The Replacement Demand for Motor Vehicles:

Evidence from the Survey of Consumer Finances

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July 2003

Abstract

The motor vehicle industry has undergone important changes in recent years, including a shift in production from autos to light trucks and growth of vehicle leasing. This paper uses household-level data from the Federal Reserve's Survey of Consumer Finances to document changes in households' acquisitions and financing of motor vehicles from 1989 to 2001. We examine what types of vehicles households had, what financing arrangements were used to acquire them, and how vehicle holdings vary with such household characteristics as income, age, wealth, and creditworthiness. The data provide useful insights into the determinants of replacement demand and the use of alternative financing arrangements like leasing.

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Introduction

The motor vehicle sector plays a significant role in the United States economy. Although it accounts for a relatively small share of U.S. gross domestic product (under 4 percent in the past 15 years), fluctuations in its output contribute importantly to swings in aggregate output (Figure 1). Thus, developments in the motor vehicle industry are carefully watched in part because of their macroeconomic implications.

The motor vehicle industry has some notable features that must be taken into consideration in its analysis. On the demand side, vehicle ownership among U.S. households is high and relatively stable, so that most demand for new motor vehicles is 'replacement demand.' Decisions about replacing vehicles are relatively complicated: people compare the transportation services they get from their present vehicle and the costs associated with running it, with the services they could get from another vehicle, given the costs of buying and selling vehicles and of running the new one.[1] Replacement decisions are fairly readily moved forward or backward in time: for example, a household may replace a vehicle earlier than expected due to favorable prices and incentives, or it may postpone a replacement until uncertainty about income or unemployment resolves.[2] Replacement decisions are also affected by developments in the used-vehicle market: when people replace vehicles, they may buy either new or used, and they very often sell a vehicle on the used-vehicle market when they acquire another. Thus, although only production and sales of *new* vehicles affect the industry's contribution to GDP, demand for new vehicles is influenced by prices, quantities, and qualities in the used-vehicle market.

On the supply side, the motor vehicle industry has a relatively concentrated market structure, with the "Big Three" auto companies – General Motors, Ford, and Daimler-Chrysler -- having a market share of about 65 percent in 2002.[3] This relatively tight market structure means that, in making decisions about pricing, financing incentives, and types and characteristics of vehicles, producers must consider how their current behavior will affect the behavior of their competitors. They must also consider how their current behavior may affect market conditions in the future. For example,

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[1] See, for example, Eberly (1994).

[2] Bernanke (1984) analyzes relationships between income fluctuations and automobile purchases, using household-level panel data.

[3] *Automotive Digest* (2002). See also Doyle and Snyder (1999).

a company that improves the durability of its vehicles may realize higher sales in the short-run, but lower sales in the long-run, especially if competitors follow suit.[4] Similarly, automakers must consider how a period of strong sales would affect future demand for new vehicles, because pulling down the average age of vehicles boosts the flow of transportation services from the vehicle stock, potentially reducing the impetus for vehicle replacement in the medium-term.

In this context, a number of interesting developments have taken place in the motor vehicle industry in recent years. First, although vehicle production and sales were sluggish in the early 1990s, they surged as the economic expansion of that decade got underway. Sales were surprisingly strong in the second half of the decade, remaining at or above 15 million units per year, and although they cooled a bit in the economic slowdown of 2001, their pace has remained quite solid (Figure 1(c)). Second, new vehicle prices rose steadily at rates of 2 to 3-1/2 percent per year through 1996, and flattened out thereafter (Figure 1(d)).[5] Third, vehicle types and qualities changed appreciably. Larger vehicles, like sport-utility vehicles (SUVs) and minivans, grew in popularity, as declining gasoline prices made such vehicles more affordable. Also, improved engineering and design tended to increase the lifespan of vehicles, which would tend to stretch out the replacement demand schedule. Fourth, the increased use among manufacturers of flexible production methods made it easier for producers to change levels and composition of vehicle output in response to changes in demand. Finally, there was a notable increase in the prevalence of auto leasing. Prior to the 1990s, leasing had been limited to the high-luxury market segment, but in the early 1990s, options to lease were expanded to a much broader range of vehicles.[6] Yet in the later 1990s, the use of leasing started to trail off, as automakers reportedly realized large losses on their leasing portfolios.[7] Instead they have tended to offer incentives in the form of zero-percent financing with 3-to-5 year contracts.

This paper examines how these trends have affected households' holdings of motor vehicles, with a view toward understanding the implications for the motor vehicle industry. Our analysis is based on data from the Survey of Consumer Finances (SCF), a triennial survey sponsored by the Federal Reserve Board that collects detailed information on the assets, liabilities, incomes, vehicle holdings, and other characteristics of a representative sample of U.S. households. These data allow us to examine what types of vehicles households have, what financing arrangements were used to acquire them, and how vehicle holdings vary with such household characteristics as

[4] See Bulow (1986) and Waldman (1993).
[5] New vehicle prices are adjusted for quality improvements, as described in the Bureau of Labor Statistics Handbook of Methods (Chap. 17).
[6] See Aizcorbe and Starr-McCluer (1997) for an earlier analysis of the growth of leasing.
[7] Lease contracts specified residual values of vehicles that often turned out to be higher than what they were worth when they came off-lease, implying that customers had been charged too little for their use of the vehicle.

income, age, wealth, and creditworthiness. Analysis of data on vehicle holdings provides considerable insights into the nature of replacement demand – who replaces vehicles rapidly and why, who buys new and why – and who uses alternative financing arrangements like leasing. While the data are primarily informative about the demand side of the market, observed patterns of vehicle holdings obviously reflect the interaction of supply and demand. Thus, in the sections that follow, we describe the survey data and present what it tells us about vehicle holdings. Then we discuss implications for replacement demand.

