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NHTSA Technical Report

Preliminary Report:
The Incidence Rate of Odometer Fraud

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EXECUTIVE SUMMARY

Odometer fraud is the illegal practice of rolling back odometers to make it appear that vehicles have lower mileage than they actually do. This has historically been considered a significant problem for the American consumer. While any vehicle sold on the used car market could have been the object of odometer tampering, the problem has been considered to be most prevalent among late model vehicles which have accumulated high mileage in a relatively short period of time. Vehicles in fleets, such as lease fleets, rental fleets, or business company fleets typically fall into this category. When sold on the used car market, vehicles whose odometers have been rolled back, or "spun," can obtain artificially high prices, since a vehicle's odometer reading is a key indicator of the condition, and hence the value, of the vehicle.

Consider, for example, 3-year-old cars whose odometers were rolled back from 80,000 to 30,000 miles. Unwary consumers pay top dollar for such cars, believing that they are in prime condition, likely to give several years of nearly trouble-free service, and still have some resale value. Instead, they get a car with a lot of wear-and-tear, likely to experience irritating breakdowns and incur costly repairs over the next several years, and have little more than scrap value after that. If they had known the cars' true mileage, they would, of course, not have been willing to pay nearly as much for them, and probably would not have bought them at all.

In order to reduce the incidence of odometer fraud, Congress has enacted several laws to prohibit odometer tampering and to protect consumers. The most recent law (Public Law 99-579) is the Truth in Mileage Act (TIMA) of 1986. It requires the transferor (seller) to disclose the vehicle's mileage on the title when a vehicle's ownership is transferred. The regulations apply when a vehicle is sold or leased to auto auctions, car dealerships, and individuals. The title must be printed by a secure process, or if not printed, be set forth by a secure system, to decrease the possibility of counterfeiting or altering titles. These provisions help create a permanent record or "paper trail" on the vehicle's title. In addition, the TIMA requires that auction companies establish and maintain records for at least four years following the date a vehicle is sold at auction. This provides law enforcement investigators with a better means to track the vehicle's course from seller to consumer. The TIMA required all vehicle transfers to conform with the new disclosure requirement on April 29, 1989, unless NHTSA granted a time extension or approved an alternate motor vehicle mileage disclosure requirement if it was consistent with the purposes of the new law. NHTSA granted time extensions to most states. It took some states several years to comply with the new regulations. By April 18, 1994, all states were in compliance.

The Congress specifically requested "a nationwide assessment of odometer fraud. This study, to be conducted by National Highway Traffic Safety Administration's (NHTSA) Office of Programs and Policy, will determine the extent of used car dealer compliance with odometer disclosure requirements and the effectiveness of state enforcement activities." (House Report 103-190 of July 27, 1993). The Government Performance and Results Act of 1993 and

Executive Order 12866 (October 1993) also require agencies to review their existing programs and regulations from time to time. This report consists of the three components:

(1) estimation of the incidence rate of odometer fraud and economic loss due to its inflation of the purchase price of passenger vehicles,

(2) a survey of the states' efforts to combat odometer fraud,

(3) an assessment of the Federal efforts to investigate and deter odometer fraud.

However, this report is not an evaluation of the effectiveness of the Truth in Mileage Act in that it does not estimate how well the regulations reduced odometer rollback or helped catch criminals. Data to estimate rollback rates before the Truth in Mileage Act were not available. Thus, a typical evaluation, comparing the odometer rollback rate before the regulation to the rate after the regulation took effect, was not possible. This report estimates the current incidence of odometer fraud.

The report estimates the probability of an odometer rollback **during the first 11 years of a passenger vehicle's life** to the extent it can be detected in title transfer and other odometer reading data. The analysis uses a nationally representative sample of 10,000 passenger cars, pickup trucks, vans and sport utility vehicles and a national vehicle history database (Carfax) to identify vehicles with odometer discrepancies that suggest rollback - i.e., odometer readings on two separate occasions, and the later reading has the lower mileage. These data are used only for statistical purposes to estimate rollback rates for the overall vehicle population. No claim is made that these data alone, without a follow-up investigation, are sufficient to prove or disprove fraud in individual vehicle cases.

The rate of odometer fraud over the life of the vehicle is 3.47 percent (confidence bounds from 2.68 to 4.26 percent). That is a 3.47 percent chance that a vehicle would have its odometer rolled back at any point during the first 11 years of its life. This rate includes, but is not limited to the types of rollback that can be detected in title histories such as Carfax. An odometer may be rolled back and not identified as such in Carfax as long as the subsequent mileage is not lower than the previous mileage. This could happen in several ways. The most common way is to alter the mileage on the title to reflect the rolled-back odometer reading that is lower than the true mileage, although higher than any previously titled mileage. The incidence of such "hidden" rollbacks was estimated with a case-by-case analysis of a large file of known rollbacks.

There are approximately 452,000 cases of odometer fraud per year in the United States based on the fraud rate and number of registered vehicles by vehicle age.

This study also estimates the increased price consumers pay for odometer rollback at the time they purchase a vehicle: the difference between the inflated prices that consumers actually paid

for the rolled-back vehicles and the prices they would have been willing to pay if they had known the true mileage. Those costs average $2,336 per case of odometer fraud. Given 452,000 cases per year in the United States, that amounts to $1,056 million per year (confidence bounds from $737 million to $1,376 million). That sum does not include inflated financing, insurance and tax costs; additional amounts consumers pay for vehicle repairs; other consequential damages; the decreased resale value due to the vehicle having an altered odometer; or the many indirect or intangible costs of odometer fraud: time spent waiting for vehicle repairs and road service, consumers' anger and frustration at being cheated and getting a car they wouldn't have wanted, and costs of government programs to detect and deter odometer fraud.

The increased cost consumers pay to purchase passenger vehicles with odometer rollback of $1,056 million per year makes odometer fraud one of the top crimes against property in the United States. By comparison, the Federal Bureau of Investigations estimated that in the year 2000, auto theft resulted in direct losses of $2,900 million, arson $760 million, burglary $3,000 million, and shoplifting $200 million.[1]

To assess the states' efforts to combat odometer fraud, a questionnaire was sent to state Department of Motor Vehicle offices in October 1997. The major focus of the questionnaire was on the odometer disclosure requirements imposed on states by Federal Regulations. Forty-six states, the District of Columbia and Puerto Rico returned completed questionnaires. The questionnaires showed:

- Most states had to make extensive changes to meet the new odometer disclosure requirements. Only 8 states met all the requirements before the April 29, 1989 deadline. All states met the new requirements by April 18, 1994.

- Although all states met the minimum Federal regulatory requirements, very few states appeared to have a comprehensive detection program in place to identify cases of suspected odometer fraud. Only four states had taken all three of the following steps to detect and deter fraud: (1) routinely verify odometer readings submitted by title applicants, (2) alert the titling office or applicant when a vehicle is being titled with a lower mileage than indicated on a previous title, and (3) keep records of odometer readings at any time other than titling, such as at annual emissions or safety inspections.

- Fewer than ten states routinely notified law enforcement agencies when the odometer reading shows signs of alterations on the title being surrendered.

- Most applicants do not request a check of odometer reading or title history, which is an inexpensive service.

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1 *Crime in the United States - 2000 Uniform Crime Reports*, Federal Bureau of Investigations, U.S. Department of Justice, Washington, DC.

- Almost 65 percent of the states were aware of odometer fraud investigations being conducted in the last year. But only seven states had information indicating that the new disclosure requirements are deterring odometer fraud.

- Federal regulations require dealers to maintain records systems that include odometer readings of vehicles sold in the last five years. However, NHTSA did not specifically evaluate how completely dealers actually comply with the regulations.

Although odometer fraud is not a top criminal priority in most states, states have some detection programs in place to identify cases of suspected odometer fraud and law enforcement agencies to investigate such cases. Data are not available to compare current and previous enforcement activities so changes in state enforcement activities cannot be calculated.

Since 1978, NHTSA has maintained at its headquarters location, in Washington, D.C., an Odometer Fraud Enforcement Program. The staff consists of eight employees, four of them field investigators. Each field investigator covers approximately one-quarter of the United States. For the most part, this program has concentrated on the investigation of specific cases of alleged odometer fraud, primarily in small geographical areas suspected of being (or known to be) "hotbeds" for such practice. Cases investigated by NHTSA are usually turned over to the U. S. Department of Justice (DOJ), or to state enforcement authorities for prosecution or further legal action.

NHTSA's prime weapon to deter odometer fraud is its power to investigate cases. NHTSA refers most completed and substantiated odometer fraud cases to the DOJ for prosecution. The DOJ has prosecuted more the half of the NHTSA cases and has convicted 138 defendants in these cases over the last 11 years.

NHTSA's odometer fraud program also helps the states to deter odometer fraud. NHTSA assists with state investigations, trains state titling clerks and investigators, and funds states to initiate or enhance their odometer fraud programs. The budget for these grants has been $150,000 in each of the last two years.

NHTSA is also deterring odometer fraud by notifying victims that they have been defrauded. NHTSA sends letters to victims advising them that they have been defrauded and how to recover their losses, and letting them know that when they sell their vehicle they must disclose to the buyer that the odometer reading is not the true mileage. This ensures that future owners of these vehicles will not be defrauded and helps victims recover their losses mostly from the retailers. This in turn makes the retailers leery of purchasing vehicles from wholesalers who have sold them vehicles with rolled back odometers, so the retailers make more of an effort to ensure that the odometers have not been rolled back in the vehicles they are purchasing from wholesalers.

CHAPTER 1

INTRODUCTION AND BACKGROUND

Odometer fraud is the illegal practice of rolling back odometers to make it appear that vehicles have lower mileage than they actually do. This has historically been considered a significant problem for the American consumer. While any vehicle sold on the used car market could have been the object of odometer tampering, the problem has been considered to be most prevalent among late model vehicles which have accumulated high mileage in a relatively short period of time. Vehicles in fleets, such as lease fleets, rental fleets, or business company fleets typically fall into this category. When sold on the used car market, vehicles whose odometers have been rolled back, or "spun," can obtain artificially high prices, since a vehicle's odometer reading is a key indicator of the condition, and hence the remaining value, of the vehicle.

The Congress specifically requested "a nationwide assessment of odometer fraud. This study, to be conducted by National Highway Traffic Safety Administration's (NHTSA) Office of Programs and Policy, will determine the extent of used car dealer compliance with odometer disclosure requirements and the effectiveness of state enforcement activities." (House Report 103-190 of July 27, 1993). The Government Performance and Results Act of 1993 and Executive Order 12866 (October 1993) also require agencies to review their existing programs and regulations from time to time. This report consists of the three components:

(1) the incidence rate of odometer fraud and economic loss due to its inflation of the purchase price of passenger vehicles,

(2) the states' efforts to combat odometer fraud,

(3) an assessment of the Federal efforts to investigate and deter odometer fraud.

This study attempts to estimate the incidence rate of odometer rollback based on nationally representative data. None of the previous studies on odometer fraud produced a comparable national estimate. Most of the previous studies estimated the rollback rate for leased vehicles. One previous study estimated the rollback rate on auction vehicles but only auction vehicles bought and sold in Pennsylvania. Vehicles auctioned to the highest bidder by large wholesalers are known as auction vehicles. Auction companies sell only a subset of cars. Some cars are never sold, are sold privately, or are sold by the original dealer and never get involved with auction companies. This evaluation provides national data on the incidence rate of odometer fraud, not only to provide an accurate assessment of the magnitude of the problem, but also to provide information on which to base future Federal and state programs aimed at deterring this illegal practice.

Typically, the rollback artist initially purchases the vehicle legitimately on the wholesale market from an auction house. The artist picks out a fleet car, two or three years old, showing mileage higher than "average" for a vehicle of that age. The odometer is rolled back to a mileage that is considered "average" or "low" for a vehicle of that age, increasing its resale value according to the "blue book." The interior is cleaned thoroughly, new brake or gas pedals are installed if necessary, and the vehicle is sold at an inflated price to an unsuspecting dealer or auctioneer.

In order to reduce the incidence of odometer fraud, the Congress enacted a 1972 law (Title IV, Motor Vehicle Information and Cost Savings Act) to prohibit odometer tampering and to provide certain other consumer protections against these deceptive practices. To implement this statute, the NHTSA promulgated a Federal regulation which required a written statement, from the transferor to the transferee, attesting to the vehicle's odometer reading whenever ownership of a vehicle was transferred (49 C.F.R. Part 580, March 1, 1973). Subsequent amendments in 1978 and 1988 strengthened the regulation by requiring: (1) that odometer disclosure be a condition of the transfer of title (of ownership) of a vehicle, and (2) that dealers, distributors, and other marketers of motor vehicles maintain specific records of odometer readings in order that a "paper trail" of the history of the vehicle be available to facilitate the carrying out of investigations in cases where odometer tampering is suspected. The most recent amendment to Regulation 580 was issued in response to the Truth in Mileage Act of 1986 (Public Law 99-579). Prior to the 1990-1991 period when most states began to issue titles in conformance with the 1988 amendment to Part 580, states generally did not require odometer readings to be recorded on the title.

However, this report is not an evaluation of the effectiveness of the Truth in Mileage Act in that it does not estimate how well the regulations reduced odometer rollback or helped catch criminals. Data to estimate rollback rates before the Truth in Mileage Act were not available. The report estimates the current (2001) incidence of odometer fraud.

Federal regulations (49 CFR Part 580, Appendix A) also require the vehicle title form and the odometer disclosure forms to be produced by a secure printing process to help deter or detect counterfeiting and/or unauthorized reproduction. Secure printing processes may involve intaglio printing, high-resolution printing, micro-line printing, holograms, security paper, erasure sensitive printing, etc. All dealers and distributors of motor vehicles are required to retain for five years a copy of each odometer statement they issue and receive. In addition to the odometer reading, other information in the records includes the name and address of the most recent owner, the name and address of the buyer, and the Vehicle Identification Number (VIN), and the date of transfer. Auction companies and fleet lessors are required to maintain similar records for vehicles they handle. The records are to be kept in an order that is appropriate to business and that permits systematic retrieval. The requirements of 49 CFR Part 580 apply to motor vehicles that are less than 10 years old and less than 16,000 pounds Gross Vehicle Weight Rating (GVWR).

Before these laws and regulations took effect, the rollback artist could easily obtain a new title for the car. Even after the laws, they still had ways to obtain new titles, despite the existence of a "paper trail" showing earlier mileage readings: For example, before the sale, the rollback artist could doctor the title to match the mileage on the rolled-back odometer. Many rollback artist use stencils, glue or nail polish remover to change the numbers on the title. The number "eight" is doctored to look like a "three" on the vehicle that had originally 80,000 miles. Then the doctored title is taken to a state's Department of Motor Vehicles for a new title. In some states, the Department of Motor Vehicles issues same-day, over-the-counter titling without checking the mileage against prior out-of-state titling. In some instances, the seller may not have recorded the mileage reading before selling the vehicles, allowing the buyer to record a lower mileage without altering the title.

RESULTS OF EARLIER STUDIES

Most of the previous studies on odometer fraud estimated the odometer rollback rate in one-time lease vehicles. A 1985 study by the Illinois Attorney General's Consumer Protection Division[1] tracked 5,000 randomly chosen vehicles sold in a one year period by a large lease car company. The lease company provided the VIN, year, make, mileage, sale date, and purchaser. The vehicles were tracked in 23 states through the State of Illinois Department of Law Enforcement computer and National Law Enforcement Telecommunications Network (NLETS). NLETS directs computer inquires to each of the target states to locate the vehicle by the VIN. Twenty-three states was "the maximum number of states which could be accessed without unduly loading down the (NLETS) switching system" at the time of the study. The Attorney General then requested the titling information from the respective states including the mileage readings. The mileage provided by the lease company and the subsequent mileage from states were used to identify rolled back odometers. The study found a overall rollback rate of 49.8 percent among one-time lease vehicles for which subsequent mileages were reported.

A more recent study (1992) by the Pennsylvania Office of Attorney General[2] also tracked vehicles sold by two major leasing companies. A systemic random sample of 4,368 cars was selected for further review from 49,229 vehicles sold by the leasing companies during a six month period, but only 3,630 vehicles were studied. These vehicles were tracked in all 50 states in order to determine if their odometers were rolled back prior to resale to a consumer. The study found that 5.07 percent of the leased vehicles resold had their odometers rolled back. The average rollback was 53,123 miles. The estimated direct consumer loss (inflation of the resale

[1]Synder, P., *A Study and Statistical Analysis of Odometer Tampering by Subsequent Purchasers of One-Time Lease Vehicles*, NHTSA Report No. DOT HS 806 859, Washington, DC, 1985.

[2]Kelly, J., *A Study & Statistical Analysis of Odometer Tampering by Purchasers of One-Time Lease Vehicles*, NHTSA Report, Washington, DC, 1992.

price) was $.10 per mile for high mileage full size vehicles. The average consumer damage for each rollback amounted to $6,653 when excess sales tax, excess finance charges, and higher collision insurance costs were included.

In order to obtain results directly comparable to the earlier Illinois study, Pennsylvania also limited their analysis to a single lease company that also participated in the Illinois study, and tracked its vehicles only in the 23 states considered by Illinois. This limited study produced a 3.91 percent rollback rate, substantially lower than the 49.8 percent rate found in the 1985 study. The report credits this apparent reduction to the Truth in Mileage Act of 1986 and increased criminal prosecutions, but recommended the creation of a nationwide odometer data base to further deter odometer tampering.

The only known estimate of the odometer fraud incidence rate from a sample that included non-lease vehicles comes from a 1982 study[3] of vehicles sold at auction in the state of Pennsylvania. According to NHTSA's 1988 Regulatory Evaluation which implemented the Truth in Mileage Act, this study estimated a rollback rate of 20 percent. There was no breakout as to the source of vehicles auctioned. Presumably, they could have included lease vehicles that were returned to the dealer at the end of the lease, vehicles from rental fleets, privately owned vehicles, etc. Although this study includes vehicles other than lease vehicles, it certainly does not contain a nationally representative sample of all vehicles. The study covered vehicles sold at auction in Pennsylvania, more than one time, and consequently was not able to detect cases where rollback may have occurred for vehicles which came from other states.

