Reprint from

Journal of Insurance Regulation

Published by the National Association of Insurance Commissioners

Sex-Divided Mileage, Accident, And Insurance Cost Data Show That Auto Insurers Overcharge Most Women

Patrick Butler

Twiss Butler

Laurie L. Williams

Journal of Insurance Regulation
March, 1988, Vol. 6, No. 3 (Part I)
June, 1988, Vol. 6, No. 4 (Part II,
including Appendices I and II)

CONTENTS

APPENDICES

Distributed by:
NOW Insurance Project

Sex-Divided Mileage, Accident, And Insurance Cost Data Show That Auto Insurers Overcharge Most Women†

*Patrick Butler**
*Twiss Butler***
*Laurie L. Williams****

ABSTRACT

The paper, which is presented in two parts, examines the effect of current pricing—80 per cent unisex—on insurance cost to women by using the same accident, mileage, and price data auto insurers cite to defend sex-rating. The authors distinguish between classification and measurement of on-the-road exposure, and test the response of prices to the known 2:1 ratio at all ages of men's to women's driving exposure and accident involvement. The authors maintain that fixed annual premiums result in windfall profits,

---

 Communications regarding the paper should be addressed to the first author, National Organization for Women, Suite 700, 1000 16th St. N.W., Washington, DC 20036.

The authors are responsible for the factual material presented and the conclusions drawn from it. These conclusions are in agreement with official positions of the National Organization for Women ("NOW") and its chapters 1) that *all* sex discrimination should be eliminated because it is inherently harmful to women and 2) that insurance sex discrimination is defended and the Equal Rights Amendment opposed by those who profit from such sex discrimination.

* Ph.D. (Geochemistry), Harvard University; M.Sc., New Mexico Institute of Mining & Technology; A.B, Harvard University. The author is on the staff of NOW. Responsibilities include development of information on sex discrimination in insurance and pensions, and on the Equal Rights Amendment. The author was formerly a research scientist with the Nat. Aeronautics and Space Administration's Apollo program and was the Curator of Lunar Samples at the Johnson Space Center.

** B.A. (English Literature), Vassar College. The author is on the Action Staff of NOW, with responsibility for analyzing institutional promotion of sex discrimination in the areas of pregnancy, insurance, pornography, and communication and education media.

*** J.D., Dickinson School of Law; B.A. (Psychology & Biology), Wilson College. The author is attorney for *Pennsylvania NOW* in its price and sex discrimination case against auto insurers. She practices law in Harrisburg, Pennsylvania, concentrating in family law and employment sex discrimination law.

which prove prices are not responsive to mileage exposure. They present evidence that competition depresses men's prices below cost. The authors conclude that women are overcharged as a class; they examine the regulator's responsibility to prevent pricing that ignores significant cost differences and to prevent misrepresentation of such pricing to the public.

PART I

INTRODUCTION

At every age in their driving lifetime, men as a class drive twice as many miles and have twice as many accidents as women. This fact consistently demonstrates on a large scale that accidents are proportional to mileage and that mileage is both the objective measure of a car's exposure to risk of accidents and the objective measure of the cost of providing insurance protection for the car's owner and users.

Auto insurers acknowledge this mileage-to-cost relationship on a class basis, albeit imprecisely, when they differentiate prices by the sex of the presumed driver for 20 per cent of cars insured.[1] They ignore it entirely, however, in pricing insurance for the 80 per cent of cars that are within the large unisex "adult" classes. Neither verified odometer readings nor driver sex affects premium charges for "adult" cars.

This paper establishes that the prevailing system of charging for auto insurance by fixed annual prices is a contrived mixture of unisex- and sex-pricing; and that under the prevailing system, prices do not reflect the measurable differences known to exist in average and individual costs. Further, this paper explains for whose benefit and at whose expense this illogical system is allowed to exist.

The industry's battle to preserve sex-pricing of insurance coverage for a minority of cars is, in fact, a battle to preserve the much larger system of fixed annual unisex charges to which it is linked by a chain of false logic that mixes fact with emotion.

An Aetna advertisement, *Our Case for Sex Discrimination*,[2] epitomizes the industry's technique of using false logic to persuade the public

1. Since this paper addresses methods of pricing auto insurance, the term "insurer" is used to include non-company "ratemakers," such as Insurance Services Office, Inc. (ISO) as well as insurance companies that may or may not be "ratemakers" for the insurance they sell.