Household Data on Vehicle Ownership and Leasing

The Federal Reserve Board's Survey of Consumer Finances (SCF) is one of the few sources of detailed information on ownership and leasing of motor vehicles by U.S. households. The survey is conducted every three years and interviews about 4,300 households.[8] About two-thirds of the households interviewed are drawn from a standard area-probability sample. The remainder come from a high-wealth sample intended to provide adequate representation of the upper-end of the wealth distribution, where wealth ownership is concentrated. Sample weights are used to make the observations representative of the population as a whole. This dual sample frame is especially useful for analyzing vehicle leasing because, as will be discussed below, vehicle leasing is concentrated among higher-income households.

The SCF asks detailed questions on households' vehicle holdings. For each vehicle owned by the household, information is collected on the vehicle's make, model, and model year; the year in which it was bought; whether it was bought new or used; and if there is outstanding borrowing for that vehicle, the terms of the loan (its outstanding balance, term and monthly payment). Analogous information is collected for vehicles leased for personal use.[9] Because households may or may not know the current value of their motor vehicles, information on vehicle make, model and model year is matched with data from the National Automobile Dealers Association (NADA) on average market prices by vehicle make and model.

Table 1 presents some basic information on households' vehicle holdings. Between 1989 and 2001, the share of households owning or leasing a vehicle for personal use held steady around

[8] See Aizcorbe, Kennickell, and Moore (2003).

[9] Note that the SCF also collects information on vehicles provided to households by a business, where the vehicle may be held for business and personal use. The share of households having a vehicle for business use rose notably between 1989 and 2001, from 3.7 percent to 9.1 percent. Having a vehicle for business use was especially common in the top 10 percent of the income distribution, where 21 percent of households had such a vehicle in 2001. Yet because most households having a vehicle for business use also had a vehicle for personal use, the share of households having a vehicle for either type of use is only a nick up from the share having a vehicle for personal use (87.8 percent versus 86.6 percent in 2001).

86 percent, while the average number of vehicles per household remained just below 2.0.[10] These facts are consistent with the centrality of replacement demand in the demand for motor vehicles. The data show some notable variations in vehicle holdings by household characteristics. The share of households having a vehicle tends to rise with income: for example, in 2001, less than 2/3 of households in the bottom 25 percent of the income distribution had a motor vehicle, whereas almost all of those in the top 10 percent did. Higher-income households also tend to have more vehicles than households overall. By age, the share of households having a vehicle is relatively high among households in the 35-64 age ranges and relatively low among those in the 75+ range.

Table 1 also shows an updrift in the average age of vehicles held by households, from 7.8 years in 1992 to 8.7 years in 1998, slipping back a bit to 8.5 percent in 2001. This updrift is consistent with other data on vehicle ages.[11] There are clear variations across households in the age of their vehicles. In the bottom 25 percent of the income distribution, the average vehicle age is over 10 years, while for households in the top 10% of the distribution it is 6.5 years or less. This is consistent with high-income households' greater tendency to acquire new vehicles: thus, for example, in 2001, more than half of vehicles held by households in the top 25% of the income distribution were new when acquired by the household, versus about 25% of vehicles held by households in the bottom 25% (figure 2). Still, the data show that, even among those households who favor new vehicles, purchasing used vehicles is nonetheless common. This highlights the point that, for many households, new and used vehicles substitute for each other, so that past levels of production and sales may affect current demand for new vehicles via the used-vehicle market.

Vehicle financing and leasing

Given the rise in new vehicle sales in the 1990s, coupled with rising new vehicle prices, it is not surprising that the share of vehicles having some form of financing outstanding – whether loan or lease – moved up over the period: whereas 26.3 percent of all vehicles had financing outstanding

[10] Almost 87 percent of households owned a vehicle in 2001; this broad ownership makes vehicles the second most widely owned asset among U.S. households after liquid transactions accounts (Bertaut and Starr-McCluer 2002).