None of these studies have been designed to obtain nationally representative results. The two NHTSA-sponsored studies by the Attorneys General Offices in Illinois and Pennsylvania do not permit inferences to be made about the actual incidence rate of odometer fraud in the national population of vehicles. The Pennsylvania auction house study could not estimate the rollback rate of vehicles that came from other states.

[3]Kelly, J., *Odometer Tampering Involving Vehicles Sold at Pennsylvania Auctions*, Pennsylvania Office of Attorney General, Bureau of Consumer Protection, 1982.

CHAPTER 2

THE INCIDENCE RATE OF ODOMETER ROLLBACK IN PASSENGER VEHICLES

Odometer rollback may have occurred when the mileage for a given vehicle on a later date is less than the mileage recorded on an earlier date. Other events that could result in a lower odometer reading at a later date include: (1) passing 100,000, when the odometer only goes up to 100,000; (2) a malfunctioning odometer. One way to identify rollback is to compare the odometer reading at different points in time. Federal regulations require the odometer reading or mileage be recorded when vehicle's ownership is transferred. These regulations apply when a vehicle is sold or leased to auto auctions, car dealerships, and individuals.

The odometer reading is most commonly documented on the Vehicle Title itself. The Separate Disclosure Form, Power of Attorney Form, or Disclosure Form for Leased Vehicles are also used to document the odometer reading. The Separate Disclosure Form is used when there is no title or the title has no space to record this information. The Power of Attorney Form is used when the transferor title is held by a lienholder. The Disclosure Form for Leased Vehicles is what its name implies.

There are two other possible sources of odometer reading data, although not required by federal regulations. State vehicle inspection stations may record the odometer reading when a vehicle is inspected. Dealerships and automobile manufacturers may record the odometer reading when the vehicle is serviced under warranty.

The purpose of this analysis is to obtain a best estimate of the incidence rate of odometer fraud in the United States to the extent it can be detected in title transfer and other odometer reading data. This analysis uses a nationally representative sample of 10,000 passenger cars, pickup trucks, vans, and Sport Utility Vehicles (SUVs) and a national vehicle history data base to identify vehicles with rolled back odometers. These data are used only for statistical purposes to estimate rollback rates for the overall vehicle population. No claim is made that these data alone, without a follow-up investigation, are sufficient to prove or disprove fraud in individual vehicle cases. This analysis determines the probability that a passenger vehicle would have its odometer rolled back at any point during the first 11 years of its life. The rate of odometer fraud in this analysis is 3.47 percent (confidence bounds from 2.68 to 4.26 percent).

NATIONAL SAMPLE

Budget constraint and time constraints limited the size of the nationally representative sample of passenger vehicles studied to identify odometer fraud. R. L Polk provided a random sample of 10,000 Vehicle Identification Numbers (VINs) for passenger cars, pickup trucks, vans and SUVs

from a census of these vehicles registered in the United States. The sample contained 1989 through 2001 model year vehicles (11 years old or less in 2000).

CARFAX

In this analysis, a national data base called Carfax was used to identify which of the 10,000 vehicles in the sample experienced a reduction in its odometer reading from one date to the next one, possibly indicating a rolled back odometer. Carfax[1] is a comprehensive vehicle history database. The vehicle histories in Carfax include the date and number of title transactions, title number, type of title, odometer reading, city and state in which the title was issued. The vehicle histories also include if the vehicle was salvaged, junked, and/or damaged by flood. Carfax collects this information from State title records, State registration records, auto auctions, salvage auction, and rental/fleet vehicle companies. Most states regularly supply this information to Carfax, normally weekly or monthly depending on the state. All state agencies are supplying information to Carfax at the time of this analysis. Carfax maintains a complete historical data file back to 1992.

Title transfers supply most of the odometer reading data in Carfax. At the time of the study, 18 states were also providing odometer reading data collected when the vehicle was inspected for emissions. In eight of these states, the odometer reading at emission inspections is rounded to the nearest thousand. In two of these states, the odometer reading is missing most of the time. Carfax does have a few readings when service contracts were issued on vehicles and when these vehicles were serviced. But Carfax does not include the majority of the readings from vehicle maintenance records at dealers' service departments, the only other major untapped source of odometer readings.

The information in Carfax is classified by the VIN. Figure 2-1 shows an example of a simple vehicle history from Carfax.

NHTSA requires that two problems be reported on the title: “Exceeds Mechanical Limit” and “Not Actual Mileage.” When a vehicle is transferred to a new owner, the transferor must certify that the odometer reading reflects the actual mileage, or that it reflects the amount of mileage in excess of the designed mechanical odometer limit, or that the odometer reading does not reflect the actual mileage. “Exceeds Mechanical Limits” occurs in earlier model year vehicles when the odometer was only five digits and not able to record mileage over 100,000 miles. “Exceeds Mechanical Limits” and “Not Actual Mileage” information was valuable to us. It helps us to decide if a mileage decrease was odometer rollback.

Carfax flags a vehicle with “Potential Odometer Rollback” if on two sequential odometer readings less than a year apart, the later reading is at least 3,000 miles lower than the earlier

[1]Carfax is owned by R. L. Polk, Inc. and is located in Fairfax, VA.

reading. Anything less than that Carfax determine to be within a tolerable period of time where records coming from more than one data source might be affected by some type of time lag. Carfax also flags vehicles with "Potential Odometer Rollback" if on two sequential odometer readings more than a year apart, the later reading is at least 1 mile lower than the earlier reading. On records more than a year apart, it is entirely possible for the vehicle's mileage to have gone up significantly and rolled back to a mileage 1 mile lower than the earlier reading.

FIGURE 2-1: SIMPLE TITLE HISTORY WITHOUT ODOMETER ROLLBACK

```
SECTION 1          VEHICLE SPECIFICATIONS
--------------------------------------------------------------------------------
Vehicle ID:        1G1JC1441R7XXXXXX
Yr/Mfg:            1994 Chevrolet
Model:             Cavalier
Body:              2D Cpe. Compact car
Engine:            2.2L L4 MPI OHV 8V
Fuel:              Gasoline
Driveline:         Front-wheel Drive
Aspiration:        Normal
Country Mfg.       United States

Exceeds Mechanical Limits Title---------->  Checked. No Problem Title Found.
Not Actual Mileage Title----------------->  Checked. No Problem Title Found.

SECTION 3          ODOMETER ROLLBACK CHECK
--------------------------------------------------------------------------------
RESULT: No odometer rollback detected in the Carfax database.

DATE          ODOMETER  INFORMATION              GENERAL
REPORTED       READING  SOURCE                   COMMENTS

08/15/1994          11  Missouri                 Title issued
                        Motor Vehicle Dept.      First lien reported
                        XXXXXXXXXX, MO
                        Title #XXXXXXXX

06/19/2000      78,154  Missouri                 Title issued
                        Motor Vehicle Dept.
                        XXXXXX, MO
                        Title #XXXXXXXX
```

The history shown in Figure 2-1 is for a 1994 Chevrolet Cavalier. This vehicle was originally bought and titled in Missouri on August 15, 1994 with 11 miles. A new title was issued on June 19, 2000 when the vehicle had 78,154 miles. There is no evidence of odometer rollback here. In addition, neither of these readings "exceeded mechanical limits" or were "not actual mileage."

Figure 2-2 shows another example of a more complex vehicle history from Carfax. This example has three interstate transfers and two emissions inspections. The state title transactions

provide more information than the emission inspections, but both provide the information this analysis requires: odometer reading and date. Since mileage increased with each transaction, there is no evidence of odometer rollback.

Figure 2-3 is an example of a vehicle with likely odometer rollback. In May 1996, this one-year old rental car had 42,085 miles. The odometer reading was 12,086 miles a month later when this car was titled or registered in New Mexico. This is a mileage decrease of almost 30,000 miles. Indeed, Figure 2-3 is what we would expect to see in a "classic" case of odometer rollback: a 1-year old rental car transformed from high mileage (42,085) to low mileage (12,086). These data are not absolute proof that odometer fraud occurred (e.g., it is theoretically possible that a mileage was incorrectly recorded, or that the odometer malfunctioned). But based on the information contained in the vehicle history, the mileage discrepancy, vehicle age, and mileage, the most probable explanation is that the odometer was rolled back.

FIGURE 2-2: MULTIPLE RESALES WITHOUT ODOMETER ROLLBACK

SECTION 1 VEHICLE SPECIFICATIONS

Vehicle ID:	JH4DA9352LSXXXXXX
Yr/Mfg:	1990 Acura
Model:	Integra LS
Body:	2D H/B Compact car
Engine:	1.8L L4 PFI DOHC
Fuel:	Gasoline
Driveline:	Front-wheel Drive
Aspiration:	Normal
Country Mfg.	Japan

DATE REPORTED	ODOMETER READING	INFORMATION SOURCE	GENERAL COMMENTS
01/14/1992	24,520	Washington Motor Vehicle Dept. Title #XXXXXXXXXX	Title or registration issued First lien reported
05/25/1993	24,943	Washington Motor Vehicle Dept. XXXXXX, WA Title #XXXXXXXXXXXXXXX	Title or registration issued
03/24/1994	43,017	Nebraska Motor Vehicle Dept. XXXXX, NE Title #XXXXXXXXXXX	Title issued
11/03/1994	55,727	Colorado Motor Vehicle Dept. XXXXXXXXX, CO Title #XXXXXXXXX	Title or registration issued
12/06/1994		Washington Motor Vehicle Dept. XXXXXXXXX, CO Title #XXXXXXXXXXXXXXX	Title or registration issued Duplicate title issued
11/06/1996	82,661	Colorado Inspection Station	Passed emissions inspection
12/02/2000	128,673	Colorado Inspection Station	Passed emissions inspection

FIGURE 2-3: LIKELY ODOMETER ROLLBACK

SECTION 1 VEHICLE SPECIFICATIONS

Vehicle ID:	2G4WB52M8S1XXXXXX
Yr/Mfg:	1995 Buick
Model:	Regal Custom
Body:	4D Sedan Mid-size car
Engine:	3.1L V6 SFI OHV 12V
Fuel:	Gasoline
Driveline:	Front-wheel Drive
Aspiration:	Normal
Country Mfg.	Canada

DATE REPORTED	ODOMETER READING	INFORMATION SOURCE	GENERAL COMMENTS
02/01/1995		Texas Motor Vehicle Dept. XXXX XXXXXXXXX, FL	Registered as rental vehicle (major car rental company)
03/30/1995	5	Texas Motor Vehicle Dept. XXXX XXXXXXXXX, FL Title #XXXXXXXXXXXXXXXXX	Title or registration issued First lien reported
05/22/1996	42,085	Auto Auction Mountain Region	Vehicle Sold
06/15/1996	12,086	New Mexico Motor Vehicle Dept. XXXXXXXXXX, NM Title #XXXXXXXXXXXXXX	Title or registration issued POTENTIAL ODOMETER ROLLBACK

RESULTS

Out of the random sample of 10,000 VINs, Carfax provided vehicle histories for 9,836 VINs. Only 164 vehicles in the Polk sample were not found in Carfax Therefore, Carfax is missing only 1.6 percent of the registered passenger cars, pickup trucks, vans, and SUVs. Carfax flagged 165 of the 9,836 vehicles as having a "potential odometer rollback" defined as a lower reading on a subsequent date, without any statement that the lower reading was due to "exceeding mechanical limits" or a malfunction. But a further case-by-case examination suggests that many of these cases are unlikely to have involved odometer rollback. Clerical errors, unrealistic odometer readings, or odometer readings possibly over 100,000 miles and not indicated as such may account for the discrepancy in the odometer readings.

A four-person NHTSA panel reviewed all the 165 flagged cases to identify which cases most likely involved odometer fraud. The panel classified the "potential odometer rollback" cases as likely odometer fraud, possible odometer fraud, or no odometer fraud. The cases the panel classified as "likely" or "possible" odometer fraud are the panel's best guess based on their interpretation of the information in Carfax. The panel has no proof that any of these were actually odometer fraud. They have not seen these vehicles or investigated them individually.

The panel classified many of the cases as no odometer fraud. As shown in Table 2-1, the panel believes that 97 of 165 cases most likely did not involve odometer fraud.

TABLE 2-1
Classification of Potential Odometer Fraud Cases

Likely Odometer Fraud	37
Possible Odometer Fraud	31
No Odometer Fraud	97
Total	165

Below is a summary of reasons why the panel classified a case as not involving odometer fraud. Cases are presented to illustrate each reason.

- The mileage appears to be over 100,000 miles. In some of the cases, not all the entries after the vehicle goes over 100,000 miles are listed as such. Auction houses are not required to report if the mileage exceeds mechanical limits so auction houses report the actual mileage on the odometer. Auto auction transactions do not report "Exceeds Mechanical Limits."

FIGURE 2-4: MILEAGE UNDOUBTEDLY OVER 100,000

SECTION 1 VEHICLE SPECIFICATIONS

Vehicle ID:	1FACP36X5KXXXXXX
Yr/Mfg:	1989 Ford
Model:	Tempo GL
Body:	4D Sedan Compact car
Engine:	2.3L L4 TBI HSC OHV
Fuel:	Gasoline
Driveline:	Front-wheel Drive
Aspiration:	High Swirl Combustion
Country Mfg.	United States

DATE REPORTED	ODOMETER READING	INFORMATION SOURCE	GENERAL COMMENTS
04/12/1989	10	North Carolina Motor Vehicle Dept. XXXXXXXXXXX, IL Title #XXXXXXXXXX	Title or registration issued
04/17/1995	50,055	Virginia Motor Vehicle Dept. XXXXXXXXXXX, VA Title #XXXXXXXX	Title or registration issued
07/23/1997	20,132	Auto Auction Eastern Region	Vehicle Sold POTENTIAL ODOMETER ROLLBACK
08/22/1997	20,138	Virginia Motor Vehicle Dept. XXXXXXXX, VA Title #XXXXXXXX	EXCEEDS MECHANICAL LIMITS TITLE ISSUED

In Figure 2-4, the mileage on July 23, 1997 was undoubtedly 120,132, not 20,132 (but the auto auction house did not report it as such). A month later when this car was titled or registered in Virginia the odometer reading is classified as "Exceeds Mechanical Limit" so the mileage was probably 120,138. It is most unlikely that the car was rolled back 29,923 miles and then driven 100,006 miles in the next month.

- The odometer readings from emission inspections are not federally required. It is strictly up to the state. Some states do a better job of capturing this data than other states. Even in states that do a good job, it appears that in some cases the actual mileage on the

odometer is recorded even if the odometer reading exceeds the mechanical limit of the odometer.

FIGURE 2-5: EMISSIONS INSPECTION MILEAGE UNDOUBTEDLY OVER 100,000

SECTION 1	VEHICLE SPECIFICATIONS		
Vehicle ID:	1FACP5742LAXXXXXX		
Yr/Mfg:	1990 Ford		
Model:	Taurus GL Wagon		
Body:	4D Sedan Mid-size S.W.		
Engine:	3.8L V6 TBI OHV		
Fuel:	Gasoline		
Driveline:	Front-wheel Drive		
Aspiration:	Normal		
Country Mfg.	United States		
10/18/1990	12,787	California Inspection Station XXXXXXXXX, CA	Passed emissions inspection
09/23/1993	52,527	California Inspection Station XXXXXXXXX, CA	Passed emissions inspection
03/10/1995	72,418	Auto Auction Pacific SW Region	Vehicle Sold
04/11/1995	72,526	California Inspection Station XXX XXXXX, CA	Passed emissions inspection
04/12/1995	72,563	California Motor Vehicle Dept.	
02/01/1997	92,114	California Inspection Station XXX XXXXX, CA	Passed emissions inspection
02/03/1999	18,137	California Inspection Station XXX XXXXX, CA	Passed emissions inspection POTENTIAL ODOMETER ROLLBACK

In Figure 2-5, the mileage on February 3, 1999 was probably 118,137 although the odometer had 18,137. This car did not change owners; the owner just had the scheduled emissions inspection.

- The odometer readings appear to contain clerical errors such as missing a digit, adding an extra digit, transposing digits, or replacing a digit.

FIGURE 2-6: LIKELY CLERICAL ERROR

```
SECTION 1          VEHICLE SPECIFICATIONS
-------------------------------------------------------------------------
Vehicle ID:        1B7GL26X6KSXXXXXX
Yr/Mfg:            1989 Dodge
Model:             Dakota
Body:              Pickup 2WD Large P/U
Engine:            3.9L V6 TBI OHV
Fuel:              Gasoline
Driveline:         Rear-wheel drive
Aspiration:        Normal
Country Mfg.       United States

02/16/1991      58,501  California              Passed emissions inspection
                        Inspection Station
                        XXXXXX, CA

03/11/1993     126,046  California              Passed emissions inspection
                        Inspection Station
                        XXXXXX, CA

01/28/1995     193,266  California              Passed emissions inspection
                        Inspection Station
                        XXXXXX, CA

04/01/1997     262,625  California              Passed emissions inspection
                        Inspection Station
                        XXXXXX, CA

07/31/1997     262,782  Auto Auction            Vehicle Sold
                        Pacific SW Region

02/23/1999     284,334  California              Failed emissions inspection
                        Inspection Station
                        XXXXXX, CA

03/10/1999      28,560  California              Passed emissions inspection
                        Inspection Station      POTENTIAL ODOMETER
                        XXXXXX, CA              ROLLBACK
```

In Figure 2-6, it appears the 28,560 miles on March 10, 1999 is missing a digit. The truck failed the emissions inspection on February 23 and passed it two weeks later. It probable accumulated

more mileage during that time frame, so that it had 284,560 or 285,560 miles on March 10, 1999. The truck did not change owners so it is highly improbable the odometer was rolled back 255,774 miles.

- ODOMETER READINGS THAT HAVE "NOT ACTUAL MILEAGE" RECORDED IN SOME TRANSACTIONS BUT OMITTED ON OTHERS.

