$

Alternative model 4 predicts PC sales with a relatively high R^2 of 59 percent. These results are again a bit puzzling in that growth in the S&P 500 and new housing starts are usually interpreted as indicators of a strong economy and thus favorable conditions for new-vehicle sales. So here again we may see them functioning more as alternative consumer choices to vehicle purchases. It should be noted, however that these two variables are the fourth and fifth predictors in terms of effect, and have relatively less effect on sales of passenger cars than the earlier three in the equation. The model remains the same however as the model in the main body, except unemployment has been deleted.

Passenger-Car Sales (78-88):

$$42) PC = -1.0(CPI) + .64(CSI) - .53(INT.RATE) - .29 (HOUSING)* - .23(S\&P 500)*^{28} \\ R^2 = 52\%$$

Here the alternative model eliminates disposable income and the predictive power of the model drops from 56% to 52%, still strong, but a bit weaker.

Passenger-Car Sales (89-98):

$$43) PC = -1.3(UNEMP. RATE) - 1.2(CPI) - .80(INT. RATE) - .63(HOUSING) - \\ .52(MONEY) - .43(GAS) \\ R^2 = 57\%$$

Alternative model 6 has a relatively strong R^2 of 57 percent. Negative unemployment rate, CPI, interest rate, and gas behave as expected. The fourth impact variable, negative new housing starts, is also a little odd, as discussed in alternative model 4. Given that new housing starts are conventionally a lead indicator of the general economy and that a drop in this indicator is the first sign of a coming recession and a subsequent decline in new-vehicle sales, it is puzzling that a rise in this variable could indicate decreased sales. As we suggested, new housing may now

²⁸ Please remember that in the models, an * indicates a variable in the model, while necessary to the predictive power of the model, is not itself significant at a 0.05 level. In other words, there is a greater than 5 percent chance that the effect of the variable could be simply a random departure from zero.

sometimes represent an alternative to buying a car.

LIGHT TRUCKS

Light Trucks (78-98):

$$44) LT = 1.09 (PCE) - .27(MONEY) + .27 (CSI) - .22(INT. RATE) \\ R^2 = 91\%$$

Alternative model 7, has an almost identical R^2 of 91 percent and replaces disposable income (DI) with personal consumption expenditures (PCE) as the highest impact predictor. Our analysis indicates a strong correlation between PCE and DI, which makes sense for if DI rises, it supports increased personal expenditures on goods and services.

Light Trucks (89-98):

$$45) LT = 1.3(PCE) - .25(INT. RATE) - .21 (MONEY) + .12(CSI)* \\ R^2 = 89\%$$

Alternative model 8 with equally strong predictive powers, an R^2 of 89 percent, does not reveal anything striking or counterintuitive. It does seem to confirm that consumers in this segment are sensitive to interest rates, perhaps an indication of their focus on monthly payments, and their own personal feelings of the state of the economy, as reflected in the inclusion of the Consumer Sentiment Index.

PASSENGER-CAR SEGMENTS

Small Passenger Cars (78-98):

$$46) SMALL PC = .77(INDEX ECON. INDIC.) - .50(HOUSING) - .47(DI) - .43(S\&P 500) \\ R^2 = 32\%$$

The alternative model for the entire period is fairly weak, with an R^2 of 32 percent. An R^2 this low indicates that the predictive power of this model, in comparison to others, is extremely low.

Small Passenger Car (78-88):

$$47) SMALL PC = 1.22 (PCE) + .58(GAS) + .21(UNEMP. RATE) \\ R^2 = 58\%$$

Alternative model 10 has R^2 of 58 percent, much better than the full period model, alternative model 9. Also, the model shows that if personal consumption expenditures go up, so do sales.

Similarly, if unemployment rates rise, sales of small cars increase. As the unemployment rate increases, consumers see their economic situation as less secure and presumably opt for something less expensive, lest they face high monthly car payments.

Small Passenger Car (89-98):

$$48) \text{ SMALL PC} = -.64(\text{CPI}) - .63(\text{HOUSING}) - .27(\text{INFL. RATE}) \\ R^2 = 74\%$$

The alternative model 11 is not too surprising, other than the now familiar negative housing start relationship to sales.

Midsized Passenger Cars

The alternative models for the midsized passenger-car segments are all very weak, with predictive power less than 30 percent. As no new knowledge would be gained from examining these models, they are not listed here.

Large Passenger Cars (78-98):

$$49) \text{ LARGE PC} = -1.06(\text{MONEY}) - .79(\text{GNP}) - .71(\text{GAS}) + .38(\text{CSI}) - .35(\text{INT. RATE}) \\ R^2 = 71\%$$

Model 12, with a moderately strong R^2 of 71 percent, is quite similar to the model in the main body of the report. Of interest when looking at both of these models is that they are identical, except for the substitution between negative GNP and negative DI. In analyzing these two variables, we have found a strong correlation: as the general economy grows, so does disposable income, and vice versa.