[11] According to Polk data compiled by Ward's Communications (2001), the average age of automobiles has continued to trend up, from about 7.5 years in 1990 to a high of 9.0 years in 2000. In contrast, the average age of trucks had declined from a high of 8.6 in 1993, to 8.0 years by 2000, probably reflecting the increasing popularity of sport utility vehicles, vans, and pick-up trucks over the period. According to the SCF data, the increase in average age reflects a shift in the age distribution of motor vehicles: the share of vehicles under 2 years old rose over this period, reflecting strong sales of new motor vehicles, but the share of vehicles aged 10 years or older also rose.

in 1992, by 2001 this share had advanced to 34.5 percent (see figure 3). Recent model-year vehicles (2 years old or less) are much more likely than vehicles overall to have financing associated with them: in 1995-2001, over 80 percent of vehicles with recent model years had a loan or lease outstanding. Much of this increase came from vehicle leasing: whereas 8.5 percent of recent model-year vehicles were leased in 1992, this figure had risen to 19.9 percent in 1998, although it dropped back a bit to 17.5 percent in 2001.

Several factors have been mentioned as potential explanations for the rise of leasing in the 1990s. At the outset of the 1990s expansion, when demand for new vehicles was surprisingly sluggish, automakers were said to be using leasing to bolster current demand for new vehicles without subtracting from future vehicle demand. This was because people acquiring vehicles by leasing were expected to "come back to the market" when their leases expired.[12] But this move would only partly offset adverse effects on future demand, because the inflow of lightly-driven, off-lease vehicles into the used-vehicle market would increase the relative attractiveness of buying used, rather than new.[13]

Other explanations have focused on households' incentives for leasing a vehicle rather than purchasing one with a traditional loan. For much of the 1990s, leasing a given vehicle often involved a smaller upfront payment and lower monthly payment than taking out a loan, and although the customer did not own the vehicle at the end of the lease, he/she had the option of buying it at a pre-specified 'residual value' when the lease expired. Because the decision to lease versus buy involves a fairly complex financial calculation, many wondered whether consumers favored leasing at times because they misunderstood the terms; indeed, concerns in this regard led to an overhaul of regulations governing reporting of lease terms in the mid-1990s.[14] At the same time, some types of households were said to be especially drawn to leasing, such as liquidity-constrained households who had limited funds for upfront payments, and/or well-off consumers who like to replace vehicles frequently and appreciate its convenience.

The SCF data are valuable for documenting the growth of auto leasing among households. As shown in Table 2, only 2.5 percent of all households leased a vehicle for personal use in 1989; by 1998, this percentage had more than doubled to 6.4 percent, although it had slipped back to 5.8

[12] Bulow (1986) shows that producers in oligopolistic markets for durable goods have incentive to increase rentals relative to sales, to boost the rate of repeat purchases.
[13] Off-lease vehicles are typically in good condition partly because mileage is limited by the lease agreement.
[14] See Miller (1995) and Nunnally and Plath (1989) on the decision to lease versus buy. To simplify lease transactions and reduce confusion for consumers, the Federal Reserve Board in 1997 enacted revisions to Regulation M of the Consumer Leasing Act, which requires clear, uniform disclosure of terms of lease transactions (see Palmer 2000).

percent in 2001.[15] Throughout the 1989-2001 period, leasing was most common among households with relatively high incomes; for example, 13.6 percent of households in the top 10 percent of the income distribution leased a vehicle in 2001, compared to 4.5 percent of households in the 25th-to-49th percentiles. This is consistent with marketing research showing rates of leasing penetration to be highest for high-end vehicles.[16] According to the SCF data, the slowdown in leasing from 1998 to 2001 reflected a trend away from leasing among households with incomes in the 75th-to-89th percentiles; in other groups, the share of households leasing a vehicle edged forward a bit. The concentration of leasing in the upper-income ranges suggests that its popularity is rooted in its convenience as a means of acquiring and disposing of new vehicles, rather than its usefulness for getting around liquidity constraints. But to address this point more directly, we need to know more about the finances of households that lease.

The creditworthiness of households that lease

The SCF collects very detailed information on households' finances at the time of the survey, including their assets, liabilities, debt payments, payments problems in the past year, and bankruptcy experience. While this information does not necessarily tell us how households' finances looked at the time that they took out a lease or a loan, it does provide a detailed picture of their finances generally and likely reflects broad variations in creditworthiness.

Using data from the 2001 survey, Figure 4 shows selected financial variables for three groups of households: (1) those leasing at least one vehicle for personal use; (2) those having no leased vehicles but at least one vehicle loan outstanding; and (3) those owning a vehicle without any outstanding vehicle financing. Because there are essentially no households with leased vehicles in the bottom 25 percent of the income distribution, results for this group are not included in the analysis. Broadly speaking, households that lease seem to be at least as creditworthy as households with loans, and do not generally appear to face liquidity constraints. As shown in panel (a), within income groups, households with leased vehicles were about as likely as households with vehicle loans to have had trouble getting credit in the past year; here a household is considered to have had trouble getting credit if they say they were turned down for credit in the past year, or did not apply for credit in expectation of being turned down.[17] Both

[15] This dropback is consistent with data from industry sources. For example, according to data collected by CNW Marketing/Research, leases accounted for 23 percent of new vehicle acquisitions in 2002, down from 32.2 percent in 1998 (Maynard 2002).
[16] According to CNW Marketing/Research, in 1997, 75 percent of all luxury vehicles acquired by households were leased.
[17] This measure was first used as a measure of liquidity constraints by Cox and Jappelli (1993). Households having been turned down for credit exclude those who reapplied and were able to get the full amount.

groups had higher incidences of trouble getting credit than households without vehicle financing. Again within income groups, households with leased vehicles were less likely to have had debt payments 60+ days late in the past year, compared to households with vehicle loans (panel (b)). Rates of late payments are anyway very small in the top 25% of the income distribution, where leasing is concentrated.