FIGURE 2-7: REPORTED MILEAGE IS NOT ACTUAL MILEAGE

```
SECTION 1          VEHICLE SPECIFICATIONS
-------------------------------------------------------------------------
Vehicle ID:        JT2EL46B4N0XXXXXX
Yr/Mfg:            1992 Toyota
Model:             Tercel
Body:              2D Sedan Subcompact car
Engine:            1.5L L4 EFI
Fuel:              Gasoline
Driveline:         Front-wheel Drive
Aspiration:        Normal
Country Mfg.       Japan

01/23/1992          22  Louisiana               Title or registration
                        Motor Vehicle Dept.     issued
                        XXXXXXXXX, LA           First lien reported

10/26/1993      21,257  Louisiana               Title or registration
                        Motor Vehicle Dept.     issued
                        XXXXX, LA
                        Title #XXXXXXXX

07/17/1996       1,756  Louisiana               NOT ACTUAL MILEAGE TITLE
                        Motor Vehicle Dept.     ISSUED
                        XXXXX, LA

07/17/1996       1,756  Louisiana               Title or registration
                        Motor Vehicle Dept.     issued
                        XXXXX, LA               POTENTIAL ODOMETER
                        Title #XXXXXXXX         ROLLBACK

07/17/1996       1,756  Louisiana               NOT ACTUAL MILEAGE TITLE
                        Motor Vehicle Dept.     ISSUED
                        XXXXX, LA
                        Title #XXXXXXXX

08/13/1999      56,688  Louisiana               NOT ACTUAL MILEAGE TITLE
                        Motor Vehicle Dept.     ISSUED
                        XXXXX, LA
```

In Figure 2-7, since two of the three transactions on July 17, 1996 declare that 1,756 is not the true mileage, this discrepancy with the previous reading (21,257) is not an attempt to defraud. Carfax flagged this case because one of the three transactions at 1,756 miles did not include the "Not Actual Mileage" disclaimer.

The NHTSA panel found that 97 of the 165 flagged cases resembled the examples in Figures 2-4 - 2-7 and were quite unlikely to have involved odometer rollback. The remaining 68 cases have odometer discrepancies that could well indicate rollback, and have no evidence that would disqualify them as rollbacks. These are further classified as "likely" odometer fraud (37 cases) and "possible" odometer fraud (31 cases) based on the age and mileage of the car. "Likely" cases resemble the "classic" example in Figure 2-3, where a high-mileage used car (42,000 miles in 1 year) is transformed into a car with below-average miles (12,000). The amount of rollback is enough to increase the resale value of the car substantially, but not so great as to strain the credulity of buyers. "Possible" cases are those where the reported odometer discrepancy is more unusual, and where the panel considered but eventually rejected the possibility they were looking at data in error rather than a rollback.

Figure 2-8 is an example of a case the panel classified as possible odometer fraud. This 1995 Dodge Intrepid had 56,000 miles on December 19, 1998 and a year later it had 26,111 miles. In this case, a 4-year-old car with mileage slightly lower than average is transformed into very low mileage. The average mileage for a 4-year-old car is between 60,001 and 65,000 miles according to the N.A.D.A. Official Used Car Guide. The panel decided in this case it was possible that someone rolled back the odometer to an unbelievably low mileage and found a gullible buyer. In Figure 2-3, a case the panel classified as likely odometer fraud, the car went from high mileage to a reasonable low mileage for a 1 year old car, slightly less than NADA's average mileage.

From here throughout the rest of this report, the likely odometer fraud and possible fraud cases will be considered together as odometer fraud. The possible fraud cases are included so as not to underestimate the rate of odometer fraud. But if some of the possible cases are not odometer fraud then our estimate will be inflated.

FIGURE 2-8: POSSIBLE ODOMETER ROLLBACK

SECTION 1 VEHICLE SPECIFICATIONS

Vehicle ID:	1B3HD46T4SFXXXXXX
Yr/Mfg:	1995 Dodge
Model:	Intrepid
Body:	4D Sedan Large car
Engine:	3.3L V6 SMPI OHV 12V
Fuel:	Gasoline
Driveline:	Front-wheel Drive
Aspiration:	Normal
Country Mfg.	United States

DATE REPORTED	ODOMETER READING	INFORMATION SOURCE	GENERAL COMMENTS
12/09/1994	6	Ohio Motor Vehicle Dept. XXXXXXXXXX, OH Title #XXXXXXXXXX	Title issued
03/25/1997		Auto Auction Central Region	Vehicle Sold
03/27/1997	25,961	Ohio Motor Vehicle Dept. XXXXX, OH Title #XXXXXXXXXX	Title issued
04/14/1997		Ohio Motor Vehicle Dept. XXXXX, OH Title #XXXXXXXXXX	Title issued First lien reported
05/02/1997	28,000	Ohio Inspection Station	Passed emissions inspection
12/19/1998	56,000	Ohio Inspection Station	Passed emissions inspection
12/08/1999	26,111	Ohio Motor Vehicle Dept. XXXXX, OH Title #XXXXXXXXXX	Title issued First lien reported POTENTIAL ODOMETER ROLLBACK

LIKELIHOOD OF ROLLBACK DURING THE FIRST 11 YEARS OF A VEHICLE'S LIFE

The Carfax data indicate 68 cases of likely or possible odometer rollback in a sample of 10,000 vehicles. At first glance, it is a rate of 0.68 percent per vehicle. But that grossly understates the probability of an odometer rollback over the life of a vehicle. Many of the vehicles in the sample are so young that they have not yet experienced the prime years of odometer rollback (vehicles less than two years old rarely have their odometer rolled back.) Others are so old that Carfax was not fully operational during their early years, and their rollbacks are unreported in Carfax. The estimation procedure described here will adjust for both of those factors and obtain the rate that would be seen if vehicles were tracked by Carfax over their lifetimes. This report's objective is to estimate the probability of an odometer rollback **during the first 11 years of a vehicle's life**. Whereas odometers could also be rolled back even in vehicles that are more than twelve years old, those rollbacks can be safely disregarded in our study because they have little impact on consumers' pocketbooks: the vehicles have greatly depreciated; their net value is low, and so is any proportional increase or decrease for low or high mileage. Moreover, the value of old vehicles is influenced more by their appearance or condition than by their mileage, so the cost effect of high or low mileage is low even in relative terms.

Table 2-2 shows the 68 cases of odometer fraud by vehicle model year and calendar year. Carfax was not complete before 1992. The shaded section of Table 2-2 shows not one case of odometer fraud in our sample during calendar years 1989-1991. The rate of fraud is underestimated for model year 1989-1991 vehicles during the first years of their lives because these data are not in Carfax.

At this point, a much simpler way to proceed would be to use only the 13 fraud cases in the "2000" column of Table 2-2 and just discard the other cases. During calendar year 2000, there were 13 cases of fraud in a nationally representative sample of 10,000 vehicles up to 11 years old. In other words, the fraud rate is 13/10,000 = .13 percent per vehicle year. This straightforward computation would have been the method of choice if, say, 100,000 or more VINs had been run through Carfax. With our limited data, we are obligated to develop a procedure that makes use of all 68 fraud cases, even if it is more cumbersome. This procedure will now be described.

TABLE 2-2
Odometer Fraud by Vehicle Model Year and Calendar Year of the Fraud

Model Year	Calendar Year of Rollback												
	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	Total
2001	0												
2000	0	0											
1999	0	1	0										1
1998	0	0	0	0									0
1997	0	1	0	0	0								1
1996	0	0	1	0	0	0							1
1995	2	3	2	0	2	1	0						10
1994	1	0	4	1	1	0	0	0					7
1993	4	0	1	1	0	2	0	0	0				8
1992	3	1	0	4	1	1	0	0	0	0			10
1991	0	2	3	2	0	0	1	0	0	0	0		8
1990	3	2	1	0	0	0	2	0	0	0	0	0	8
1989	0	3	5	2	1	1	0	2	0	0	0	0	14
Total	13	13	17	10	5	5	3	2	0	0	0	0	68

Although Carfax is a comprehensive vehicle history database, Carfax does not necessarily identify all forms of odometer rollback. An odometer may be rolled back and not identified as such in Carfax as long as subsequent mileage is not lower than the previously mileage. This could happen in several ways.

For example, an individual who owns a vehicle for several years and accumulates more miles than normal may personally roll back the odometer to a reasonable level before selling it. The rolled back odometer is recorded on the title and there is no record of the higher mileage. A second way this might happen is the owner of a car with high mileage may not record the mileage on the title when he or she sells the car. The buyer rolls back the odometer and fills in the lower mileage on the title. The buyer then sells the car again to make a profit. The higher mileage is never recorded on the title and there is no record of it in Carfax. A third way is that the seller fills in the correct mileage but the buyer alters the title to show a different mileage. A fourth way is roll back the odometer to a level above the mileage in the vehicle's previous title history (if the mileage is known). We will estimate the incidence rate of such practices and inflate the 68 fraud cases found in Carfax by using vehicles that had their odometers rolled back.

NHTSA's Odometer Fraud Office provided a file that contained vehicles that had their odometers' rolled back. These vehicles were investigated by the Odometer Fraud Staff (OFS) and were proven to have had their odometers' rolled back. The file contained 8,176 passenger cars, pickup trucks, vans, and Sport Utility Vehicles (SUVs). Besides the Vehicle Identification

Number (VIN) which can uniquely identify the vehicle, the file contained the odometer reading, the date, and the price that was paid for the vehicle before the odometer was rolled back; and the odometer reading, the date, and the price that was paid for the vehicle after the odometer was rolled back.

Only a sample of these known rollback cases were sent to Carfax. The sample included all vehicles with a good VIN and model year 1993 or newer; all vehicles with a good VIN, model year 1989-1992, and the price before and the price after the odometer was rolled back; and a random sample of vehicles with good VIN and model year 1989-1992 without price data. All vehicles with good VIN and model year 1993 and newer were kept because Carfax is complete back to 1992 and it should have the full history for these vehicles. Carfax may not have full vehicle histories for model year 1989-1992 vehicles. But all older vehicles (model year 1989-1992) with good VINs and price information were kept because the price data will be used later to estimate the cost of odometer fraud. Of the remaining older vehicles the sample was drawn to equal number of vehicles by model year. There were 6,846 cases in the known rollback sample.

NHTSA submitted the VINs for these cases along with the VINs from the Polk random sample to Carfax[1]. Ninety-eight percent of the known rollback vehicles (6,692/6,846) were found in Carfax. Carfax did not have records for only 154 of them. Table 2-3 shows the known rollback vehicles by model year and calendar year of rollback. This table includes vehicles not found in Carfax. The calendar year of the rollback in Table 2-3 is based on the data in the OFS file. The calendar year of rollback is the year in the date after the odometer was rolled back when the date is known (82.5 percent of the cases). When the date after the rollback is unknown, the calendar year is based on the date before the rollback. This is a good estimate for the calendar year of the rollback because the time difference between the dates is within 3 months in 96 percent of the cases when the date before and the date after the odometer was rolled back are both known. In the remaining cases, none of the dates are more than 11 months apart.

NHTSA's Odometer Fraud Staff (OFS) gave us the known rollback file in January 2001. It did not have any rollbacks occurring in 2001 and very few occurring in 2000 because investigations take a long time to complete. The OFS investigate mainly fleet vehicles because they are likely candidates for odometer fraud. They usually accumulate high mileage in the first four or five years and are sold before the vehicle requires extensive maintenance. Therefore, some cells in the table have a small number of known rollbacks. The highlighted cells in the table have cell totals less than 30.

[1]Only 6,384 known rollback VINs were submitted to Carfax with the 10,000 random Polk VINs. These were run through Carfax on March 13, 2001. The 462 remaining known rollback VINs were submitted to Carfax later and were run on April 19, 2001 because they were inadvertently left out of the first batch.

TABLE 2-3
Known Rollback Vehicles
by Model Year and Calendar Year of Rollback

Model Year	Calendar Year of Rollback												
	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	Total
1998	13	46	1	0									60
1997	20	277	108	0	0								405
1996	3	136	460	11	1	0							611
1995	1	57	431	113	37	1	0						640
1994	0	18	182	65	210	61	0	0					536
1993	0	1	93	58	146	285	80	3	1				667
1992	0	4	49	39	63	223	389	165	7	0			939
1991	0	2	10	48	54	147	274	392	64	1	0		992
1990	0	0	11	43	65	79	170	351	166	62	13	0	960
1989	0	0	3	15	44	52	85	236	199	279	121	2	1,036
Total	37	541	1348	392	620	848	998	1147	437	342	134	2	6,846

Of the 6,692 vehicles found in Carfax, 2,780 were flagged in Carfax as having a potential odometer rollback. Table 2-4 shows the known rollback vehicles by model year and calendar year of the rollback that were found in Carfax and flagged as potential odometer rollback in Carfax.

TABLE 2-4
Known Rollback Vehicles Flagged as Rollbacks in Carfax
by Model Year and Calendar Year of Rollback

Model Year	Calendar Year of Rollback												
	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1989	Total
1998	2	18	1	0									21
1997	5	99	34	0	0								138
1996	1	34	116	2	0	0							153
1995	0	16	92	21	17	0	0						146
1994	0	11	34	28	127	33	0	0					233
1993	0	0	27	18	94	145	37	1	1				323
1992	0	1	20	12	26	125	164	55	0	0			403
1991	0	1	10	23	30	77	143	188	17	0	0		489
1990	0	0	5	19	35	34	97	194	52	11	0	0	447
1989	0	0	0	10	26	30	48	138	81	68	26	0	427
Total	8	180	339	133	355	444	489	576	151	79	26	0	2,780

We compared the first 100 cases of the known rollback file that Carfax flagged as potential odometer rollback to see if the Carfax identified rollback was the same rollback found by NHTSA's OFS. Twenty cases had an exact match. The date and mileage in Carfax before the odometer was rolled back and the date and mileage in Carfax after the odometer was rolled back exactly match the dates and mileages found by the Odometer Fraud Staff. In seventy-two cases, the rollbacks identified in Carfax appear to be the same as the rollbacks identified by OFS, but not all dates and mileages matched exactly. For example, the OFS found a vehicle to have 92,726 miles on August 14, 1991 and 30,428 miles on September 9, 1991. For the same vehicle, Carfax had 92,726 miles on August 14, 1991, 29,840 miles on August 16, 1991 (this transaction is flagged as potential odometer rollback), and 30,428 on September 4, 1991. In this example, the date and mileage after the rollback did not match because Carfax had a subsequent date and mileage after the rollback but prior to the one found by the OFS.

In some of these cases, the Carfax dates and mileages are not as close to the OFS ones, but they appear to be identifying the same odometer rollback. For example, the OFS found 76,330 miles on May 18, 1992 and 46,431 miles on May 26, 1992. Carfax had 64,800 miles on November 21, 1990 and 46,854 miles on September 3, 1992. Based on the four dates, the mileage sequence appears logical with the rollback occurring sometime between May 18 and May 26.

There were 8 cases where the rollback flagged in Carfax was different than the rollback found by the OFS. The two dates flagged in Carfax were after the dates found by the OFS. Carfax appears to identify a second rollback in these cases. In 4 of the 8 cases, the vehicle history in Carfax also has a record of the rollback found by the OFS, but only the most recent odometer rollback is flagged in Carfax. In the other 4 cases, the vehicle history has no record of the rollback found by the OFS.

Table 2-5 shows the percent of missing rollbacks in Carfax by model year and calendar year of rollback based on the data in Table 2-3 and 2-4. The values in this table are essentially inflation factors that can be used to inflate the 68 fraud cases in Carfax. But the percent missing in some of the essential cells (cells where the 68 fraud cases are located) could not be computed because of division by zero (designated by ?).

The next step is to find a model that best fits our data and use that model to estimate the percent missing in the "?". The percent missing tends to decrease as the vehicle ages. (The percent missing decreases as you look down a column.) Or in other words, the percent of rollback found in Carfax is increasing as the vehicles get older. Consider the data in calendar year 1993 column, one and two year old vehicles have 67 percent missing, three year olds have 52 percent, four year olds 45 percent, and five year old vehicles have only 41 percent missing.

One would expect the percentage of missing rollbacks for two-year-old vehicles to be constant or decreasing by calendar year (i.e. the percent missing along the diagonal.) But there doesn't appear to be any pattern across calendar year. If anything the newer calendar years have higher percentage of missing rollbacks than older calendar years. The decline of known rollbacks

found in Carfax in recent years may be attributed to shift in the type of rollbacks such as: alteration of the mileage written on the title, or a more cautious rollback to a level above the mileage recorded in the previous title. Thus, Carfax will not identify this vehicle as a potential odometer rollback even after it is sold.

TABLE 2-5
Percent of Missing Rollbacks in Carfax by Model Year and Calendar Year of Rollback

Model Year	Calendar Year of Rollback								
	2000	1999	1998	1997	1996	1995	1994	1993	1992
1998	84.6%	60.9%	0.0%	?					
1997	75.0%	64.3%	68.5%	?	?				
1996	66.7%	75.0%	74.8%	81.8%	100.0%	?			
1995	100.0%	71.9%	78.7%	81.4%	54.1%	100.0%	?		
1994	?	38.9%	81.3%	56.9%	39.5%	45.9%	?	?	
1993	?	100.0%	71.0%	69.0%	35.6%	49.1%	53.8%	66.7%	0.0%
1992	?	75.0%	59.2%	69.2%	58.7%	43.9%	57.8%	66.7%	100.0%
1991	?	50.0%	0.0%	52.1%	44.4%	47.6%	47.8%	52.0%	73.4%
1990	?	?	54.5%	55.8%	46.2%	57.0%	42.9%	44.7%	68.7%
1989	?	?	100.0%	33.3%	40.9%	42.3%	43.5%	41.5%	59.3%

We estimated the percent missing using the logistic regression model in the SAS procedure PROC LOGISTIC[2]. The independent variables are vehicle age and calendar year at the time of the rollback. Vehicle age at the time of rollback is a linear variable because the percent missing tends to decrease as the vehicle ages. The calendar year of the rollback is a non-linear (categorical) variable because there did not appear to be a linear pattern across calendar year. The estimated values are in Table 2-6.

Table 2-7 shows the inflated rollback cases by model year and calendar year of rollback. The inflation factor is 1/ (1 – the percent missing). For example, the inflation factor for model year 1999 vehicles rolled back in 1999 is 1/(1-.800) = 5.00. There was 1 model year 1999 vehicle rollback in 1999 in Carfax. So there were 1 * 5.00 = 5.00 model year 1999 vehicles rolled back in 1999. Therefore, the 68 fraud cases found in Carfax based on the Polk sample inflate to 170.53 cases.

[2] *SAS/STAT User's Guide: Volume 2, GLM-VARCOMP*, Version 6, Fourth Edition, SAS Institute Inc., Cary, NC 1990.