2. The two-page ad was run nationally from June to December, 1981, appearing 2 to 3 times each in the *Wall Street Journal*, *Sports Illustrated*, *Newsweek*, and *U.S. News and World Report*. The ad was also targeted to opinion-makers in the news media with appearances in *Broadcasting* magazine (July 27) and the *Columbia Journalism Review* (Sept./Oct.). The ad is reproduced in Appendix III (added in reprint).

that insurance prices are based on cost and on what men and women deserve to pay.[3] In a 3/4-page photograph, a woman standing on a small stack of dented cars gazes up at a man who sits casually atop a towering stack of smashed cars while he addresses the reader in large print on the facing page:

> Consider the nearly double crack-up rate of male drivers 25 and under versus female drivers 25 and under. Suppose we at Aetna Life & Casualty ignored this statistical reality. Sister Sue would pay 40% more for auto insurance so Brother Bob could pay 20% less. Unfair![4]

Which of these implied untruths do insurers want the public to accept? 1) That men drivers over 25 do not have "double the crack-up rate" vs. women drivers over 25? 2) Or that insurers sex-price all auto insurance and thus do not ignore "statistical reality?" 3) Or that there is some indescribable insurance method in use for assessing the costs of men's "double crack-up rate" without sex-pricing?[5]

The *factual* false logic assumes that making a price differentiation tied to cost differences in one area—the 20 per cent of cars for which insurance is sex-priced—"proves" that prices for all cars are precisely and accurately based on cost. The *emotional* false logic assumes that, having endured sex-based surcharges in youth as the price of virility, adult men have paid their dues and are thenceforth entitled to lifetime subsidization by a system that does not charge for auto insurance protection by the amount consumed.

Doing Sex Discrimination 'Better'?

In theory, sex discrimination could be done "better;" *i.e.*, by using sex-divided pricing for all cars rather than by limiting it to 20 per cent of cars as is currently done. In fact, however, any proposal to do sex dis-

---

3. By pointing out that a difference exists between men's and women's accident costs, insurers falsely imply that they are responding to it with a difference in price.

4. The data in the "Sister Sue" sentence establish unequivocally that the sex-prices cited for cars with men drivers are 75% more than for cars with women drivers, and are paid on 53% of sex-priced cars. The "Bob and Sue" price changes and the values underlying them are typical of those used by insurers to threaten women with the effects of unisex pricing. Such values are consistent with values that appear when accident and mileage data are used to estimate average overcharges to women age 25 and older under the current unisex-pricing system. The Aetna ad confirms that most women, who are currently charged unisex prices, have in effect already had their prices raised 40%, as will be discussed in Subject 8, *infra*. See also, note 9, *infra*.

5. To test for the existence of indescribable methods of cost-based pricing, price variations across and within unisex price classes in response to variation in mileage are considered as Subjects 5 & 6, *infra*.

crimination "better" is either frivolous or malevolent. Sex discrimination was not invented to benefit women. It is invariably used selectively and can be relied upon to operate to women's economic disadvantage. Significantly, no industry statement opposing "unisex" as harmful to young women—or to their fathers' wallets—includes a proposal to do sex discrimination better by charging adult drivers sex-divided prices.

Cost-measuring systems used in other types of insurance, as well as in non-insurance metered goods and services, show that auto insurance could be sold in the same way—as a routine commercial transaction in which individual consumers are charged only for the amount of insurance protection consumed through actual on-the-road exposure to risk of accident[6] as accurately recorded by the odometer on the covered car.[7] The obvious question is why insurers ignore this normal practice when pricing private passenger automobile insurance. A standard insurance textbook states an axiom about auto insurance cost and its measurement as if it applied only to public autos (buses and taxis):

> Because public automobile rates are high and because there is no risk when the car is not in operation, a system of rating has been devised on an earnings basis per $100 of gross receipts [i.e., per cent of total passenger fares] or on mileage basis [i.e., total miles operated times a cents per-mile rate].[8]

For competitive sales reasons which this paper will examine, insurers choose to base charges for insuring private passenger automobiles, not on actual on-the-road exposure to risk, but instead on a mileage average that inaccurately assumes that all cars within each class consume the same amount of insurance protection. Insurers consequently overcharge all low mileage drivers and most women by charging these groups for

6. Premium is consumed (*i.e.* earned by the insurer) while the insurance for which it pays is providing protection. A life insurance premium is not refunded if the insured survives the year; it has been consumed, day by day throughout the year. Auto insurance premium, as payment for protection against loss due to an accident, is consumed mile after mile like gasoline, while the car is being driven. When the car is parked, there is no need for insurance protection against accident loss, and no justification for charging for such protection.

7. Odometer fraud, unlike much of the rampant misclassification fraud in auto insurance, is readily detectable, is prosecuted, and, under existing law, is punishable with severe fines and jail.

8. BICKELHAUPT, GENERAL INSURANCE (11th ed., 1983) at 613.

In his classic 1930 paper on accounting for exposure in premium charges, Dorweiler noted that the mileage basis for computing auto insurance premiums requires payment of an estimated premium initially [like a deposit for electrical or telephone service] with "a final adjustment which would be determined retrospectively." 16 PROC. CAS. ACTUARIAL SOC'Y 319 at 339.

insurance protection that they predictably and actually will never consume.

Some 70 per cent of women who own and drive automobiles, drive their cars significantly less than the national and Pennsylvania averages for automobiles of approximately 10,000 miles annually, and therefore are involved in proportionately fewer accidents than average. For cars driven the adult women's average of about 7,000 miles annually, the overcharge for car accident insurance is about 30 per cent.[9]

Structure of Paper

The structure of this paper is as follows:

Subject 1: Calibration of sex-divided and non-sex-divided insurance prices with public accident data.