Panel (c) compares households in terms of a widely used measure of household debt burden: the share of household income going to debt payments. The standard version of this measure includes debt payments only; payments related to vehicle leases are not included. Computed in this way, within income groups, households with leased vehicles have payments-to-income ratios that are *lower* than those of households with vehicle loans. However, when lease payments are included in monthly payments obligations, a somewhat different picture emerges. Among households in the 25-49th percentiles of the income distribution, the median ratio of payments to income is now higher for households with leases than for households with loans. But among other income groups, the median payments burden of households with leases remains somewhat lower than that of households with loans.

Finally, panel (d) shows information on median net worth by income and vehicle financing. Among households in the 25-49th, 50-74th and 75-89th percentiles of the income distribution, those having leases had median net worth about the same as those with loans; perhaps not surprisingly, median net worth was higher for households without vehicle financing of either type. The minimal differences in wealth between households with leases and those with loans suggest that lack of funds for upfront payment *per se* is not a key ingredient in propensity to lease – although, as will be discussed in a moment, there may be issues about affording upfront payments of particular vehicles. In the top 10% of the income distribution, the median wealth level of households that lease is way above that of households with loans -- $1,000,000 versus $425,000 – and is about the same as that of households without vehicle financing. Of course, with levels of wealth so high in these groups, it is unlikely that lack of funds for upfront payments has much role in explaining leasing.

Even so, it remains possible that leasing was favored in part because it enabled households to acquire a more expensive vehicle than they could have afforded via a traditional loan-financed vehicle purchase. For much of the 1990s, monthly payments associated with leasing a given vehicle tended to be lower than those associated with a loan. This payments differential would not necessarily make leasing the financially wiser thing to do, because expected vehicle equity should also figure into the lease versus buy decision.[18] Still, many observers pointed out that, for

[18] See Miller (1995) and Nunnally and Plath (1989).

given upfront and monthly payments, leasing often enabled a household to acquire a more expensive vehicle than could have been acquired by taking out a loan.

Data from the SCF show that, indeed, within income groups, values of vehicles financed by leasing tended to be notably more expensive than those financed by loans (figure 5). For example, among households in the 50-74th percentiles of the income distribution, the median value of a leased vehicle was $17,300, versus a median value of $12,300 for a vehicle having a loan outstanding. This is consistent with the idea that recourse to leasing often facilitated acquisition of vehicles with higher values -- a more expensive model in place of a less expensive one, or a new vehicle in place of a used one.[19]

Implications for Replacement Demand

An important feature of the 1990s growth in leasing was the short-term nature of the leases. As shown in Figure 6, the average duration of a lease fell from 48 months in 1989 to about 37 months in 1995, and remained at or below 40 months in 2001. The growth of shorter-term leasing was said to be shortening the 'replacement cycle' and so potentially boosting the pace of new vehicle sales. In particular, a consumer who acquires a vehicle under a two-year lease presumably revisits the replacement decision when the lease expires. If she would have replaced the vehicle at the two-year mark anyway, the shift to leasing from traditional financing would not alter the replacement cycle. However, estimates from industry statistics suggest that the average new vehicle buyer tends to replace the vehicle after about four years.

Indeed, SCF data on the age distribution of used vehicles suggest that many leased vehicles were returned when the leases expired and entered the used-vehicle market. As table 3 indicates, the number of vehicles that were used when acquired that were 2-to-4 years old almost doubled between 1992 and 1998 -- the period when short-term leasing had grown substantially – and leveled off between 1998 and 2001, as the relative importance of leasing in new-vehicle acquisitions slipped. It seems likely that this inflow into the used-vehicle market of relatively new vehicles reflected a tendency for lessors to turn in their vehicles at the end of the lease, rather than purchasing them when the lease expired and holding on to them.[20]

[19] This is true even if one controls for the age of the vehicle. That is, regressions that explain the value of the vehicle in terms of the vehicle's age and leasing status still show that leased vehicles tend to be more expensive than other vehicles.

[20] As mentioned above, the tendency for residual values to have been overestimated in the 1990s makes it unlikely that people would have bought and resold vehicles that they had leased.

Data on the age distribution of vehicles that were new when acquired also shows the shift toward relatively young vehicles. The number of vehicles that were less than two years old at the time of the survey grew from 14 million in 1992 to 19 million in 2001 period. This increase in the stock of new vehicles reflects in part the sizable incentives and zero-percent financing deals used to boost sales in 2000 and 2001. In contrast, the number of vehicles aged 2-to-10 years that were new when first acquired held steady between 1992 and 2001, while the number aged 10 years or more rose from 8 million to 12 million.