TABLE 2-6
Estimated Percent of Missing Rollbacks in Carfax by
Model Year and Calendar Year of Rollback

Model Year	Calendar Year of Rollback								
	2000	1999	1998	1997	1996	1995	1994	1993	1992
2001	82.2%								
2000	80.0%	82.2%							
1999	77.6%	80.0%	82.2%						
1998	75.1%	77.6%	80.0%	80.0%					
1997	72.3%	75.1%	77.6%	77.7%	58.2%				
1996	69.4%	72.3%	75.1%	75.1%	54.7%	63.1%			
1995	66.3%	69.4%	72.3%	72.4%	51.1%	59.7%	63.1%		
1994	63.0%	66.3%	69.4%	69.4%	47.6%	56.2%	59.7%	70.2%	
1993	59.7%	63.0%	66.3%	66.3%	44.1%	52.7%	56.2%	67.2%	70.2%
1992	56.2%	59.7%	63.0%	63.1%	40.6%	49.1%	52.7%	63.9%	67.2%
1991	52.7%	56.2%	59.7%	59.7%	37.2%	45.6%	49.1%	60.6%	63.9%
1990	49.1%	52.7%	56.2%	56.3%	33.9%	42.1%	45.6%	57.2%	60.6%
1989	45.6%	49.1%	52.7%	52.7%	30.8%	38.7%	42.1%	53.7%	57.2%

TABLE 2-7 Inflated Rollbacks by Model Year and Calendar Year of Rollback										
Model Year	Calendar Year of Rollback									
	2000	1999	1998	1997	1996	1995	1994	1993	1992	Total
2001	0.00									0.00
2000	0.00	0.00								0.00
1999	0.00	5.00	0.00							5.00
1998	0.00	0.00	0.00	0.00						0.00
1997	0.00	4.01	0.00	0.00	0.00					4.01
1996	0.00	0.00	4.01	0.00	0.00	0.00				4.01
1995	5.93	9.80	7.23	0.00	4.09	2.48	0.00			29.53
1994	2.71	0.00	13.07	3.27	1.91	0.00	0.00	0.00		20.95
1993	9.92	0.00	2.97	2.97	0.00	4.23	0.00	0.00	0.00	20.08
1992	6.85	2.48	0.00	10.84	1.68	1.97	0.00	0.00	0.00	23.82
1991	0.00	4.57	7.44	4.96	0.00	0.00	1.97	0.00	0.00	18.94
1990	5.90	4.23	2.28	0.00	0.00	0.00	3.68	0.00	0.00	16.08
1989	0.00	5.90	10.57	4.23	1.45	1.63	0.00	4.32	0.00	28.09
Total	31.31	35.99	47.57	26.27	9.13	10.31	5.64	4.32	0.00	170.53

Next, we need a table of denominators corresponding to the fraud incidence counts in Table 2-7: the vehicle years of exposure of the 10,000 vehicles in the sample, by model year and calendar year.

Table 2-8 shows the distribution of vehicles in the sample by model year. Of these vehicles, we need to estimate how many were registered in the preceding years (1992-1999). In general, one year old and older vehicles registered in the current year are also registered in the previous year. Minus one year old vehicles registered in the current year are not registered in the previous year because they are introduced in the fall of current year. But that is not true for zero year old vehicles. For example, one would expect a 1998 model year vehicle registered in 2000 would also be registered in 1999. A 2001 model year vehicle registered in 2000 can not be registered in 1999, because it was not for sale until fall of 2000. Only some model year 2000 vehicles registered in 2000 are also registered in 1999, because 2000 model year vehicles are not available for sale until fall of 1999. Thus, the same number of model year 1989-1999 vehicles registered in 2000 are also registered in 1999 and none of model year 2001 vehicles are registered in 2000.

TABLE 2-8 Vehicles in the Sample by Model Year		
Model Year	Number	Percent
2001	183	1.83%
2000	770	7.70%
1999	827	8.27%
1998	785	7.85%
1997	726	7.26%
1996	727	7.27%
1995	811	8.11%
1994	946	9.46%
1993	897	8.97%
1992	769	7.69%
1991	809	8.09%
1990	839	8.39%
1989	911	9.11%
Total	10,000	100.00%

The next step is to estimate the percentage of the zero year old vehicles registered in the current year that are also registered in the previous year. From Table 2-8, there are 770 model year 2000 registered in 2000 (zero year old vehicles) and 183 model year 2001 vehicles registered in 2000. So there are 183 / 770 = 23.8 percent model year 2000 vehicles registered in 2000.

Table 2-9 shows the registered vehicle years in the sample by model year and calendar year. The data in Column 2 are copied directly from Table 2-8. The data in Column 3 are estimated from Column 2, the data in Column 4 are estimated from Column 3, and so on through Column 10. For example, the Column 3 data for model years 1989-1999 is copied directly from Column 2 (1 year old vehicles and older in Column 3). The 1999 data for model year 2000 (-1 year old vehicles) are estimated from the model year 1999 in 1999 data using the factor developed above. There are 827 * 23.8% = 197 model year 2000 vehicles registered in 1999. Next, the Column 4 model year 1998-1989 values are copied from Column 3 and model year 1999 are estimated from model year 1998. This process is repeated through Column 10. Exposure data for calendars years 1991 and earlier are omitted since Carfax has no fraud data for those years.

TABLE 2-9
Vehicle Years in the Sample by Model Year and Calendar Year

Model Year	Calendar Year								
	2000	1999	1998	1997	1996	1995	1994	1993	1992
2001	183								
2000	770	197							
1999	827	827	187						
1998	785	785	785	173					
1997	726	726	726	726	173				
1996	727	727	727	727	727	193			
1995	811	811	811	811	811	811	225		
1994	946	946	946	946	946	946	946	213	
1993	897	897	897	897	897	897	897	897	183
1992	769	769	769	769	769	769	769	769	769
1991	809	809	809	809	809	809	809	809	809
1990	839	839	839	839	839	839	839	839	839
1989	911	911	911	911	911	911	911	911	911
Total	10,000	9,244	8,407	7,608	6,882	6,175	5,396	4,438	3,511

The rate of odometer fraud for vehicles of a specific age is calculated from the various diagonals in Table 2-7 and Table 2-9. For example, the values in the highlighted diagonal line in Table 2-7 are added together to get the number of odometer fraud cases that occur when the vehicle is zero years old. The values in the highlighted diagonal line in Table 2-9 are added together to get the number of vehicle years that are zero years old. The values for each specific age from the diagonals lines are compared in Table 2-10. Column 2 in the table is the sum of the values along the diagonal lines in Table 2-7 for vehicles -1-11 years old. Column 3 is the sum of the values along the diagonal lines in Table 2-9 for vehicles -1-11 years old. The rate of odometer fraud for zero year old vehicles is 7.48 / 7,258 = 0.10 percent.

Intuitively, one expects the rate of odometer fraud by vehicle age to be low initially, rise and peak, for 3-6 year old vehicles then decline and drop to zero for older vehicles. The observed rate by vehicle age follows this pattern expect for older vehicles (7-10 year old). It appears that fraud rate in older vehicles does not decline as we expected but remains constant until the value of a vehicle is not dependent on the mileage. The mileage for the older vehicles has less of an effect on the value of these vehicles than the mileage on newer vehicles (Chapter 3). As a result, these incidents in the 7-10 year old vehicles, even if they are actually fraud, will contribute negligibly to overall consumer loss.

TABLE 2-10
Rate of Odometer Fraud by Vehicle Age

Vehicle Age	Inflated Rollbacks	Vehicle Years	Rate
-1	0.00	1725	0.00%
0	7.48	7258	0.10%
1	4.09	7297	0.06%
2	14.16	7309	0.19%
3	14.43	7435	0.19%
4	35.51	6709	0.53%
5	19.74	5982	0.33%
6	9.30	5171	0.18%
7	21.28	4225	0.50%
8	17.93	3328	0.54%
9	14.79	2559	0.58%
10	11.80	1750	0.67%
11	0.00	911	0.00%

The rate of odometer fraud over the first 11 years of a vehicle's life is estimated in Table 2-11. The fraud rates, by vehicle age, from Table 2-10 are multiplied by the percentage of vehicles that

survive to reach that age. These products are summed up for ages –1 to 11. A vehicles has 3.47 percent chance of having its odometer rolled back sometime within its first 11 years.

The number of odometer frauds in the United States during calendar year 2000 is estimated in Table 2-12. The fraud rates, by vehicle age, from Table 2-10 are multiplied by the number of registered vehicles (as of 7/1/2000) in each age group. These products add up to 452,000 rollbacks.

With only 68 fraud cases in the sample, it is impossible to determine whether the fraud rate changed from 1992 to 2000. It might be desirable to run another sample of vehicles through Carfax in about 2003 or so. This would allow a comparison of the 1992-2000 fraud rates with the later fraud rates. It is also impossible to determine the fraud rate separately in passenger cars and pickups, vans and SUVs.

TABLE 2-11 Rate of Odometer Fraud Over the First 11 Years of a Vehicle's Life			
Vehicle Age	Odometer Rollback Rate	Survival Factor	Rate * Survival
-1	0.00%	1.00	0.00%
0	0.10%	1.00	0.10%
1	0.06%	1.00	0.06%
2	0.19%	0.99	0.19%
3	0.19%	0.98	0.19%
4	0.53%	0.95	0.50%
5	0.33%	0.93	0.31%
6	0.18%	0.91	0.16%
7	0.50%	0.90	0.45%
8	0.54%	0.88	0.47%
9	0.58%	0.85	0.49%
10	0.67%	0.80	0.54%
11	0.00%	0.75	0.00%
Rate Over the First 11 Years of a Vehicle's Life			3.47%

TABLE 2-12 Estimated of Odometer Rollbacks in Calendar Year 2000			
Model Year	Odometer Rollback Rate	Vehicles Registered as of 7/1/2000	Number of Rollbacks
2001	0.00%	299,992	0
2000	0.10%	12,324,551	12,709
1999	0.06%	15,366,755	8,619
1998	0.19%	13,903,267	26,938
1997	0.19%	13,857,576	26,896
1996	0.53%	12,383,809	65,555
1995	0.33%	14,072,643	46,427
1994	0.18%	12,529,605	22,537
1993	0.50%	11,726,378	59,073
1992	0.54%	10,362,227	55,836
1991	0.58%	10,310,481	59,608
1990	0.67%	10,073,363	67,897
1989	0.00%	10,730,981	0
Rollbacks in Calendar Year 2000			452,095

CONFIDENCE BOUNDS

A jackknife procedure is used to obtain confidence intervals for the rate of odometer fraud over the life of the vehicle. This section describes this procedure step-by-step. This relatively complicated procedure was used because simpler formulas based on p * q / n will not work -- the rate of odometer fraud over the life of the vehicle is not a simple rate.

Even so, a still relatively simple procedure might have estimated the variance as follows: take all the vehicles in the order they were inputted to Carfax, number them sequentially to create a case number (CASE), split the cases into 10 groups according to the last digit of the case number (CASE), and estimate the rate of odometer fraud within each of the 10 subsamples using the method developed in the preceding section. This gives 10 independent estimates of rate, ε_1, ε_2, . . . , ε_{10}, each based on a tenth of the cases. Let

$$\bar{\varepsilon} = \frac{\sum_{1}^{10} \varepsilon_i}{10} \qquad s^2 = \frac{\sum_{1}^{10} (\bar{\varepsilon} - \varepsilon_i)^2}{9}$$

Then s^2 is an estimate of the variance of rate based on a tenth of the cases. The variance of the rate using all of the cases is $s^2 / 10$.

Unfortunately, this approach is not advisable. It requires estimating the rate separately for each tenth of the cases. A tenth of the cases is so sparse a sample that it might contain only a few cases of odometer fraud, making it impossible to calculate a meaningful rate over the life of the vehicle using the multi-celled method developed in the preceding section.

The jackknife procedure circumvents that problem. Instead of the rate being calculated for one tenth of the cases, it is computed for the nine tenths of the cases that remain after removing a tenth of the file. Nine tenths of the data contain enough cases with odometer rollback to calculate the rate using the method of the preceding section. Let $\varepsilon_{(1)}$, $\varepsilon_{(2)}$, . . . , $\varepsilon_{(10)}$ be the estimates of the rate, each based on 9/10ths of the cases i.e., all of the cases except the 1st, 2nd, . . ., 10th subsample, respectively i.e. using the fraud cases in that 9/10ths of the sample, inflating the cases based on the missing in a 9/10 sample of known rollbacks, and dividing by 9/10 of vehicle years in Table 2-9. Let $\varepsilon = 3.47$ % be the rate estimated based on all case (i.e., rates of odometer fraud over the life of the vehicle). Let

$$\varepsilon_{*i} = 10\varepsilon - 9\varepsilon_{(i)}$$

Then ε_{*i} is a surrogate for ε_i, the rate within the removed tenth of cases: ε_{*i} is called a pseudo estimate of ε_i.

Let $\bar{\varepsilon}_* = \frac{\sum_{1}^{10} \varepsilon_{*i}}{10}$ $s^2 = \frac{\sum_{1}^{10} (\varepsilon_{*i} - \bar{\varepsilon}_*)^2}{9}$

Then $s^2 / 10$ is an approximation to the variance of the rate using all of the cases. It is called a **jackknife estimate of variance**. The standard deviation of the rate is $s / \sqrt{10}$.

The rates were obtained as follows: The 10,000 cases in the Polk sample were numbered consecutively in the order they were submitted to Carfax. The cases whose identification number (CASE) ends with the digit I were removed, where I is an integer between 0 and 9. The odometer fraud cases in the each subsample were identified. The 6,846 cases in the known rollback sample were numbered consecutively in the order they were submitted to Carfax. The cases whose identification number (CASE) ends with the digit I were removed, where I is an integer between 0 and 9. The inflation factors were calculated in each subsample similar to the method used in the full sample. The rate of odometer fraud over the life of the vehicle was calculated in each subsample similar to the method used in the full sample. The 2nd column of Table 2-13 shows the subsample rates.

TABLE 2-13
Estimates and Pseudo Estimates of the Odometer Fraud Rate over the Life of the Vehicle for Jackknife Procedure in which Tenths of Cases are Removed

Estimates		Pseudo Estimates	
Cases Except Those with Case #	Rate of Odometer Fraud	Cases with Case # Ending in	Rate of Odometer Fraud
1	3.35%	1	4.57%
2	3.68%	2	1.60%
3	3.36%	3	4.47%
4	3.55%	4	2.75%
5	3.54%	5	2.84%
6	3.66%	6	1.75%
7	3.38%	7	4.28%
8	3.30%	8	4.97%
9	3.27%	9	5.23%
0	3.60%	0	2.33%
All Cases	3.47%		

The next task is to obtain the pseudo estimates ε_{*i} by subtracting the respective rates for 9/10 of the sample from the estimates from the full sample using the equation below. These pseudo estimates are surrogates for the results that would have been obtained if only the removed tenth of the sample had been used for the calculations.

$$\varepsilon_{*i} = 10\varepsilon - 9\varepsilon_{(i)} = 10(3.47\%) - 9\varepsilon_{(i)}$$

The 10 values of ε_i are shown in the 4th column of Table 2-13. These values are used to calculate:

$$\bar{\varepsilon}_* = \frac{\sum_{1}^{10} \varepsilon_{*i}}{10} = 3.478\% \qquad \frac{s}{\sqrt{10}} = \left(\frac{\sum_{1}^{10} \left(\varepsilon_{*i} - \bar{\varepsilon}_* \right)^2}{9} \right)^{1/2} \Big/ \sqrt{10} = 0.434\%$$

The standard deviation, $s / \sqrt{10}$, is T distributed with 9 degrees of freedom. Therefore, 90 percent confidence bounds around the rate of odometer fraud (i.e. with $\alpha = .05$ on each side) are $3.47\% \pm (0.434\% * 1.833)$. Table 2-14 shows the estimate and the confidence bounds.

TABLE 2-14
The Rate of Odometer Fraud over the Life of the Vehicle and the Confidence Bounds

	Lower Bound	Estimate	Upper Bound
Rate of Odometer Fraud	2.68%	3.47%	4.26%

CHAPTER 3

THE INCREASED PRICE CONSUMERS PAY FOR PASSENGER VEHICLES DUE TO ODOMETER ROLLBACK

This chapter will estimate the additional cost consumers pay to purchase vehicles with rolled back odometers. Buyers of vehicles with spun odometers will, on the average, pay more for the vehicles than they are actually worth, since the value of a vehicle is to a substantial extent based on the total miles a vehicle has been driven. Other monetary costs of odometer fraud are not estimated in this report. They include inflated financing, insurance, and tax costs; additional amounts consumers pay for vehicle repairs; other consequential damages; the decreased resale value due to the vehicle having an altered odometer; the funding of Federal and state regulatory, investigative, and other efforts to detect and deter tampering; dealer (seller) "buyback" costs and restitution fees which may be imposed as a result of detected and successfully prosecuted cases of odometer tampering. For example, NHTSA provides $150,000 annually to states to promote and assist their odometer fraud enforcement efforts. We do not know the costs incurred by states to fund their odometer fraud enforcement efforts. Legal and court costs may also be involved. These costs ultimately become taxes which are passed on to the consumer. Also not estimated are “intangible” costs such as the lost time and frustration of repairing a vehicle that’s much more worn-out than its buyer had anticipated, and the psychological pain consumers must feel when they realize they have been cheated.

In this analysis, a vehicle's value is initially determined based on its mileage using the N.A.D.A. Official Used Car Guide and Official Older Used Car Guide. A vehicle with high mileage, mileage higher than average, is less valuable than the vehicle with average or low mileage. The difference in price is calculated for vehicles with “likely” and “possible” odometer rollback to estimate (with adjustments) the national cost of odometer rollback at the time of purchase. This analysis estimates that odometer fraud annually costs consumers at the time of purchase $1,056 million for passenger cars, pickup trucks, vans and sport utility vehicles (confidence bounds from $737 million to $1,376 million).