A negative disposable income or GNP variable suggests in our analyses that a wealth-effect shift in purchase decisions may be occurring. The additional wealth that consumers feel they possess is contributing to their increased confidence in the strength of the economy. Consumers feel wealthy and they are acting on their feelings. Presumably, this feeling of wealth is shifting them into other purchases. Given the sectoral decline in large car sales, this makes sense.

The other variables in the model are fairly clear. A negative gas price variable implies that consumers of large passenger cars are sensitive to a rising fuel price which would drive up the operating costs of the vehicle over its life. Positive consumer sentiment and negative interest rate are also expected results.

Large Passenger Cars (78-88):

$$50) \text{ LARGE PC} = -2.7(\text{MONEY}) - .92(\text{GAS}) - .74(\text{INT. RATE}) + .62(\text{CSI}) + .59(\text{DI})^* \\ R^2 = 71\%$$

Model 13 is identical to the model in the main body of the report, except for the interchange of the fifth impact variables, GNP and DI. There is nothing startling about the variables contained in these two models. Negative gas and interest rates indicate consumers worried about the monthly costs of owning a large passenger car, while positive Consumer Sentiment Index and GNP/DI indicate that if consumers generally feel the economy is strong, they are willing to purchase a large car.

Large Passenger Cars (89-98):

The alternative model replaces interest rate with new housing starts and the predictive power of the equation drops six percentage points down to 57%.

Luxury Passenger Cars (78-98):

$$51) \text{ LUXURY PC} = .89(\text{CPI}) - .45(\text{GAS}) + .33(\text{CSI}) \\ R^2 = 65\%$$

Alternative model 14 has an R^2 of 65%. This model indicates that consumers of luxury vehicles are indifferent to upward movement in the CPI, but are sensitive to upward movement in gas prices. Of course, consumers in this segment behave as expected—as their confidence in the economy rises, luxury PC sales increase.

Luxury Passenger Cars (78-88):

$$52) \text{ LUXURY PC} = .51(\text{CPI}) + .37(\text{CSI}) - .28(\text{GAS}) \\ R^2 = 90\%$$

This alternative model, with a strong predictive power of 90%, indicates that during the first decade, a rising CPI did not deter luxury-car consumers. More sales in this segment could be anticipated even if the CPI were rising. However, consumers of luxury PCs tend also to act like many other consumers in this decade—as consumer sentiment rose, they were more likely to purchase luxury vehicles, but if gas prices rose they restrained their purchases.

Luxury Passenger Cars (89-98):

The next best alternative model for this segment has an R^2 almost 20 points lower than the reported model, so we do not list it here.

Nonluxury Passenger Cars (78-98):

$$53) \text{ NONLUXURY PC} = -.72(\text{S\&P 500}) + .54(\text{CSI})$$
$$R^2 = 34\%$$

Nonluxury Passenger Cars (78-88):

$$54) \text{ NONLUXURY PC} = -.59(\text{INT. RATE}) + .57(\text{GAS}) + .5(\text{GNP})$$
$$R^2 = 34\%$$

Alternative nonluxury passenger-car model 16 for the full period and model 17 for the first decade exhibit weak R^2 s, below 35 percent. These time periods have proven extremely difficult to model for PC sales, and with almost 65 percent of the variance in sales unexplained by the models, extreme caution must be exercised in extrapolating any trends.

Nonluxury Passenger Cars (89-98):

$$55) \text{ NONLUXURY PC} = -.86(\text{S\&P 500}) - .64(\text{GAS}) - .55(\text{UNEMP. RATE}) - .46$$
$$(\text{HOUSING})$$
$$R^2 = 47\%$$

Alternative model 18 for the second decade contains the same variables except that interest rate is omitted. Model 18 indicates that sales in this segment are sensitive to unemployment rates, interest rates and gas prices. However, the possible individual wealth indicator, S&P 500, along with the indicator of the general economy are also negative, leading to the assumption that in good times, consumers will make alternative purchases. A critical issue is the extent to which such purchases are in other segments of the automotive market, rather than for non-automotive goods. Negative gas has become the second impact variable and the R^2 drops slightly.

LIGHT TRUCK SEGMENTS

SUV (78-98):

$$56) \text{ SUV} = .7(\text{S\&P 500}) + .68(\text{INDEX ECON. INDIC.})$$
$$R^2 = 88\%$$

The alternative model 19 has slightly lower R^2 of 88 percent but contains an indicator of the general economy—positive index of economic indicators. This model is a little more difficult to relate to individual consumers, but is valuable when looking at sales as a function of the health of the economy. Perhaps consumers in this segment are benefiting from the strong economy and stock market, which is itself decreasing liquidity.

Luxury SUV (78-88):

The luxury SUV segment contained too few sales during the first decade for reliable analysis and modeling.