Issues for future research

In sum, with vehicle ownership among households both widespread and stable, most demand for new vehicles comes from replacement demand. This highlights that, in modeling and forecasting household demand for new motor vehicles, it is essential to take into consideration the characteristics of the vehicle stock. After a period of high new-vehicle production and sales, the average age of the vehicle stock declines, boosting the flow of transportation services that households derive from it. Ceteris paribus, this shift would tend to exert some downdrag on replacement demand in the years ahead.

In this regard, for example, the SCF data would suggest that the impetus from replacement demand may have been relatively low at the outset of the expansion that began in November 2001, due to the strong pace of new-vehicle production in the 1990s. To see this, we compare data on the age distributions of vehicles in the 1992 and 2001 surveys -- years in which the U.S. economy was exiting or close to exiting from a recession, when some 'pent-up demand' for vehicles is ordinarily expected. A potential gauge of the strength of replacement demand is the share of households' vehicles that were new when acquired that were in the 2-4 year age range at the time of the survey; as discussed above, new-vehicle buyers tend to replace vehicles when they are about four years old, and lessors tend to replace vehicles when the lease expires, so many vehicles in the 2-4 year age range could be expected to be replaced in the near-to-medium term. According to the SCF data, among all vehicles that were new when acquired, the share in the 2-4 year age category was 23 percent in 2001, down from 25 percent in 1992, suggesting a somewhat weaker impetus from replacement demand at the outset of the 2001 cycle.[21] However, almost 27 percent of vehicles that were new when acquired were under two years old at the time of the 2001 survey -- way above the 21 percent share registered in 1992. Ceteris paribus, we might expect these factors to dampen replacement demand, relative to what might have been expected at this phase of the business cycle. However, a fully-specified model would also need to

[21] Calculation based on the data presented in Table 3.

consider other factors affecting the strength of vehicle demand, including income expectations, uncertainty, interest rates, and access to credit (Bernanke 1984).

Table 1. **Households owning or leasing a vehicle for personal use, 1989-2001**

	Percent of households owning or leasing a vehicle					Average number of vehicles, among households having a vehicle					Average age of vehicles, among households having a vehicle				
	1989	1992	1995	1998	2001	1989	1992	1995	1998	2002	1989	1992	1995	1998	2001
All households	84.3	86.7	85.6	85.5	86.6	1.9	1.8	1.8	1.9	1.9	n.a.	7.8	8.3	8.7	8.5
Household income, by percentile															
Bottom 25%	54.7	61.3	63.0	64.4	62.5	1.4	1.3	1.4	1.4	1.4	n.a.	10.5	11.2	11.1	11.5
24 - 49.9	89.5	90.9	88.9	88.6	90.4	1.6	1.6	1.6	1.7	1.7	n.a.	8.8	9.2	9.7	9.6
50 - 74.9	95.9	96.2	94.5	93.2	96.1	2.0	1.8	1.9	2.1	2.0	n.a.	7.4	8.2	9.0	8.2
75 - 89.9	96.5	98.6	95.7	96.3	96.9	2.4	2.2	2.2	2.2	2.3	n.a.	6.7	7.0	7.1	7.2
Top 10%	96.2	98.2	95.1	94.8	95.8	2.4	2.3	2.3	2.4	2.4	n.a.	5.7	6.2	6.1	6.4
Age of household head (years):											n.a.				
Under 35	83.2	84.8	86.2	83.3	81.5	1.8	1.7	1.7	1.6	1.7	n.a.	7.6	8.0	8.3	7.9
35-44	88.8	89.5	86.8	88.6	90.8	2.1	1.9	1.9	2.0	2.0	n.a.	7.5	8.1	8.4	7.9
45-54	91.2	93.5	90.9	90.2	92.2	2.3	2.1	2.1	2.1	2.2	n.a.	7.5	8.1	8.0	8.8
55-64	86.2	87.9	88.5	89.6	91.4	1.9	1.9	1.9	1.8	1.8	n.a.	7.5	8.5	9.1	8.9
65-74	81.5	85.9	82.4	84.3	83.3	1.5	1.6	1.7	1.8	1.8	n.a.	8.3	8.6	9.1	8.9
75 and over	66.1	73.0	71.7	70.8	74.6	1.3	1.3	1.4	1.5	1.6	n.a.	9.9	9.5	11.2	10.4

Table 2. Percent of households leasing a vehicle for personal use					
	1989	1992	1995	1998	2001
All households	2.5	2.9	4.5	6.4	5.8
Household income, by percentile					
Bottom 25%	.	.	.	3.2	.
24 - 49.9	.	1.9	2.0	4.0	4.5
50 - 74.9	2.4	3.5	4.3	6.1	7.0
75 - 89.9	6.6	3.5	10.4	11.4	9.2
Top 10%	5.7	9.0	12.2	13.2	13.6
Age of household head (years):					
Under 35	4.2	3.2	4.8	8.2	7.3
35-44	3.0	4.2	5.4	8.3	6.0
45-54	3.3	3.2	7.8	7.6	6.1
55-64	.	3.2	4.1	4.4	5.4
65-74	.	1.0	1.3	2.9	6.4
75 and over	.	.	0.5	1.9	1.6