N.A.D.A. OFFICIAL USED CAR GUIDE

The N.A.D.A. Official Used Car Guide[1] is published monthly in nine regional editions, and includes trade-in, loan, and retail values for vehicles up to seven years old. The N.A.D.A. Official Older Used Car Guide[2] is published three times a year. It also includes trade-in, loan,

[1]This book is published by N.A.D.A. Official Used Car Guide Company. N.A.D.A. Official Used Car Guide Company is a unit of NADA Services Corporation (NADASC), a for-profit subsidiary of National Automobile Dealers Association (NADA).

[2]This book is published by N.A.D.A. Appraisal Guides Company.

and retail values, but for twelve years or older model year vehicles. All values contained in these Guides are developed by N.A.D.A.'s editors, based upon many sources of information including actual transactions occurring throughout the country.

N.A.D.A. estimates the Acceptable Mileage Range, the amount of mileage a vehicle is expected to accumulate through normal use. N.A.D.A. bases its mileage ranges on averages derived from information received from the automotive marketplace. If mileage falls outside of the average range, then a deduction or addition should be made to the value of the vehicle.

The effect of high or low mileage will vary according to the class (size) and value of the vehicle. High or low mileage on an inexpensive compact vehicle will have less absolute impact than it will on a larger or luxury vehicle. In general, since the value of a vehicle depreciates as it ages, so will the effect of high or low mileage. The N.A.D.A. books contain high mileage tables which show the values that should be deducted from the base value of the vehicle by mileage, class, and model year. The low mileage tables show the values that should be added to the base value of the vehicle. By comparing the values from these tables, we estimate the difference in price for vehicles in our sample that the panel classified as likely or possible odometer fraud. The analysis derived cost estimates from the Eastern edition, October 2001 version of the N.A.D.A. Official Used Car Guide for vehicles aged 7 years old or less and from the National edition, September through December 2001 version of the N.A.D.A. Official Older Used Car Guide for vehicles more than 7 years old. They were the latest editions available at the time of the analysis (December 2001). Use of different editions and/or versions might have produced different estimates.

The additional costs, calculated in this chapter, that consumers pay at time of purchase for vehicles whose odometers have been rolled back are only estimates. They should not be considered absolute. It is possible to have either a high mileage vehicle in very good condition or a low mileage vehicle in very poor condition. In these cases, the overall condition of the vehicle should also be considered when adjusting the vehicle value. But since this analysis did not investigate any of the individual vehicles, the overall condition of the vehicle is unknown. The estimates of loss are based on book values and are averages for vehicles of this type. In none of these cases, do we know the actual prices paid by the people who bought the vehicles.

METHOD FOR AN INITIAL ESTIMATE

The method used in this chapter will estimate the value of a vehicle at two different mileages for each of the 68 vehicles we believed were rolled back. The value of the vehicle will be estimated based on the mileage before the odometer was rolled back and the mileage after the odometer was rolled back. The vehicle's value is determined at the two different mileages by its age and class using the N.A.D.A. books. The consumer cost at the time of purchase will be the difference between the two values.

Let us consider the "classic" case of odometer fraud. Figure 3-1 shows the history of a 1995 Buick Regal. On May 22, 1996, this vehicle had 42,085 miles but on June 15, 1996 it had only 12,086 miles. Even though the odometer was rolled back in June 1996, the latest N.A.D.A. guidebook was used. The 1995 car was 1996 - 1995 = 1 year old when the fraud occurred in 1996. A one year old car in 2001 is a 2001 - 1 = 2000 model year car. Therefore, the 1995 Buick Regal is translated into a 2000 model year car and the value of a 2000 Buick Regal is estimated from the October 2001 version of the Car Guide.

As stated above, all the estimates are based on the October 2001 Official Used Car Guide or the September - December 2001 Official Older Used Car Guide. The advantage to using the latest guidebooks, besides using only two books for all of the estimates, is that the losses are updated to current (2001) prices. Using the latest guidebooks occasionally creates a problem: a model in question may translate into a model year when the model was discontinued. When this occurred, the model that essentially replaced the discontinued model is used (e.g. Pontiac Sunfire for Pontiac Sunbird).

The N.A.D.A. guidebook classifies Buick Regal as a class II vehicle. Table 3-1 shows excerpts from the High Mileage Table and Table 3-2 shows excerpts from the Low Mileage Table in the N.A.D.A. Official Used Car Guide. (The Official Used Car Guide is used in this case because the vehicle is less than 7 years old.) The shaded areas in Table 3-1 indicate the average mileage range. For a 2000 model year car, the average mileage is between 25,001 and 30,000 miles. A 2000 model year, class II car with 42,085 miles is worth $500 less than the base value of the car according to the high mileage table (bolded cell in Table 3-1). This car with 12,086 miles is worth $650 more than the base value of the car according to the low mileage table (bolded cell in Table 3-2). Therefore, a consumer would pay $500 + $650 = $1,150 more for this vehicle at the time of purchase than it was worth. In this "classic" case of odometer fraud, the mileage is rolled back 29,999 miles and the car's value is increased by $1,150.

FIGURE 3-1: LIKELY ODOMETER ROLLBACK

```
SECTION 1          VEHICLE SPECIFICATIONS
-------------------------------------------------------------------------
Vehicle ID:        2G4WB52M8S1XXXXXX
Yr/Mfg:            1995 Buick
Model:             Regal Custom
Body:              4D Sedan Mid-size car
Engine:            3.1L V6 SFI OHV 12V
Fuel:              Gasoline
Driveline:         Front-wheel Drive
Aspiration:        Normal
Country Mfg.       Canada

DATE          ODOMETER  INFORMATION             GENERAL
REPORTED       READING  SOURCE                  COMMENTS

02/01/1995              Texas                   Registered as
                        Motor Vehicle Dept.     rental vehicle
                        XXXX XXXXXXXXXX, FL     (major car rental company)

03/30/1995           5  Texas                   Title or registration
                        Motor Vehicle Dept.     issued
                        XXXX XXXXXXXXXX, FL     First lien reported
                        Title #XXXXXXXXXXXXXXXXX

05/22/1996      42,085  Auto Auction            Vehicle Sold
                        Mountain Region

06/15/1996      12,086  New Mexico              Title or registration
                        Motor Vehicle Dept.     issued
                        XXXXXXXXXXX, NM         POTENTIAL ODOMETER
                        Title #XXXXXXXXXXXXXXX  ROLLBACK
```

TABLE 3-1
Excerpt from the High Mileage Table in the N.A.D.A. Official Used Car Guide, October 2001

Mileage	Class	Model Year							
		2001	2000	1999	1998	1997	1996	1995	1994
25001 to 30000	I	275							
	II	375							
	III	575							
	IV	675							
40001 to 45000	I	700	375						
	II	950	500						
	III	1425	750						
	IV	1675	875						

Next, let us consider another "likely" odometer rollback case. In this case, a 1995 Mazda Miata had 51,162 miles on March 28, 2000 and 45,000 on March 30, 2000. This is a 5-year-old car when the mileage was rolled back (2000 - 1995 = 5 years old), so we need to consider a 1996 model year car when we use the 2001 guide. N.A.D.A. classifies Mazda Miata as a class II vehicle. This car's initial mileage (51,162) is below the average range. The average mileage for a 5-year-old car is 70,001 to 75,000 miles. Based on the N.A.D.A. low mileage table, this 1996 vehicle with 51,162 miles is worth $650 more than the base value but is worth $975 more than the base value with 45,000 miles (Table 3-2). In this case, a consumer would pay $975 - $650 = $325 more for this vehicle than it was worth. Here, the mileage goes from a low mileage to a very low mileage. For vehicles whose mileage goes from a very high mileage to high mileage, the cost would have been estimated by subtracting the high mileage reduction from the very high mileage reduction.

TABLE 3-2
Excerpt from the Low Mileage Table in the N.A.D.A. Official Used Car Guide, October 2001

Mileage	Class	Model Year							
		2001	2000	1999	1998	1997	1996	1995	1994
7501 to 15000	I	250	550	875	1150	1400	1650	1775	1850
	II	275	650	1025	1350	1650	1925	2050	2150
	III	350	825	1325	1700	2100	2475	2650	1775
	IV	400	925	1450	1900	2325	2750	2950	3075
40001 to 45000	I				275	575	825	950	1050
	II				325	675	975	1125	1225
	III				400	825	1250	1450	1575
	IV				450	925	1375	1600	1750
50001 to 50000	I					275	550	675	775
	II					325	650	800	900
	III					400	825	1025	1175
	IV					450	900	1150	1300

This method assumes the mileage recorded in the first of the two pertinent transactions was the mileage just before the odometer was rolled back, the mileage in the second transaction was the mileage just after the odometer was rolled back, and the car's trade-in value with average mileage is the same at these two points in time. If the time difference between the two transactions is minimal then these assumptions are valid. In the two examples presented above,

the time difference is minimal, so the amount of additional mileage, if any, was small, not substantially affecting the consumer cost.

But if the time difference was more than a few months, then these assumptions may not be valid. A car could accumulate a substantial amount of miles before and/or after the odometer was rolled back. Also a car's trade-in value could decrease and the average mileage range could increase since the vehicle is older. All of these could affect the amount of loss.

Figure 3-2 shows an example of possible odometer fraud with the two discrepant mileage readings occurring more than 3 months apart. On October 23, 1997, this vehicle had 109,569 miles. On November 25, 1998, it had only 46,605. The time difference between these two dates is more than a year. The only way this car could have had 109,569 miles on it just prior to rollback and 46,605 just after rollback is if it had just sat still for a year (October 1997 - November 1998). This is unlikely.

For these cases, the vehicle's value should be based on the date when the consumer bought the vehicle with rolled back odometer. In general, that will be the later date, because that is typically the date when the cheated consumer registers the vehicle. Let us call the dates, Date1 and Date2, where Date1 is earlier than Date2. The mileage will be Mileage1 and Mileage2, where Mileage1 is bigger than Mileage2. The consumer thinks he or she is buying a vehicle with Mileage2 on Date2. But the true mileage is sometimes bigger than Mileage1. Let us call it Mileage1A.

In cases where the time difference between the two discrepant mileage readings is more than 3 months apart, the method will first estimate Mileage1A by

$$\text{Mileage1A} = \text{Mileage1} + \text{AAM}*(\text{Date2}-\text{Date1}),$$

where AAM is Average Annual Miles of travel per year. In other words, Mileage1A is the expected mileage this car would have if it had Mileage1 by Date1 and it accumulated average mileage between Date1 and Date2. Then the method will estimate the consumer loss based on Mileage1A and Mileage2 on Date2 using the N.A.D.A. Used Car Guides.

The variables have the following values for this case:

Date1 = October 23, 1997	Date2 = November 25, 1998
Mileage1 = 109,569	Mileage2 = 46,605

(Date2 - Date1) = 1.08 years

FIGURE 3-2: POSSIBLE ODOMETER ROLLBACK WITH
TWO DISCREPANT MILEAGE READING MORE THAN 3 MONTHS APART

```
SECTION 1          VEHICLE SPECIFICATIONS
-------------------------------------------------------------------------
Vehicle ID:        1FMEU15H4KLXXXXXX
Yr/Mfg:            1989 Ford
Model:             Bronco
Body:              Utility

DATE          ODOMETER  INFORMATION              GENERAL
REPORTED       READING  SOURCE                   COMMENTS

12/13/1989      19,729  New Jersey               Title issued
                    Motor Vehicle Dept.
                    XXXXXXX, NJ
                     Title
                    #XXXXXXXXXXXXXXXXX

03/26/1994      93,001  New York                 Title issued
                    Motor Vehicle Dept.
                    XXXX XXXXXX XXXX, NY

10/23/1997     109,569  New York                 Title issued
                    Motor Vehicle Dept.
                    XXX XXXX XXXX, NY

03/16/1998          New York                     Title issued
                    Motor Vehicle Dept.
                    XXX XXXX XXXX, NY

11/25/1998      46,605  New York                 Passed emissions inspection
                    Inspection Station           Passed safety inspection
                    XXX XXXX XXXX XXXX           POTENTIAL ODOMETER
                                          ROLLBACK

12/03/1999      62,187  New York                 Passed emissions inspection
                    Inspection Station           Passed safety inspection
                    XXX XXXX XXXX XXXX

05/26/2000     136,737  New York                 Title issued
                    Motor Vehicle Dept.
                    XXXXX XXXXX, NY
```

Table 3-3 shows the average annual miles of travel per vehicle by vehicle age[3]. This information is from the 1995 Nationwide Personal Transportation Survey, a Federal Highway Administration effort to collect information on travel in the United States by households.

TABLE 3-3
Average Annual Miles per Vehicle
by Vehicle Age

Vehicle Age	Average Miles per Year
0 to 2 years	16,092
3 to 5 years	14,004
6 to 9 years	**12,608**
10 or more years	8,758
All	12,226

In October 1997, this 1989 model year vehicle is 1997 - 1989 = 8 years old and in November 1998, this vehicle is 9 years old. Table 3-3 shows 6 to 9 year old vehicles accumulate an additional 12,608 miles per year (AAM = 12,608). Therefore, Mileage1A = 109,569 + (12,608 * 1.0833) = 123,228 miles.

N.A.D.A. classifies Ford Bronco as class III vehicle. A 9-year-old SUV (the age of the vehicle on Date2) translates into a 1992 model year vehicle in 2001. A 1992 model year, class III vehicle with 123,228 miles is worth $1,450 less than the base value of the vehicle according to the high mileage table in the September through December 2001 version of the Older Used Car Guide. The guide estimates the average mileage is between 90,0001 and 100,000 miles for 1993 and older model year vehicles. The high mileage table in this guide is similar to the one in the Official Used Car Guide. It shows the values that should be deducted from the base value of the vehicle by mileage, class, and model year.

The Low mileage table in the Official Older Used Car Guide is different than the one in the Official Used Car Guide. The low mileage table contains percentages that are to be used to estimate the added value of the vehicle based on the trade-in value by mileage and model year. Vehicle class is not a factor in the low mileage tables. Table 3-4 shows an excerpt from the low

[3]Hu, P. & Young, J., Draft Summary of Travel Trends 1995 Nationwide Personal Transportation Survey, January 1999.

mileage table in the N.A.D.A. Official Older Used Car Guide, September through December 2001 version.

A 1992 model year vehicle with 46,605 miles is worth 10 percent more than the trade-in value of a similar vehicle with average mileage (Table 3-4). The trade-in value of a 1992 Ford Bronco with average mileage is $5,920. (Trade-in values in the N.A.D.A. guide are listed by model year, make, model, series, and body style.) This vehicle is worth 0.10 * $5,950 = $595.00 more than this vehicle with average mileage. Therefore, a consumer would pay $1,450 + $595.00 = $2,045.00 more for this vehicle at the time of purchase than it was worth.

TABLE 3-4
Excerpt from the Low Mileage Table in the N.A.D.A. Official Older Used Car Guide, September through December 2001 Version

Mileage	Model Year	
	1993	1992
30001 to 60000	10%	10%
60001 to 90000	5%	5%
90001 to 100000	Average Mileage Range	

The NADA guidebooks state the high mileage deduction should not exceed 40 percent of the vehicle's trade-in value. In a few cases, the high mileage deduction exceeded 40 percent of the trade-in value. For these cases, 40 percent of the vehicle's trade-in value replaced the high mileage deduction in the calculations.

RESULTS

Table 3-5 shows the cost of odometer fraud at the time of purchase and the miles rolled back by vehicle age, model year, make, and model for the vehicles in our sample identified as likely or possible odometer fraud. This table shows that the odometer is rolled back an average of 42,000 miles per vehicle, costing an additional $1,300 per vehicle at the time of purchase. Therefore, odometer roll back costs at the time of purchase an average of 3 cents for every mile rolled back.

TABLE 3-5
Model Year, Make, Model, Additional Cost, and Miles Rolled Back
by Vehicle Age for Odometer Fraud Cases

Vehicle Age	Model Year	Make	Model	Additional Cost	Miles Rolled Back
0	1999	Saab	9-3 S	$0.00	3,698
0	1995	Mazda	626	$0.00	3,897
1	1995	Buick	Regal	$1,150.00	29,999
1	1995	Toyota	Tercel	$550.00	20,406
2	1993	Pontiac	Grand Prix	$1,950.00	53,978
2	1997	Toyota	4Runner	$1,125.00	28,474
2	1993	Dodge	Intrepid	$2,400.00	45,433
2	1996	Mazda	626	$500.00	15,702
2	1994	Oldsmobile	Delta 88	$3,375.00	65,113
3	1995	Ford	Escort	$1,025.00	36,279
3	1992	Chevrolet	Sport Van	$625.00	13,086
3	1995	Volvo	850	$1,050.00	22,239
3	1991	Ford	Bronco	$4,350.00	82,413
3	1994	Ford	Ranger	$1,000.00	27,243
4	1990	Chevrolet	Corsica	$650.00	27,303
4	1994	Ford	F150	$350.00	7,800
4	1994	Mercury	Cougar	$1,150.00	35,082
4	1993	Pontiac	Bonneville	$650.00	17,108
4	1995	Dodge	Intrepid	$2,100.00	43,893
4	1994	Saturn	SCI	$1,175.00	38,219
4	1992	Dodge	Spirit	$1,950.00	65,470
4	1995	Dodge	Intrepid	$1,050.00	24,535
4	1989	Volkswagen	Jetta	$975.00	30,883
4	1989	Lincoln	Town Car	$2,025.00	32,918
4	1990	Ford	Bronco	$2,600.00	45,553
4	1995	Oldsmobile	Achieva	$1,650.00	43,200
4	1994	Jeep	Wrangle	$2,125.00	61,344
5	1995	Mazda	Miata	$325.00	6,162
5	1992	Ford	Explorer	$2,500.00	99,906
5	1992	Jeep	Cherokee	$400.00	7,757
5	1992	Ford	Tempo	$1,550.00	55,372
5	1993	Chevrolet	C1500	$2,675.00	45,923
5	1992	Oldsmobile	Cutlass	$800.00	20,004
5	1995	Lexus	LS400	$1,825.00	39,133

TABLE 3-5 Continued
Model Year, Make, Model, Additional Cost, and Miles Rolled Back
by Vehicle Age for Odometer Fraud Cases