Luxury SUV (89-98):

$$57) \text{ LUXURY SUV} = .83(\text{S\&P 500}) + .20(\text{HOUSING}) + .04(\text{GAS})^* \\ R^2 = 78\%$$

Not surprisingly, both of the models for this decade closely resembles the models for the full dataset. As noted, the vast majority of sales in this segment have occurred in the second decade and it appears that the stock market and implied wealth effect have been the drivers of the sales in this segment.

Nonluxury SUV (78-98):

$$58) \text{ NONLUXURY SUV} = .73(\text{INDEX ECON. INDIC.}) - .63(\text{S\&P 500}) + .43(\text{CPI}) - .27 \\ (\text{GAS}) \\ R^2 = 84\%$$

In contrast to the luxury SUV segment, the nonluxury segment probably contains more purchasers whose move into the segment has been tenuous. This is indicated by the most powerful predictor in model 21, the positive index of economic indicators. As the economy goes, so goes the sales of this segment. A negative S&P 500 variable could indicate a shift up to a higher-priced segment. In this segment, as opposed to the luxury SUV segment, the gas price variable is negative—here the price of gas does matter to purchasers. This indicates that consumers are concerned about how increasing gas prices, together with a low-mpg vehicle will impact their regular paychecks. Clearly, the purchasers in the luxury and nonluxury segments are different consumers.

Nonluxury SUV (78-88):

$$59) \text{ NONLUXURY SUV} = 1.3(\text{INDEX ECON. INDIC.}) - .18(\text{S\&P 500}) - .15(\text{Consumer} \\ \text{Confidence Index})^* \\ R^2 = 95\%$$

Alternative model 22 has very strong predictive powers, $R^2 = 95\%$, for nonluxury SUV sales during the first decade. The model relies on the index of leading economic indicators which has a ten-fold impact on the sales in this segment compared to the other two variables. Sales increased dramatically after the second recession of the decade, in 1982, coinciding with the expansion of the economy. Whether these sales are a result of consumers feeling better about the

economy (consumer confidence impact is insignificant) or merely coincidence with a strengthening economy is difficult to say.

Nonluxury SUV (89-98):

Because the alternative model for nonluxury SUVs during this decade is less than 26%, we do not include it here.

Pickups (78-98):

$$60) \text{ PICKUP} = -.76(\text{MONEY}) - .71(\text{GAS}) + .35(\text{CSI}) \\ R^2 = 66\%$$

This is another segment where purchasers are sensitive to the state of the general economy. In alternative model 24, negative gas and positive consumer sentiment variables indicate consumers who are responding to the performance of the economy and their monthly income.

Vans (78-98):

$$61) \text{ VANS} = .95(\text{PCE}) - .48(\text{S\&P 500}) + .46(\text{INDEX ECON. INDIC.}) - .12(\text{HOUSING}) + \\ .1(\text{UNEMP. RATE}) \\ R^2 = 87\%$$

The alternative model for this segment has a strong R^2 of 87%, but is difficult to interpret. Positive PCE indicates increased sales as expenditures increase, but a negative S&P 500 could indicate that consumers faring well in the stock market are placing their money elsewhere. These indices seem to conflict with each other. However, the general measure of the health of the economy, index of economic indicators, indicates increased purchases as the economy improves.

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Bibliography

“As U.S. Buyers Age, Designers of Autos Make Subtle Shifts,” *New York Times*, March 1, 1999.

Detroit: Crain Communications, Inc., *Automotive News Market Data Book*, 1978-1998.

Detroit: Ward’s Communications, *Ward’s Automotive Yearbook*, 1978-1998.

American Automobile Manufacturers Association, *Motor Vehicle Facts & Figures*, 1998.

Economic Time Series Page at <http://www.economagic.com> and University of Alabama at <http://www.bos.business.uab.edu>.

Flynn, Michael S., Mateyka, James A., et al. *Competing for Customers: The Future of Auto Retailing*, Office for the Study of Automotive Transportation (OSAT), University of Michigan Transportation Research Institute, No. UMTRI 2000-29, August 2000.

Flynn, Michael S., Mateyka, James A., et al. *Divergent Views on the Future of Automotive Retailing*, Office for the Study of Automotive Transportation (OSAT), University of Michigan Transportation Research Institute, No. UMTRI 99-4, March 1999.

Hymans, Saul H. *The U.S. Economic Outlook for 2000-2001*, University of Michigan: Research Seminar in Quantitative Economics (RSQE), 1998-2001.

J.D. Power and Associates, *The Power Report*, 1998-1999.

National Automobile Dealers Association (NADA) Industry Analysis Division, *NADA Data*, 1978-1998.

Research Seminar in Quantitative Economics (RSQE) at the University of Michigan.
Available: <http://rsqe.econ.lsa.umich.edu>.

U.S. Energy Information Administration, U.S. Department of Energy.
Available: <http://www.eia.doe.gov>.

“Who Will Deal in Dealerships?” *The Economist*, February 14, 1998, pp.61-63.