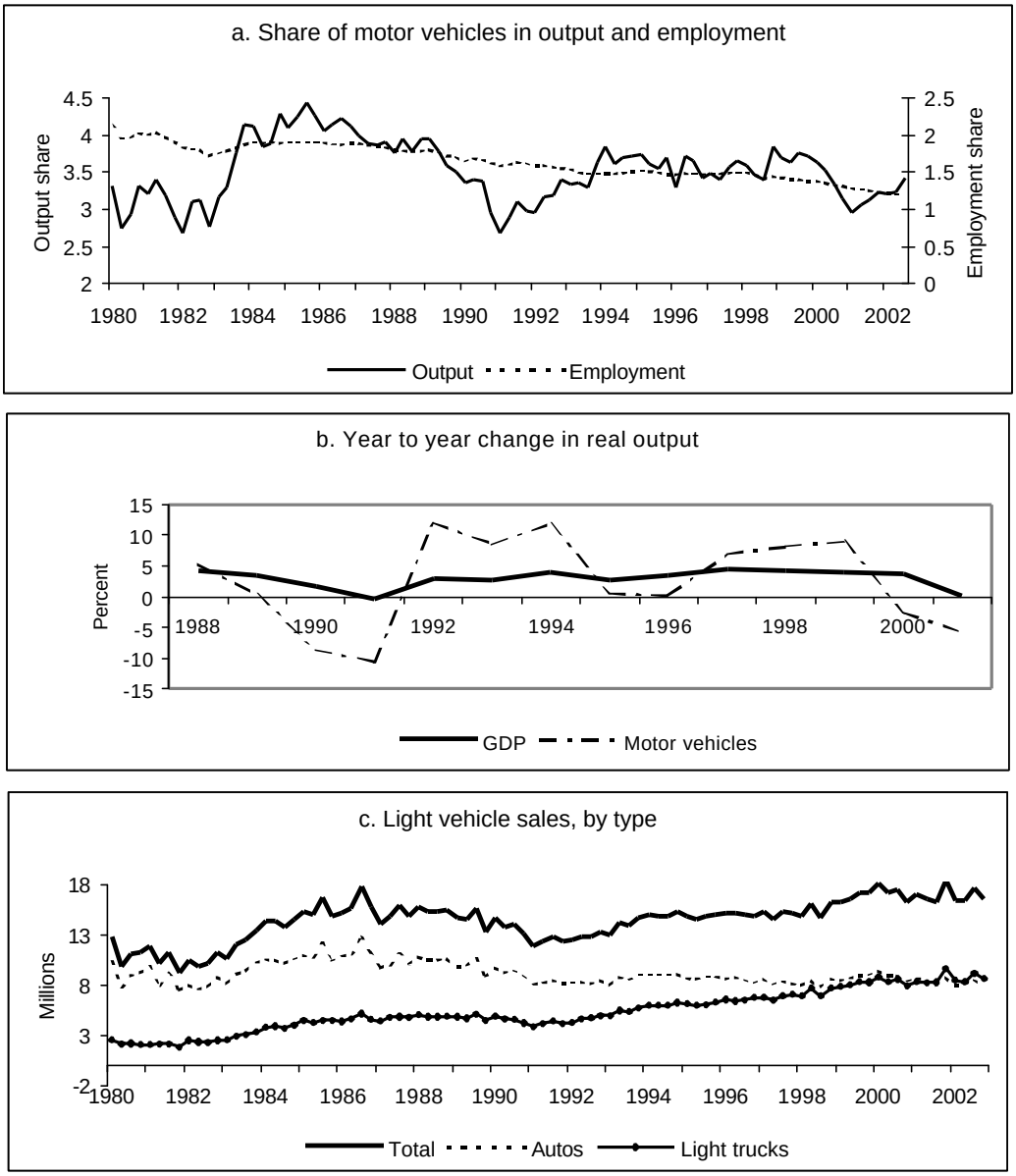
. = fewer than 10 observations.

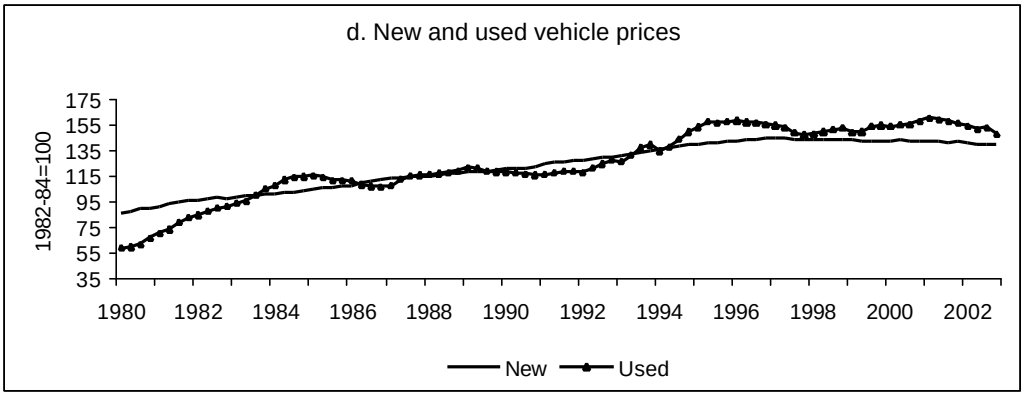
Table 3**. Age distribution of new and used vehicles, by survey year and vehicle age**