Vehicle Age	Model Year	Make	Model	Additional Cost	Miles Rolled Back
6	1991	Oldsmobile	Calais	$650.00	22,203
6	1994	Jeep	Cherokee	$875.00	26,109
6	1989	Plymouth	Voyager	$1,175.00	37,047
6	1991	Ford	Explorer	$1,900.00	57,283
7	1992	Mazda	929	$1,550.00	24,040
7	1991	Hyundai	Excel	$650.00	33,805
7	1989	GMC	Jimmy	$500.00	17,292
7	1993	Chevrolet	Lumina	$650.00	18,143
7	1991	Mitsubishi	Eclipse	$800.00	22,068
7	1993	Chevrolet	Cavalier	$1,600.00	55,396
7	1991	Jaguar	XJ6	$1,375.00	27,075
7	1993	Ford	Taurus	$2,250.00	69,482
7	1993	Ford	F150	$2,775.00	78,346
8	1989	Chevrolet	Caprice	$2,977.50	99,851
8	1989	Mazda	323	$0.00	26,811
8	1992	Toyota	Celica	$2,130.00	113,288
8	1991	Volvo	240DL	$1,383.75	22,918
8	1991	Isuzu	Trooper	$285.00	43,557
8	1992	GMC	Safari	$1,825.00	101,717
8	1990	Mazda	MX6	$1,052.50	70,672
8	1992	Ford	Mustang	$753.75	62,520
9	1989	Mitsubishi	Mirage	$58.75	22,686
9	1989	Oldsmobile	Cutlass	$0.00	10,378
9	1990	Dodge	Daytona	$628.75	33,355
9	1989	Ford	Bronco	$2,045.00	76,623
9	1989	Buick	Reatta	$1,275.00	20,709
9	1989	Chevrolet	Cavalier	$325.00	21,388
9	1990	GMC	V3500	$2,797.50	89,556
10	1989	Oldsmobile	Cutlass	$871.25	70,192
10	1989	Acura	Legend	$1,375.00	59,609
10	1989	Buick	Regal	$450.00	62,524
10	1990	Ford	Festiva	$625.00	70,747
10	1990	Chevrolet	C1500	$322.50	33,578

TABLE 3-5 Continued Model Year, Make, Model, Additional Cost, and Miles Rolled Back by Vehicle Age for Odometer Fraud Cases					
Vehicle Age	Model Year	Make	Model	Additional Cost	Miles Rolled Back
10	1990	Ford	Ranger	$292.50	58,393
			Total	$85,848.75	2,854,886
			Average	$1,262.48	41,984

Table 3-6 shows the average additional cost per vehicle, average number of miles the odometer is rolled back per vehicle, the additional cost per mile, the rate, and the cost times rate by vehicle age. The information in Table 3-6 is calculated from the data in Table 3-5. The average cost per vehicle is slightly less for older vehicles than for newer vehicles. The average number of miles rolled back is slightly larger for older vehicles than newer vehicles. These two cause the average cost per mile to decrease as vehicles age. The cost per mile is 4 cents per mile for 2 through 5-year-old vehicles, 2 or 3 cents per mile for 8 and 9-year-old vehicles, and 1 cent per mile for 10-year-old vehicles. It is appropriate that the cost per mile decreases more or less proportionally with the depreciation of the overall value of the vehicle.

TABLE 3-6 Average Cost per Vehicle, Average Miles Rolled Back per Vehicle, and Cost per Mile, and Rate by Vehicle Age and Cost of the Life of the Vehicle					
Vehicle Age	Average Cost/Vehicle	Average Miles Rolled Back/ Vehicle	Cost/Mile	Rate	Cost*rate
-1	$0.00	0	$0.00	0.00%	$0.00
0	$0.00	3,798	$0.00	0.10%	$0.00
1	$850.00	25,203	$0.03	0.06%	$0.48
2	$1,870.00	41,740	$0.04	0.19%	$3.59
3	$1,610.00	36,252	$0.04	0.19%	$3.06
4	$1,419.23	36,408	$0.04	0.50%	$7.10
5	$1,439.29	39,180	$0.04	0.31%	$4.42
6	$1,150.00	35,661	$0.03	0.16%	$1.87
7	$1,350.00	38,405	$0.04	0.45%	$6.10
8	$1,300.94	67,667	$0.02	0.47%	$6.14
9	$1,188.33	45,782	$0.03	0.49%	$5.86
10	$656.04	59,174	$0.01	0.54%	$3.54
11	$0.00	0	$0.00	0.00%	$0.00
			Total	3.47%	$42.16

The 5th column in Table 3-6 is the rate of odometer fraud after adjustment for vehicle scrappage, as calculated in Table 2-11. The 6th column is the cost times the rate calculated from column 2 and 5. The total in column 6, $42.16 is the average cost (at the time of purchase) of odometer fraud pro-rated over the life of the vehicle.

In the last three years, sales of new passenger vehicles have averaged slightly above 15 million. Given that odometer fraud costs consumers an average of $42.16 over the life of the vehicle, the annual cost of odometer fraud is $42.16 * 15 million = $632 million for passenger cars, pickup trucks, vans, and sport utility vehicles (initial estimate).

ADJUSTMENT OF THE INITIAL ESTIMATE BASED ON KNOWN ROLLBACKS

NHTSA's file of known rollback cases was used in Chapter 2 to adjust upwards the incidence rate of rollback, by identifying how many of these rollbacks were not reported in Carfax. Now, this file will also be used to adjust the cost estimate, since the actual losses at the time of purchase are reported on the file, and they can be compared to the estimates obtained using the NADA books.

There are 924 vehicles on the known rollback file that have both a purchase and sale price on the known rollback file and were also found in Carfax with a potential mileage rollback. The purchase price is cost the rollback artist paid for the vehicle. In most cases, the wholesaler who sold the vehicle to the rollback artist supplies this information. The sale price is the cost the person paid for the vehicle from the rollback artist. In most cases, the wholesaler who purchased the vehicle from the rollback artist supplies this information. For these vehicles, we will calculate the cost using the NADA method and the Carfax mileages and compare that cost to the actual cost on the known rollback file. The ratio of the two will be the amount our method underestimates the cost of odometer rollback.

The vehicle's "book" values before and after the rollback were determined using the NADA method described above. The two critical mileages and dates flagged in Carfax as potential odometer rollback were used. If the dates were more than 3 months apart, the mileage was adjusted to account for additional miles driven during the time period. The total cost of odometer fraud at the time of purchase for these 924 vehicles was $1,747,051.25 based on the NADA method. Since the 2001 guidebooks were used, the cost is already in 2001 dollars.

The purchase and sale prices on the known rollback file for these vehicles are not in 2001 dollars. They are based on the year the vehicle was purchased (before the odometer was rolled back) and the year the vehicle was sold (after the odometer was rolled back). Both the purchase price and sales price were inflated to 2001 dollars using the Gross Domestic Product price

index[1]. The difference in the purchase price and sales price is the cost of odometer fraud. The total cost of odometer fraud at the time of purchase for these 924 vehicles is $2,916,078.93 based on the purchase and sales price on the known rollback file. Therefore, the NADA method underestimates the cost of odometer fraud by a factor of $2,916,078.93/$1,747,051.25 = 1.67. Therefore, the annual increased purchase price consumers pay due to odometer fraud is $632 * 1.67 = $1,056 million for passenger vehicles. The estimated average increased purchase price per rollback is $1,056 million/452,000 = $2,336.28. The lifetime cost (at the time of purchase) of odometer fraud is $42.16*1.67 = $70.71.

The NADA method may underestimate the purchase price increase because it does not consider the condition of the vehicle. Typically, late model vehicles that have accumulated high mileage in a relatively short period of time are targeted for odometer rollback. These vehicles probably look well used when initially purchased by the rollback artist. The vehicle is dirty, the carpet looks worn and the upholstery may have stains. But when the rollback artist sells these vehicles they probably look very sharp. They probably have new carpet, cleaned upholstery, and are washed and waxed. The bad condition of the vehicle when it is purchased by the rollback artist reduced the cost even more than the high mileage deduction from the NADA guidebooks. The good condition when it is sold increased the cost even more than the addition from low mileage. These extra reductions and additions are not included in the NADA method but are included in the purchase and sales price from the known rollback file.

The NADA method probably also underestimates the purchase price increase when the dates of the mileage readings are more than 3 months apart. In these cases, the high mileage is estimated based on the average annual miles driven. But these vehicles probably accumulate more than the average annual miles since they are mostly fleet vehicles.

The sales price on the known rollback file may include some of the rollback artist expenses. The cost for new carpet and the labor to install the carpet and thoroughly clean the interior and exterior of the vehicle may be included. These expenses are not included in the NADA method and may account for some of the cost differences.

CONFIDENCE BOUNDS

The jackknife procedure will be used to produce confidence intervals for the annual cost of odometer fraud. This is the same procedure that was used in Chapter 2 to obtain confidence bounds for the rate of odometer fraud. The jackknife procedure allows us to estimate the variance and standard deviation of the cost of odometer fraud in nine tenths of the data, instead of a procedure using one tenth of the data. Nine tenths of the data will contain enough cases to estimate the cost of odometer fraud using the method in the preceding section, whereas one tenth would not produce valid estimates.

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1 U.S. Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis

The Carfax cases were split into ten different subsamples to calculate the confidence bounds in Chapter 2. Each subsample contained nine tenths of the data. The multi-celled method in Chapter 2 produced the rate of odometer fraud for each subsample. Using the same subsamples and the subsample's rate of odometer fraud, the method described in this chapter produced cost estimates in each subsample. Let $\varepsilon_{(1)}, \varepsilon_{(2)}, \ldots, \varepsilon_{(10)}$ be the cost of odometer fraud over the life of the vehicle in each of the 9/10ths subsample. Let ε = \$42.16 be the lifetime cost of odometer fraud estimated by using all cases. Let ε_{*_i} be the pseudo estimate of ε_i, the cost using only one-tenth of the cases. The second column of Table 3-7 shows the cost of odometer fraud over the life of the vehicle in each subsample. The fourth column shows the Pseudo estimates, ε_{*_i}.

TABLE 3-7
Estimates and Pseudo Estimates of the Consumer Cost of Odometer Fraud over the Life of the Vehicle for Jackknife Procedure

Estimates		Pseudo Estimates	
Cases Except Those with Case #	Cost of Odometer Fraud	Cases with Case # Ending in	Cost of Odometer Fraud
1	\$39.99	1	\$61.70
2	\$44.61	2	\$20.11
3	\$41.22	3	\$50.63
4	\$42.57	4	\$38.50
5	\$39.89	5	\$62.61
6	\$44.95	6	\$17.01
7	\$37.83	7	\$81.09
8	\$38.25	8	\$77.32
9	\$41.01	9	\$52.48
0	\$42.98	0	\$34.82
All Cases	\$42.16		

Here, the pseudo estimates are calculated by solving:

$$\varepsilon_{*i} = 10\varepsilon - 9\varepsilon_{(i)} = 10(42.16) - 9\varepsilon_{(i)}.$$

These values are used to calculate:

$$\bar{\varepsilon}_* = \frac{\sum_{1}^{10} \varepsilon_{*i}}{10} = 49.63 \qquad \frac{s}{\sqrt{10}} = \left(\frac{\sum_{1}^{10} \left(\varepsilon_{*i} - \bar{\varepsilon}_* \right)^2}{9} \right)^{1/2} \Big/ \sqrt{10} = 6.96$$

The standard deviation, $s / \sqrt{10}$, is T distributed with 9 degrees of freedom. Therefore, 90 percent confidence bounds around the cost of odometer fraud (i.e. with $\alpha = .05$ on each side) is \$42.16 " (6.96 * 1.833) = \$29.40 and \$54.92. Therefore, odometer fraud cost \$1,056 million with confidence bounds from \$737 million to \$1,376 million, assuming 15 million new passenger vehicles annually and using the 1.67 inflation factor.

CHAPTER 4

STATE EFFORTS TO DETER ODOMETER FRAUD

This chapter presents the revisions the states made to implement the Truth in Mileage Regulation and their efforts to deter and detect odometer fraud. In October 1997, a questionnaire was sent to the Department of Motor Vehicle (DMV) offices in each state, the District of Columbia, Puerto Rico, and American Samoa. The major focus of the questionnaire was on the odometer disclosure requirements (i.e., "mileage on title requirements") under 49 CFR 580[1], which was promulgated in response to the Truth in Mileage Act of 1986[2].

The final rule implementing the truth in mileage act required states to use a secure printing process for their title documents and reassignment documents and to obtain mileage disclosure on title documents when ownership is transferred. Specifically, the disclosure requirements are:

- the odometer reading at the time of transfer,
- the date of transfer,
- the transferor's name and current address,
- the transferee's name and current address,
- the make, model, year, body type, and Vehicle Identification Number (VIN),
- the transferor's signature and his/her printed name, and
- the transferee's signature and his/her printed name.

The title must include a citation referring to the Federal odometer law and state that incorrect information may result in fines and/or imprisonment. The title must also contain a certification by the transferor that either the odometer reading reflects the actual mileage, or the reading reflects the amount of mileage in excess of the designed mechanical limit, or the reading does not reflect the actual mileage. In most states, this rule required revisions to the title documents and reassignment documents.

Forty-six states, the District of Columbia and Puerto Rico returned completed questionnaires by January 1998. Four states and American Samoa did not respond. Below is a summary of responses to each question on the questionnaire. In the Results section, the term "states"" refers to the 48 respondents of the questionnaire.

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[1]*Code of Federal Regulation*s, Title 49, Government Printing Office, Washington, 1998, Part 580.

[2]Truth in Mileage Act of 1986, Public Law 99-579.

RESULTS

1. On what date did the DMV offices in your state begin implementing the requirements for the odometer disclosure statement to be recorded on the vehicle title, as specified by 49 CFR, Part 580 (Enclosed)? _____ (Date)

The rule required all vehicle transfers to conform with the new disclosure requirement on April 29, 1989. The new law authorized NHTSA to provide assistance to any State to conform its laws to the new requirements and to provide extensions of time in the event that any state required additional time to revise its laws to meet the new Federal criteria. It also authorized the agency to approve of an alternate state mileage disclosure requirement if it is consistent with the purposes of the new law. NHTSA granted time extension to most states. Eight states (16.6 percent) began implementing the new requirements before the deadline. It took some states several years to comply with the new regulations. Fifteen states started implementing them before the first anniversary of the deadline, 16 states by second anniversary and six states before the third anniversary. Three states begin implementing the requirement after the third anniversary of the deadline. By April 18, 1994, all states complied. In any case, only some of the states were meeting all of the requirements before the regulation took effect, unlike many NHTSA safety regulations, such as backseat outboard lap/shoulder belts, which were widely installed before the regulation took effect.

2. What changes were made in DMV procedures in order to institute the requirements?

- **a. New paper (secured printing)**
- **b. Revised odometer disclosure statement**
- **c. New procedures (specify)**
- **d. Other (specify)**

Figure 4-1 shows the types of changes the states had to make to meet the requirements. The respondents checked all that applied to their state. Therefore, the total in this table is more than 48, total number of states responding. Almost all of the states (85 percent) had to revise their odometer disclosure statement. More than half of the states had to use new paper to ensure a secure printing process (65 percent) and implement new procedures (58 percent) to meet the requirements.

Table 4-1 shows the combination of changes required. Most states had to make many changes to meet the new requirements. Twenty-three percent of the states had to use new paper, revise their odometer disclosure statement and implement new procedures. Twenty-one percent of the states had to make other changes to meet the requirements in addition to the ones stated above.

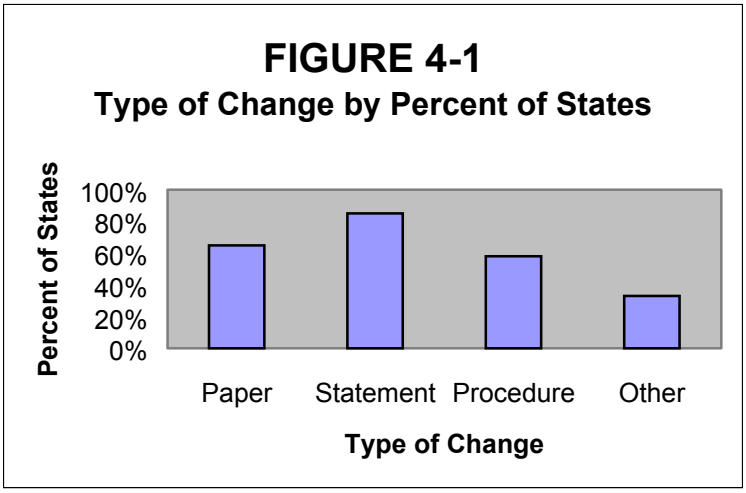


TABLE 4-1 Changes Required by Number of States		
Response	Number Of States	Percent
New Paper	4	8%
Revised Odometer Disclosure Statement	5	10%
New Procedures	1	2%
Other	1	2%
New Paper and Revised Odometer Disclosure Statement	5	10%
New Paper and Other	1	2%
Revised Odometer Disclosure Statement and New Procedures	6	13%
Revised Odometer Disclosure Statement and Other	3	6%
New Paper, Revised Statement and New Procedures	11	23%
Revised Statement, New Procedures, and Other	1	2%
New Paper, Revised Statement, New Procedures, and Other	10	21%

The most common "new procedures" listed were restricting the use of Power of Attorney and using secure Power of Attorney procedures. Also listed were training employees and dealerships about new requirements, and publicizing the new requirements to their citizen.

The most common "other" listed changes were to the state's computer system. Some states had to reconfigure the computer system to capture additional information, others had to modify their data entry systems, and a few had to increase computer storage capacity. A few states had to publish new state rules, regulations, and\or statues to implement the new requirements.

The number of changes and amount of time needed to implement the changes appears to vary by state. Seven of the 8 states that met the implementation deadline had only one or two changes to make. But the other state that met the deadline had to use new paper, revise their statements and implement new procedures. Most of the other states that had to use new paper, revise their statements and implement new procedures and even the states that also had other changes to make needed a year or two to meet the requirements. The states taking the longest time to meet the requirement only needed to make one or two changes.

The next three questions concern states' practices before the Federal Regulation took effect.

3. Were any requirements of 49 CFR, Part 580 already in place in your state prior to the issuance of this regulation? _____ Yes _____ No

and

4. If the answer to question no. 3 is "yes" please specify the nature of the requirements that were in place, example, "specific block on title for odometer reading."

Eighty-three percent of the states (40 states) had at least one of the requirements in place before the regulation was issued. The most common requirement met was odometer reading block on the title. In most of the states, that was the only requirement met. Table 4-2 shows the number of states by type of requirement met.

TABLE 4-2 Number of States by Type of Requirement Met	
Requirement met	Number of States
Certification Statement	7
Date of Transfer	2
Odometer Reading on Title	34
Records Retention Requirements	1
Secure Paper	9
Transferor's Signature	2
Transferee Signature	2

5. If an odometer block existed on the prior title document, was it an "enforced data item" --i.e., required before issuance of title? _____Yes _____ No

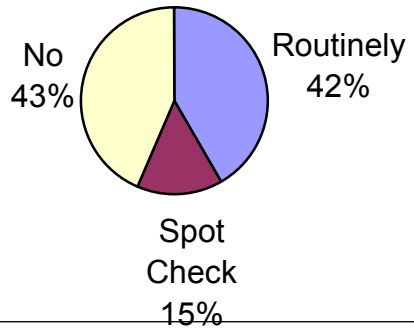
Thirty-one states (67 percent) enforced the odometer block if it existed on the prior title document. Fifteen states do not. An "enforced data item" means the item (in this case the odometer reading) is required before the title is processed.

The questionnaire returns to the states' current practices.

6. Do the state DMV offices check, either routinely or on a "spot-check" basis, to verify odometers submitted by title applicants? _____Yes (routinely)
_____Yes (spot-check) _____ Don't check

More than half of the state Department of Motor Vehicles offices check the odometer reading submitted by title applicants. Figure 4-2 shows 42 percent routinely check and 15 percent spot check.

FIGURE 4-2
Percent of States that Check Mileage



7. Does your system alert the titling offices, or title applicant, when a vehicle is being titled with lower mileage than indicated on a previous title? _____Yes (alert titling office) _____ Yes (alert applicant) _____ No alert given

Most states alert the titling offices and/or applicant when a vehicle is being titled with lower mileage than indicated on a previous title. But surprisingly 19 percent of the states neither alert the title office or applicant when a vehicle is being titled with lower mileage than indicated on a previous title. Table 4-3 shows how the states responded to this question.

TABLE 4-3
How States Respond When a Vehicle Is Being Titled with Lower Mileage than Indicated on a Previous Title

Response	Number Of States	Percent
Yes - alert titling office	12	25%
Yes - alert applicant	14	29%
Yes - alerts titling office and applicant	13	27%
No alert given	9	19%

8. Does your state capture odometer readings at any time other than titling --i.e., annual registration, safety or emissions inspections?_____Yes _____ No
If "yes", are the readings entered into the title records? _____Yes _____ No

Slightly fewer than half of the states (46 percent) capture odometer readings other then when the vehicle is titled. But only 18 percent of the states who capture other readings enter the readings into the title records.

Questions 6, 7, and 8 list three different ways to detect odometer fraud. Very few states use all three ways listed in these questions to detect odometer fraud. Sixteen states (33 percent) routinely verify odometer readings submitted on title applications and alert the titling office or the applicant when a vehicle is being titled with lower mileage than indicated on a previous title. Only four of those sixteen states also capture and automate odometer readings at any time other than titling.

9. Do you take any action when odometer readings show signs of alterations on the title being surrendered with the application for a new title? _____ Yes _____ No
If "yes", are the readings entered into the title records? _____Yes _____ No
If "yes", please describe action taken.

Most states (94 percent) take action when the odometer readings show signs of alterations on the title being surrendered. Table 4-4 summarizes the actions taken. Of those states that take action, 65 percent do not enter the reading into the title records. The action most commonly taken by these states is to process the title only after subsequent documents explain the alteration. In some states, the cases are referred to law enforcement officials if odometer fraud is suspected. Only a handful of states routinely refer the cases to law enforcement officials for investigation.

Thirty-one percent of the states that take action do enter the reading into the title record. But in most of these states, the correct reading is entered or the reading is branded as unknown or not actual mileage. In some of these states, the cases are also forwarded to law enforcement agencies for investigation.

Only the true odometer reading should be entered into the title record. It appears that it is irrelevant whether a state enters or does not enter an altered odometer readings. In either case, the states enter what they believe is the true mileage or the mileage is branded as incorrect or unknown.

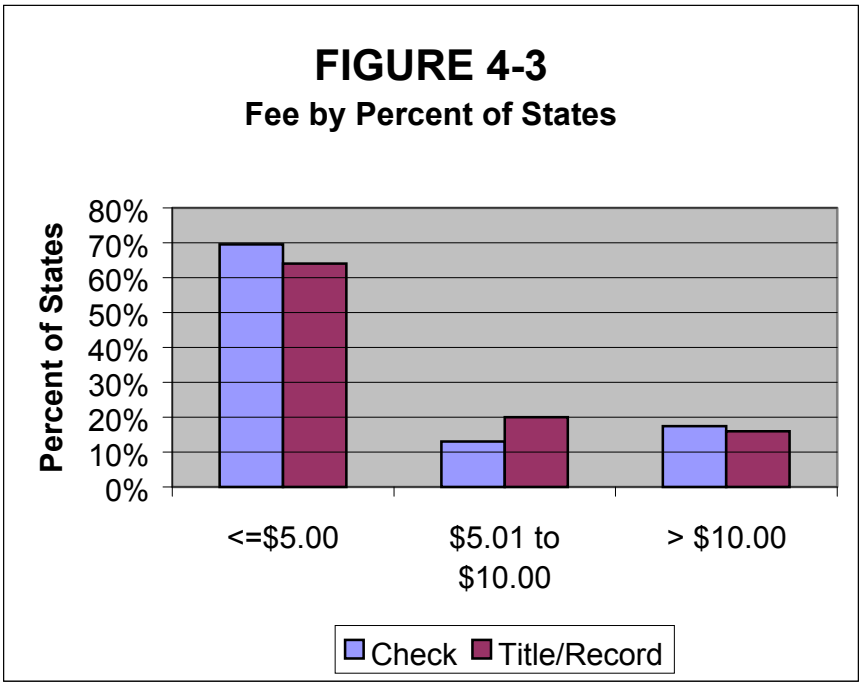
TABLE 4-4 States That Do and Do Not Enter an Apparently Altered Reading into the Title Records by Actions Taken and Number of States		
States that do not enter the reading into the title records		
	Action taken	Number of States
	The title is not processed until subsequent documents explaining the alteration are obtained.	13
	The case is investigated unless subsequent documents explaining the alteration are obtained. The case is always investigated if DMV has reason to suspect illegal intent.	7
	DMV notifies law enforcement agency for investigation.	5
	Do not issue a new title.	3
	The discrepancies must be resolved, otherwise title is branded and odometer discrepancy is noted or mileage is recorded as not known.	2
	Obtain verification from inspection station.	1
States that enter the reading into the title records		
	DMV notifies law enforcement agency for investigation.	4
	Title application is suspended pending receipt of supplemental assignment documents showing correct mileage. Copies of altered documents may be sent to the odometer enforcement area.	4
	Title is branded.	2
	Background check and possible brand on title.	1
	Refused if noticed, otherwise branded “not actual mileage”.	1
	Conduct investigation if reading is incorrect on title. Correct title to reflect mileage, if known. Otherwise, true mileage is not known.	1

10. How frequently do applicants request a DMV check of odometer readings, (i.e., title/odometer history)? Estimate _____ percent of title applicants.

More than half of the states (58 percent) estimate that less than 5 percent of the applicants request an odometer reading check. Six states estimate that 5-10 percent of the applicants request a check. Four states estimate 15-25 percent and one state estimates 40 percent. Three states estimate that more than 50 percent of the applicants request a check. (Six states did not answer this question.) For the 42 states that answered the question, the average is approximately 9 percent.

11. What is the fee for a title history check? $_____ per check, or $_____ per title/record

Most fees are $5.00 or less per check or per title/record. Figure 4-3 shows the cost per check and per title/record by percentage of states. The cost per check varies moderately by state from $1.00 to $17.50. The cost per title/record also varies by state from $.075 to $35.00. Eleven states provided fees for both per check and per title/record. In four of the 11 states, the fee per title/record was at least twice the fee per check. In the other seven states, the fee was the same per check and per title/record. The average cost per check is $4.86 weighted by the percentage of applicants requesting a check and the average cost per title check is $3.98 weighted by the percentage of applicants requesting a check.



As expected, the state with the lowest fee per title/record check ($0.75) has one of the highest percentage (60 percent) of applicants requesting a check. The states with the highest fees ($15.00 or more) per check or per title/record have a very low percentage (0-2 percent) of

applicants requesting a check. But 61 percent of the states that have 0-2 percent of the applicants requesting a check charge a modest fee ($5.00 or less) per check or per title/record.

To estimate the total spent by applicants for odometer checks, we need to estimate the number of title transaction a year, specifically the number of older vehicle title transactions a year. There are 15 million new vehicles sold annually, so there are 15 million new vehicle transactions annually. There are approximately 190 million passenger vehicles registered, so there are approximately 190 - 15 = 175 million older vehicles registered. If we assume an older vehicle changes hands twice during its lifetime (14 years), then there are approximately 175 * 2/14 = 25 million older vehicle title transfers a year for a total of 15 + 25 = 40 million transactions. Thus, 40 * 9% = 3.6 million applicants request a title check per year. Therefore, it cost these applicants 3.6 * $4.86 = $17 million for odometer reading checks or 3.6 * $3.98 = $14 million for title/record checks. This is inexpensive when compared to the annual cost of odometer fraud ($235 million) estimated in Chapter 3.

12. Has the rate of title/odometer history checks changed since the implementation of the new odometer disclosure requirement? _____Yes, increased _____Yes, decreased _____ No change

More than half of the states (53 percent) did not see a change in the rate of title/odometer history checks since the implementation of the new odometer disclosure requirements. In 36 percent of the states, the rate of title/odometer history check increased and in 4 percent of the states, the rate decreased.

13. Was the change to the new requirement accompanied by any special publicity, (i.e., news bulletin, media announcement)? _____Yes _____ No If "yes", please specify.

Sixty-seven percent of the states announced the new requirements with special publicity. The most common type of publicity was directed toward the general public with press releases, public service announcements, and/or newspaper ads. Some states also notified dealers with direct mailings or articles in trade publications. Other states offered seminars to dealers. A few of the states also notified title agents, lienholders, and/or attorneys about the changes with bulletins or seminars.

14. Was the title fee increased as a result of the requirements of 49 CFR, Part 580? Yes _____ No If increased, please state: _____ Old fee _____ New fee

Most of the states (46) did not increase the title fee because of the requirements. Only two states did increase the title fee as a result of the requirements. In one state, the fee went from $3.50 to $5.00 and in the other state the fee went from $5.00 to $10.00.

15. Does your state operate any independent consumer protection office(s) which can assist consumers in the area of odometer fraud? _____ Yes _____ No _____ Don't know

More than half of the states (58 percent) have independent consumer protection offices that can assist consumers in the area of odometer fraud. Twenty-nine percent of the states do not have an independent consumer protection office and 12 percent of the state DMV's did not know if their state has an independent consumer protection office.

16. If the answer to question no. 15 is "yes", please provide address/phone number, if known.

States listed the address and phone number of the independent consumers protection office. Responses to this question are not included in this report.

17. If your state has a consumer protection office(s), do they interact with the DMV in cases of suspected odometer fraud? _____ Yes _____ No If "yes", please explain.

More than 80 percent of the states with consumer protection offices do interact with the DMV in cases of suspected odometer fraud. In most states, the DMV office will provide information and other assistance to the consumer protection office. In a few states, the consumer protection office is part of the DMV.

18. Are you aware of any odometer fraud investigation cases that have been conducted in your state in the past year? _____Yes _____ No

Sixty-three percent of the states are aware of an odometer fraud investigation being conducted in the past year.

19. If the answer to question no. 18 is "yes", please cite the investigating agency, (name, address) if known.

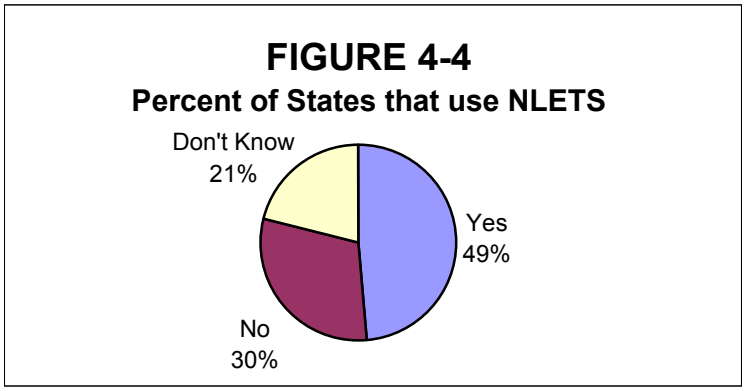
States listed the name and address of their state's investigating agency. Responses to this question are not included in this report.

20. Are the DMV offices in your state familiar with the National Law Enforcement Telecommunication System (NLETS) operated by the United States Department of Justice? _____Yes _____ No

and

21. Do the DMV offices in your state utilize the NLETS for assistance in odometer fraud investigations? _____Yes _____ No _____ Don't know

Sixty-nine percent of the states are familiar with NLETS. NLETS is a computer tracking system that directs computer inquiries to each state to locate the vehicle by the VIN. Almost half of the states familiar with NLETS use it in odometer fraud investigations. The remaining states familiar with NLETS either do not use it or do not know if they use it. Figure 4-4 shows the use of NLETS by the states that are familiar with NLETS.



22. Do you have any information to indicate that the new odometer disclosure requirement is helping to deter odometer fraud? _____Yes _____ No If "yes", please explain.

Only seven states (15 percent) do have information that indicates the new disclosure requirement is helping to deter odometer fraud. One state saw a decline in odometer fraud from 1987-1995, but now sees a rise because there are no funds available to investigate odometer fraud cases in their state. The other states that responded "yes" to this question explained that the new disclosure requirements make it easier to follow a vehicle's history and mileage or to make buyers more aware of the odometer fraud problem. The courts in one state have become stricter on enforcement of odometer fraud. The majority of states do not have any information to indicate the new requirement is deterring odometer fraud.

23. Are you aware of any studies or articles in your state which have dealt with odometer fraud? _____Yes _____ No If "yes", please cite.

Only five states were aware of articles in their state on odometer fraud. None of the other states knew of any articles. None of the 48 states were aware of any studies on odometer fraud.

24. Please provide any comments you would like to make concerning odometer fraud, (its extent, effectiveness of efforts to combat, additional actions that should be taken, etc.)

Nineteen states provided comments concerning odometer fraud. Most of the comments were recommendations to reduce and detect odometer fraud. The following is a summary of their recommendations:

- Increase penalties for odometer fraud. (4 states) Below are some of the specific comments received on this topic:
  1) "State laws is only a misdemeanor and should be upgraded to a felony."
  2) "Make odometer fraud a predicate offense[3] so forfeiture of assets could be possible."
  3) "No Federal or State Attorney from the Attorney General's Office will represent a consumer who has purchased a vehicle with an odometer roll-back. The Federal Information and Cost Saving Act, 15 USC SS 1981-1991, allows three time's actual damages or $1500, whichever is greater. Unfortunately, since no AG's will take these cases, the consumer ends up being stuck since they cannot afford a lawyer. The only way to stop odometer fraud is for these individuals to be prosecuted."

- Implement the National Motor Vehicle Title Information System (NMVTIS). (3 states) The Anti-Car Theft Act of 1992 mandated this. It is supposed to be a system similar to Carfax but run by the states. One state believes "NMVTIS will allow additional outlets to deter odometer fraud." Another state says "If used properly, NMVTIS will further aid efforts to combat odometer fraud."

[3]A predicate offense in this state's criminal code appears to be a conviction of a prior odometer fraud offense or conviction of another offense such as a homicide committed while rolling back an odometer.

- Require uniform titling procedures across the U.S. (3 states) One state wants "detailed rules, regulations, policies from NHTSA." Another state is "often criticized for enforcing and requiring what other states do not."

- Increase resources. (3 states) The states want more staff to detect and investigate suspected odometer fraud cases and to prosecute criminals. One state would like "help with enforcement of small cases; 1-25 vehicles from the federal government."

- Increase public awareness. (2 states)

- "Make odometer reading blank with each disclosure instead of having a box to check." (1 state)

- Require mileage reading more frequently. (1 state) This state says, "Odometer fraud is almost impossible to stop since it usually involves late model vehicles with one title issued, the initial title." This state "requires vehicle owners to provide mileage at each registration renewal; the mileage is verified by DMV vehicle inspectors and is loaded into DMV's database. This makes it extremely difficult for an individual to roll back mileage and not be caught."

Several states had comments about the Power Of Attorney (POA)[4].

1) "Many states do not have or provide secure reassignment documents and/or POA. This creates a hardship on citizens and industry when involved in inter-state vehicular commerce."

2) "It is possible that common use of the secure POA forms may extend beyond the use intended."

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[4]Disclosure of odometer information is done on a power of attorney form when the transferor title is held by a lienholder, and therefore not physically in the possession of the transferor. It is also used in cases where a vehicle title has been lost. In such cases, the transferor gives power of attorney to the transferee for purposes of mileage disclosure. POA forms are issued by the state to the transferor. The transferor discloses the odometer at the time of transfer on the POA form. The transferee signs and prints his/her name. Upon receipt of the transferor's title, the transferee completes the mileage disclosure on the title exactly as it appeared on the POA form. In some cases, the transferee may give power of attorney to his/her transferor to review the title and any reassignment documents for mileage discrepancies. Whoever exercises the power of attorney must also complete a certification that he/she has disclosed on the title document the mileage provided on the POA form and the mileage is greater than previously stated mileage on the title and reassignment documents. If the mileage is less than that previously stated on the title and any reassignment documents, then the power of attorney is void.

3) "The use of the secure POA has not been used properly and has added an additional step for automobile dealers. Dealers do not understand its use."

4) "Stricter guidelines on POA for dealers and lienholders."

5) The state "was contacted earlier this year by the [state] Auto Dealers Association concerning the restrictive nature of statutory requirements associated with the secure POA forms. This association advises that [state] dealers need relief and may seek legislation to amend statute or petition to amend current rules."

The following is a summary of the other comments:

- The requirement for printed names is the most beneficial feature of odometer laws. It is "valuable for investigating complaints."