	Number of new or used vehicles, by vehicle age in years (millions of units)						
	< 2	2 to 4	4 to 6	6 to 8	8 to 10	≥ 10	Total
Vehicles that were used when acquired, by survey year							
1992	2.7	5.5	11.6	13.9	11.2	35.5	80.4
1995	2.0	7.4	10.1	12.9	13.7	41.9	87.9
1998	2.2	9.8	11.0	12.3	13.5	48.0	96.8
2001	2.4	9.8	12.4	14.4	12.5	48.5	101.0
Vehicles that were new when acquired, by survey year							
1992	13.8	16.1	13.5	8.9	4.9	7.5	64.7
1995	16.9	13.8	9.5	9.3	6.3	8.6	64.4
1998	17.1	13.9	9.4	7.1	6.3	10.8	64.7
2001	18.9	16.1	10.4	7.9	5.4	12.4	71.2

Note: Columns may not add to total due to rounding.

FIGURE 1. Overview of the motor vehicle industry




d. New and used vehicle prices
1982-84=100
175
155
135
115
95
75
55
35
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
New
Used

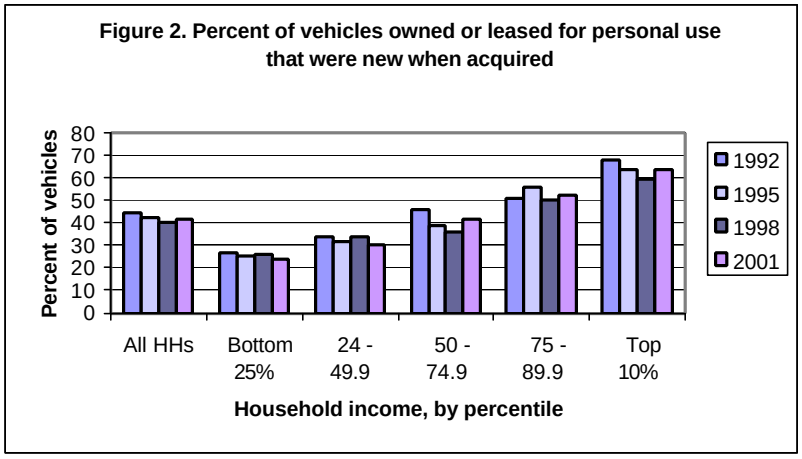


Figure 2. Percent of vehicles owned or leased for personal use that were new when acquired
Percent of vehicles
80
70
60
50
40
30
20
10
0
All HHs
Bottom 25%
24 - 49.9
50 - 74.9
75 - 89.9
Top 10%
Household income, by percentile
1992
1995
1998
2001

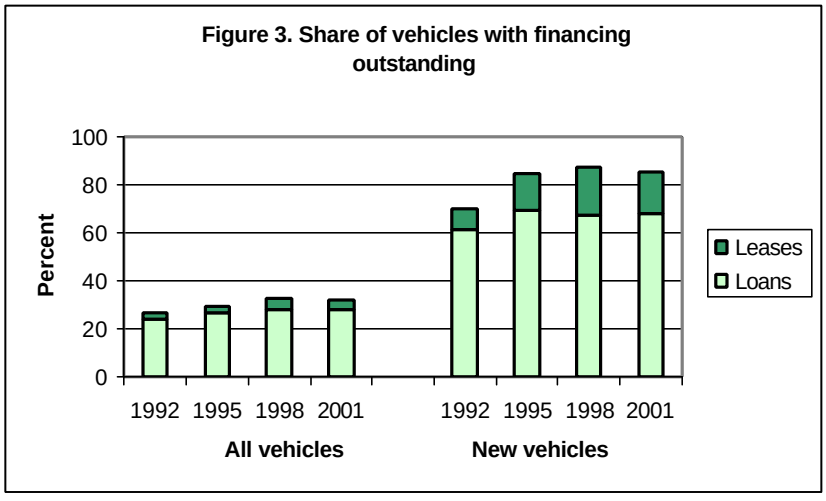


Figure 3. Share of vehicles with financing outstanding
Percent
100
80
60
40
20
0
1992
1995
1998
2001
All vehicles
New vehicles
Leases
Loans

Figure 4. Indicators of payments problems among households with vehicles: households with leases, households with loans, and households without vehicle financing