- "Consumer and vehicle dealers are more aware of odometer fraud. Interest by dealers in checking vehicle title mileage information has increased."

- One state "investigates approximately 100 consumer complaints/inquiries about odometer fraud each year. The DOT also conducts large odometer fraud cases with a total of approximately 500-700 vehicles each year. Approximately 50 percent of [the] vehicles are found "spun" and approximately 85 percent of the vehicles are spun if they were leased vehicles."

- "Close coordination between states re: exchange of titles and related vehicle records."

- "NHTSA has failed to oversee compliance by the states with the regulations contained in 49 CFR, Part 580, and consequently there are states that are not in complete compliance."

SUMMARY

The new odometer disclosure requirements contained in 49 CFR, Part 580 were extensive. None of the states met all the requirements before the regulation was issued and only 8 states met all the requirements before the April 29, 1989 deadline. By April 18, 1994, all states complied. Since all states comply and require odometer disclosure for all vehicle transfers, all used car dealerships are also complying. They are disclosing the odometer reading for all vehicle transfers, although the reading disclosed may not be the true mileage on the vehicle.

Most of the states had many changes to make to meet the new requirements. Even though most of the states already had an odometer reading block on their title, most states had to revise their

odometer disclosure statement and more than half of the states had to use new paper and/or implement new procedures.

As of late 1997, very few states appeared to have a comprehensive detection program in place to identify cases of suspected odometer fraud. Only four states took all three of the following steps to detect and deter fraud: (1) routinely verify odometer readings submitted by title applicants, (2) alert the titling office or applicant when a vehicle is being titled with a lower mileage than indicated on a previous title, and (3) capture and automate odometer readings at any time other than titling. However, a much larger number of states had implemented at least two of the steps. Sixteen states routinely verified odometer readings submitted on title application and alerted the titling office or the applicant when a vehicle is being titled with a lower mileage than previously indicated on the title. Most states had implemented at least one of these steps.

Fewer than ten states notify law enforcement agencies when the odometer reading show signs of alterations on the title being surrendered. Most states allow the applicant to provide additional documents to explain the apparent alteration first. If the additional documents are not acceptable then in some states the case is referred to the law enforcement agency.

Most applicants do not request a check of odometer reading or title history. Only three states estimate that more than 50 percent of the applicants request a check. The average frequency of applicants requesting a check of odometer readings is 9 percent. This is an inexpensive service. The weighted average fee per check is $4.86 and the weighted average fee per title/record check is $3.98, weighted by the percentage of applicants requesting a check.

More than half of the states have independent consumer protection offices and most DMV offices interact with these offices in cases of suspected odometer fraud. Almost seventy percent of the states are familiar with NLETS and almost half of those states know that their state uses NLETS. Almost 65 percent of the states are aware of odometer fraud investigations being conducted in the last year. But only seven states have information indicating that the new disclosure requirements are deterring odometer fraud.

CHAPTER 5

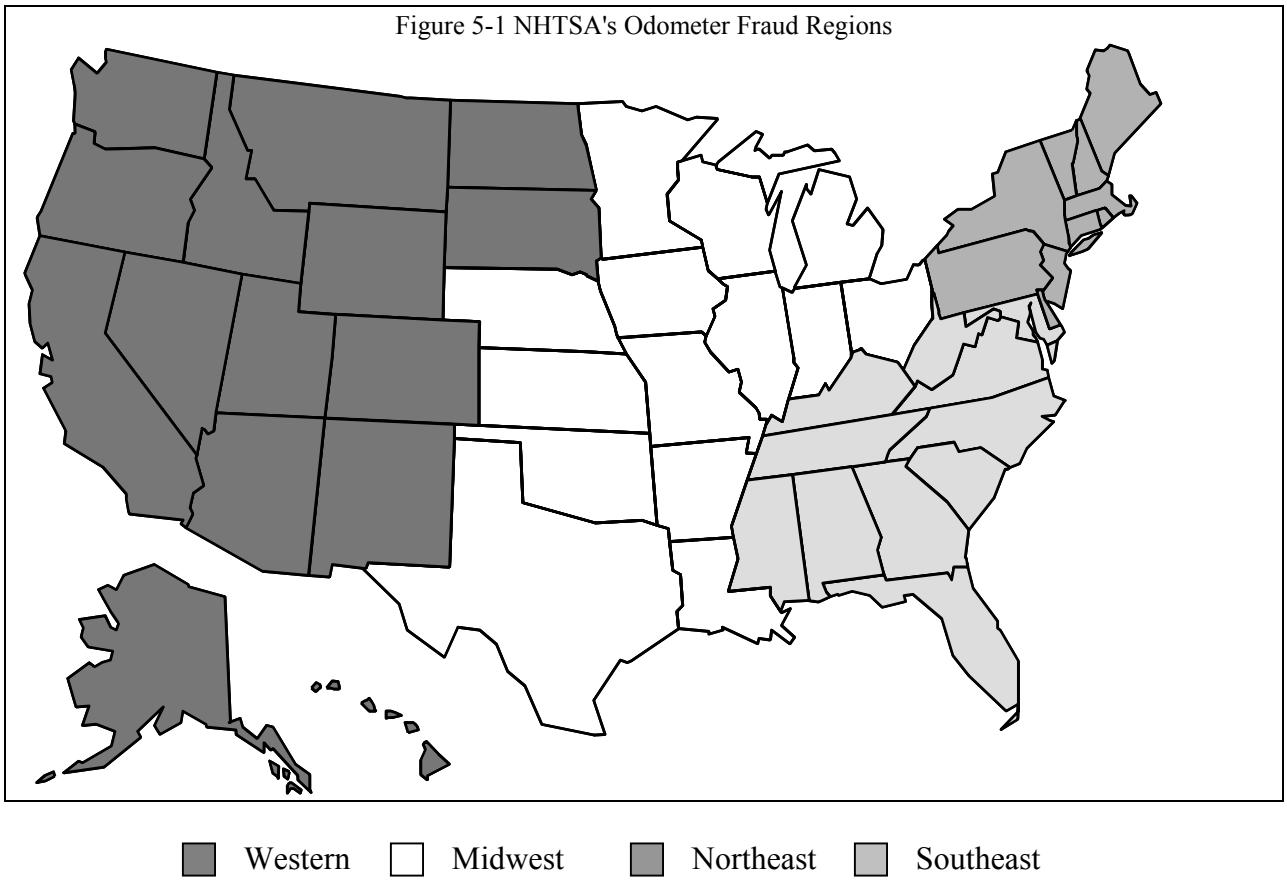
FEDERAL EFFORTS TO DETER ODOMETER FRAUD

Since 1978, NHTSA has maintained at its headquarters location, in Washington, an Odometer Fraud Enforcement Program. For the most part, this program has concentrated on the investigation of specific cases of alleged odometer fraud, primarily in small geographical areas suspected of being (or known to be) "hotbeds" for such practice. Cases investigated by NHTSA are usually turned over to the U. S. Department of Justice (DOJ), or to state enforcement authorities for prosecution or further legal action.

ODOMETER FRAUD STAFF

NHTSA odometer fraud staff (OFS) consists of 8 employees. There are two headquarters staff members, four regional investigators and two regional staff assistants. Each one of the regional investigators is responsible for one-fourth of the country: Northeast, Southeast, Midwest, or Western. Figure 5-1 shows the states in each region.

Figure 5-1 NHTSA's Odometer Fraud Regions



The Southeast region also includes Puerto Rico and the Western Region also includes Guam. The Northeast and Southeast regional offices are in Washington, DC, the Midwest office is in Kansas City, MO, and the Western office is in Denver, CO.

FEDERAL INVESTIGATIONS

NHTSA's prime weapon to deter odometer fraud is its power to investigate cases and refer them to the DOJ for prosecution. Table 5-1 shows the investigations conducted for the last 12 years and the total investigations since the OFS was established. The third column, investigations completed, represents the investigations completed where odometer fraud was substantiated. The average odometer fraud investigation takes about a year to complete. So not all the investigations opened in a particular year are closed in that same year. The 69 investigations opened in 1990 did not all close in 1990. Some of the 38 closed and substantiated investigations in 1990 could have started the year before. Therefore, the percentage of completed investigations by year is inappropriate and not included in the table.

TABLE 5-1
NHTSA's Odometer Fraud Investigations by Year

Year	Investigations		Vehicles Involved	Vehicles Per case	Referred to DOJ	Percent Referred	Cases Prosecuted	Defendants Convicted*
	Opened	Completed						
1990	69	38	320	8.4	21	55%	13	16
1991	63	25	717	28.7	23	92%	18	18
1992	36	22	1,563	71.0	20	91%	12	17
1993	22	12	105	8.8	9	75%	5	6
1994	37	39	2,274	58.3	34	87%	23	23
1995	38	26	1,468	56.5	21	81%	16	26
1996	26	14	852	60.9	9	64%	9	16
1997	26	9	730	81.1	9	100%	3	3
1998	33	14	1,006	71.9	9	64%	7	7
1999	17	14	1,707	121.9	14	100%	4	3
2000	20	17	1,831	107.7	14	82%	1	1
2001	5	3	233	77.7	2	67%	1	2
Total 90-01	392	233	12,806		185		112	138
Total 78-01	2,038	997	16,538		352		230	265

* Convictions are under the year of case completion, not the year conviction was obtained.

The number of vehicles involved per case appears to be increasing. This probably accounts for the declining number of cases opened in recent years. Since each case involves more vehicles, it takes more time to investigate but the number of investigators has remained constant. Therefore, fewer new cases are opened. NHTSA has no specific evidence that the declining number of opened cases is due to a decline in odometer fraud. Over the last twelve years each case involved approximately 12,806 / 233 = 55 vehicles per case or 12,806 / 138 = 92 vehicles per convicted defendant.

The DOJ will only prosecute certain cases. The cases must involve at least 100 vehicles or show a pattern of fraud by the defendant. NHTSA consistently refers a high percentage of completed and substantiated cases to the DOJ. The average over the 12-year period is 80 percent. DOJ takes about one to two years to prosecute a case. So only some of the referred cases in recent years have been fully prosecuted. The remaining cases are still pending at the DOJ. DOJ prosecuted about 15 cases a year between 1990 and 1995. During that same time frame, about 18 defendants a year were convicted of odometer fraud. Prison sentences for odometer fraud convictions range from 2 to 6 years.

The 2001 case totals are low because the majority of the investigators' time was devoted to supporting DOJ to get some of the backlogged cases prosecuted. Even though the table shows cases closed and referred to DOJ in 2001, the OFS had to devote a lot of support time to DOJ once DOJ starts grand jury proceedings. One case went to a lengthy trial that tied up an investigator for almost 5 months.

Table 5-2 shows the amount of criminal fines and restitution ordered for odometer fraud cases by year. The Victims Rights and Restitution Act of 1990[1] required the courts to order restitution from the convicted criminal before assessing fines. Therefore, if there are remaining assets after the ordered restitution is collected, it can be collected for fines. But in most cases, the assets of convicted criminals are insufficient to provide for the total restitution ordered, o the courts impose modest or no fines.

This act shifted the money previously ordered for fines to restitution. Prior to 1990, the courts ordered an insignificant amount of restitution: approximately $156,500 was ordered for restitution and $2,516,500 was ordered for fines. Since 1990, the total amount of federal fines imposed for odometer fraud is $846,000 and the total amount of restitution ordered for odometer fraud is $4,029,300. The average fine per defendant from 1990-2001 is about $6,130 and the average restitution ordered per defendant in the 1990's is $29,198. Since the average case involved 92 vehicles, the restitution per vehicle is $29,198/92 = $230, well below the estimated $2,336 actually lost by consumers per rollback (Chapter 3). The restitutions ordered might not be covering the additional cost consumers paid at the time of purchase for vehicles with rolled back odometers (probably because defendants do not have sufficient assets to pay full restitution).

[1]Victims Rights and Restitution Act of 1990, Public Law 101-647.

TABLE 5-2
Fines and Restitution for Odometer Fraud Cases by Year

	Cases Completed & Substantiated	Cases Prosecuted	Defendants Convicted*	Criminal Fines Federal*	Restitution Ordered*
1990	38	13	16	$71,100	$37,300
1991	25	18	18	$6,200	$22,000
1992	22	12	17	$139,500	$65,000
1993	12	5	6	$6,000	$34,000
1994	39	23	23	$21,000	$187,000
1995	26	16	26	$130,700	$294,500
1996	14	9	16	$63,000	$1,611,500
1997	9	3	3	$10,000	$162,000
1998	14	7	7	$80,000	$1,532,000
1999	14	4	3	$232,500	$41,000
2000	17	1	1	$1,000	$0
2001	3	1	2	$85,000	$43,000
Total 90-01	233	112	138	$846,000	$4,029,300
Average per Defendant				$6,130	$29,198
Total 78-01	997	230	265	$3,368,100	$4,385,200

* Convictions, fines, and restitution ordered are under the year of case completion, not the year of conviction.

ASSISTANCE TO STATES AND COMMUNITIES

Besides their own investigations, the OFS provide much needed assistance to state and local law enforcement agencies in their investigations. The interstate nature of odometer fraud, and the used car industry as a whole, creates many problems for these agencies since they have no authority to compel the production of evidence from outside of their state. Because NHTSA has nationwide authority, OFS assists the state and local agencies in obtaining the evidence necessary to complete their investigations. In many cases, the investigators have formed and provide leadership to multi-state teams to enhance enforcement efforts in specific geographical areas where odometer fraud is widespread.

The OFS investigators are considered to be the national experts in odometer fraud. Therefore, they are called upon to provide training to state and local agencies. During the past few years, OFS has trained more than 3,000 titling officials in state motor vehicle departments in detecting

altered and fraudulent motor vehicle title documents. The investigators also meet with members of the new and used car industry to advise them of their investigative activities and garner their support for NHTSA's law enforcement program.

In the 1980's, the enforcement program was augmented with funding in the form of state grants. These funds have primarily been used to promote and assist odometer fraud enforcement efforts at the state level. The funding in the form of cooperative agreements allows states to initiate or enhance their odometer fraud programs. In some cases, the funding provides in-depth training for state investigators. This enhances the state's capability of investigating and deterring odometer fraud and increases NHTSA's capability for investigating odometer fraud for federal prosecution. Table 5-3 shows the amount of funding available by fiscal year to states for their odometer fraud program.

TABLE 5-3
State Odometer Fraud Funding Available by Fiscal Year

Fiscal Year	Amount
1996	$60,000
1997	$60,000
1998	$135,000
1999	$150,000
2000	$150,000
2001	$150,000
2002	$150,000
2003	$150,000*

* Amount requested.

ASSISTANCE TO THE PUBLIC

Since 1993, OFS has been notifying all victims of odometer fraud identified during their criminal investigations as required by the Victims Rights and Restitution Act. During the past three years, more than 4,600 victims have been notified. The notification serves two purposes. The first is to advise them that they have been defrauded and how to recover their losses, and the second is to let them know that when they sell their vehicle they must disclose to the buyer that

the odometer reading is not the true mileage. This ensures that subsequent purchasers of the vehicle do not also suffer financial losses. Victims also are given documented evidence of the high mileage and information outlining various methods of determining their losses.

The victim notification process has not only been successful in deterring odometer fraud, but has been extremely beneficial to the consumers who purchased the vehicles. Since the majority of the tampering occurs in the wholesale market, retail dealers are making more of an effort to ensure that odometers in the vehicles they are purchasing from wholesalers have not been rolled back. When victims receive a notification letter, they normally return to the dealer where they bought the car and demand satisfaction. Although the retail dealers are not usually responsible for tampering, they will normally settle with the consumer in order to protect their reputation in the community. Recently, OFS completed an investigation in New Jersey and Pennsylvania. The four defendants pleaded guilty and received sentences ranging from probation to 64 months in prison. As a result of the victim notification letters in that case, the auto auction that sold the vehicles to the retail dealers settled with all 398 consumers for a total of $1.4 million. The auction, although not responsible for the tampering, made the settlements to show good faith to their customers, the retail dealers. In another investigation in Colorado, OFS identified and notified 74 consumers. As a result of this case, the defendant was sentenced to 30 months in prison and was ordered to pay $429,000 in restitution to the consumers and an auto auction.

Even though there is no provision in the Federal odometer law for NHTSA to take an action on behalf of a defrauded consumer, OFS has established a successful program to respond to consumer problems. Each week the staff responds to an average of 25 complaints from consumers who believe they have bought a used car with an odometer that has been rolled back. The consumers are provided with instructions as to what evidence is necessary to prove the rollback, how to obtain the evidence, what action to take to recover their losses, and how to determine the losses. Some of the consumer complaints lead to OFS investigations.

SUMMARY

NHTSA's odometer fraud program is deterring odometer fraud. NHTSA refers most of their completed and substantiated odometer fraud cases to the DOJ for prosecution. The DOJ has prosecuted more the half of the NHTSA cases and has convicted 138 defendants in these cases over the last 12 years. NHTSA odometer fraud program is also helping states to deter odometer fraud. NHTSA assists with state investigations, trains state titling clerks and investigators, and funds states to initiate or enhance their odometer fraud programs.

NHTSA is also deterring odometer fraud by notifying victims that they have been defrauded. NHTSA advises the victims that when they sell their vehicle they must disclose that the odometer reading is not the true mileage so the next owner is not defrauded. The notification also helps victims recover their losses mostly from the retailers. This in turn makes the retailers leery of purchasing vehicles from wholesalers, so the retailers make more of an effort to ensure

that the odometers have not been rolled back in the vehicles they are purchasing from wholesalers.

RECOMMENDATIONS

More States should keep annual odometer readings either from vehicle registrations, emission inspections, or safety inspections. More frequent odometer readings would limit the value of rolling back the odometer by taking some of the profit out of it. More States should check title histories and annual odometer reading information when registering vehicles to deter and detect odometer fraud.

Additional funding for NHTSA's enforcement program could

- Provide grants or technical assistance to States for computerized searches of title histories to identify vehicles that may have had their odometer rolled back.

- Develop a standardized training program for titling clerks and train all state titling clerks to check titles for odometer roll back. The program would illustrate the common practices used by criminals to alter odometer readings on titles so that the clerks would know what to look for and where to look for altered readings.

- Increase the state grant program that promotes and assists state odometer fraud efforts and provides in-depth training to state investigators.