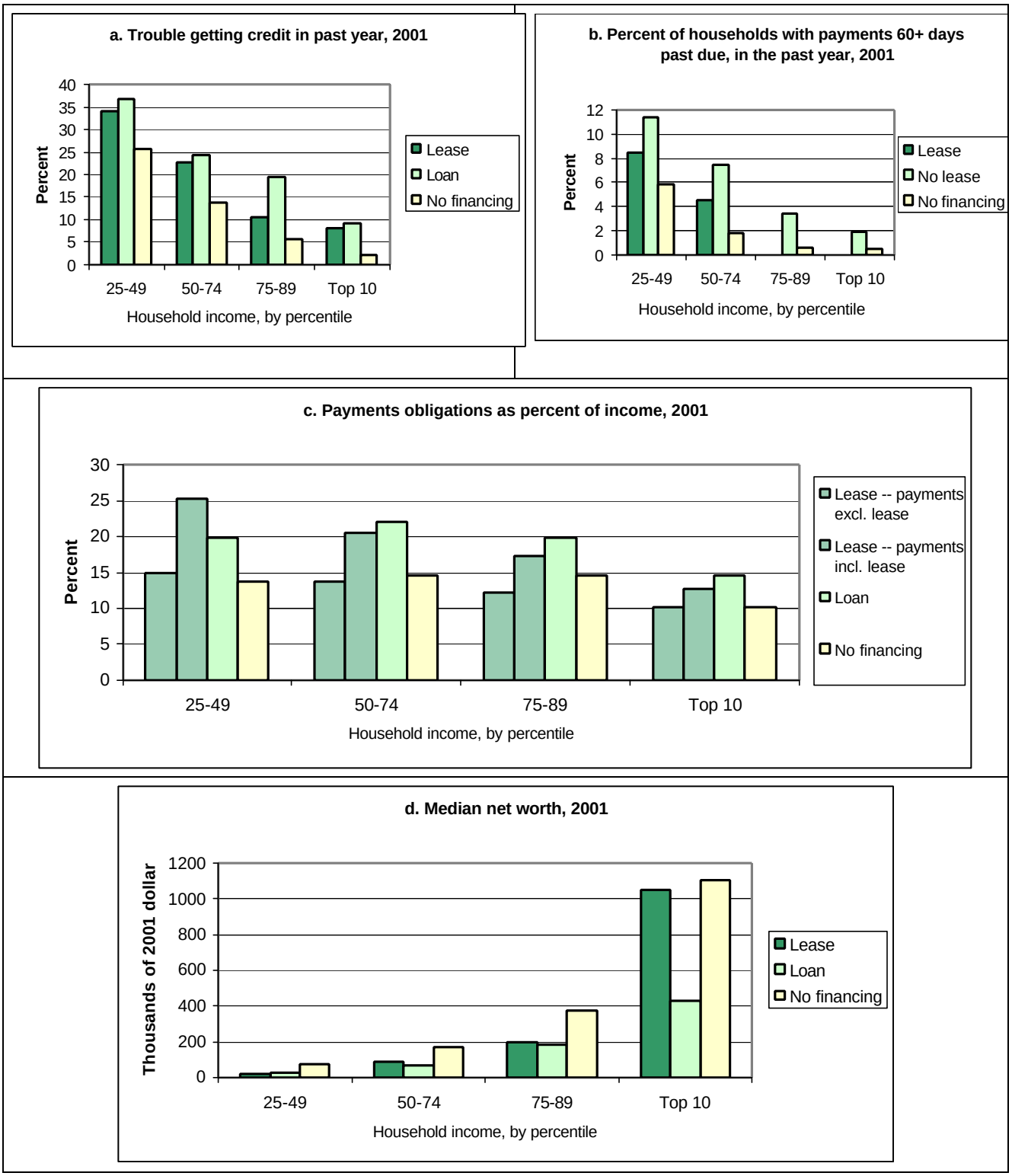


Figure 5. Median vehicle value, by financing

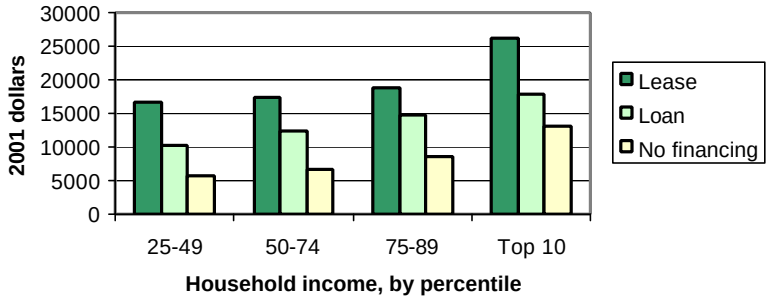
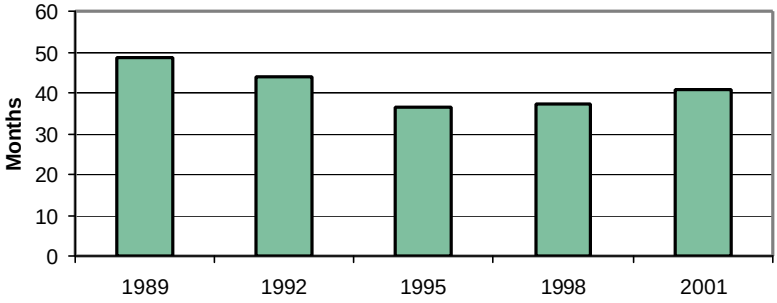


Figure 6. Average lease duration



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