Subject 2: Proportionality applies sex-divided public data to examine the proportional relationship between accident frequency and on-the-road exposure of drivers to accident involvement. (The insurance industry provides no insurance cost data on miles of exposure by individual insured cars or by price class.)

Subject 3: Mileage Driven Measures Cost correlates average insurance cost with average driving, and considers how insurers' choice to charge fixed yearly prices rather than to charge for actual mileage driven produces windfall profits.

Subject 4: Only Mileage Measures Individual Exposure distinguishes classification to make "all else equal" from measurement of individual exposure within classes, and compares ways of measuring exposure for different uses of insurance protection.

Subject 5: Across-Class Prices considers the maximum possible effectiveness of current classification price levels under fixed annual exposure charges in responding to the known range of driving exposures of cars and to the known difference in driving exposure between men and women.

Subject 6: Within-Class Prices examines within-class prices over a range of mileage exposure to assess price responsiveness to large differences in actual exposure to risk of accident. Assuming an av-

9. If instead of the current adult prices which are unisex, adult women as a class were being charged sex-divided prices at 0.7 of the unisex-average prices, then an increase to the unisex-average (from 0.7 to 1.0 times base price) would be a 43% increase that is equivalent to the threatened 40% increase to the "unisex" average for "Sister Sue" in the Aetna ad (text at note 4, *supra*).

erage 10,000 annual miles for the cars in an insurer's price class, costs to consumers under the current fixed annual price basis are compared to consumer costs on a price per-mile basis.

Subject 7: Distribution of Overcharges assesses the distribution of overcharges to women on the bases of both annual mileage and annual accident probability.

Subject 8: Competition Produces Discrimination shows how competition depresses men's prices below cost at women's expense.

Subject 9: Summary and Regulators' Responsibility summarizes the evidence concerning the overpricing of women's automobile insurance and considers insurance regulators' responsibility for approving the overcharges and for failing to meet their obligation to the public by exposing insurers' misinformation about the sex discrimination that conceals the overcharges.

The first four Subjects are discussed in Part I. The remaining five Subjects are contained in Part II, which will appear in the June, 1988, issue of the Journal of Insurance Regulation.

Sources of Information

Much of the information and evidence on which this paper is based was developed in preparation for litigation in *Pennsylvania NOW v. State Farm* [hereinafter *Pennsylvania NOW*] before the Pennsylvania Insurance Department.[10] Consequently much of the information cited relies on accident data, price distributions, rate filings, and testimony that apply to Pennsylvania.[11] This article draws upon the testimony of industry

10. Docket No. R86-9-6, 1986. (In the Complaint filed in September, 1986, Pennsylvania NOW and six individual members are suing defendants for overcharging low-mileage drivers in violation of the Pennsylvania Casualty and Surety Rate Regulatory Act, for the differential harm such violation inflicts by overcharging women as a targeted group in violation of the Pennsylvania Equal Rights Amendment and the 14th Amendment to the U.S. Constitution, and for deceiving women policyholders through mailings that threatened the loss of nonexistent benefits from sex-priced insurance in violation of the Pennsylvania Unfair Insurance Practices Act.) (Dismissal of the alleged constitutional and Unfair Insurance Practices Act violations prior to 8 days of trial in May and June 1987, and dismissal in February, 1988, of the alleged Rate Regulatory Act violations are under appeal, Pennsylvania NOW v. Ins. Dept., Pennsylvania Commonwealth Court, Docket No. 1276 C.D. 1987 and No. 376 C.D. 1988).

11. Pennsylvania Department of Transportation [hereinafter "Penna. D.O.T."] accident data appear to be typical, as judged by recent state data on accidents from Massachusetts, New York, South Carolina, Montana, Oregon, and California. Specifically, men's total accident-involvement frequencies are uniformly about twice women's, and in fatal accidents three to five times women's frequencies, overall and within each age group.

actuaries and economists who appeared as expert witnesses for the defendant ratemakers at the hearings in the *Pennsylvania NOW* case. For convenience the full names and affiliations of these persons are listed in the footnote below.[12]

The defendants—State Farm, Nationwide, Allstate, Liberty Mutual, and Insurance Services Office, Inc. ("ISO")—are ratemakers under the Pennsylvania Rate Regulatory Act; they make the prices that apply to 3.8 million cars, more than half of the insured cars in the state. For data not available for Pennsylvania, national data are used.

In addition to the Pennsylvania and national data, California data on driver records from the 1960s and early 1970s are used where appropriate. These data and the studies based on them provide pertinent evidence and continue to be cited by insurers in justifying sex-divided pricing. This paper also references the summaries and interpretations by insurers of the studies based on the California data that are a major part of the May, 1979, 432-page compilation in defense of sex-divided pricing provided by the industry to the National Association of Insurance Commissioners ("NAIC").[13]

---

12. Witnesses testifying on behalf of the insurer-defendants in *Pennsylvania NOW*:

Leroy A. Boison, Jr., Fellow of the Casualty Actuarial Society ("F.C.A.S."), Vice President and actuary with Insurance Services Office, Inc. Testified as an expert on ISO ratemaking policies and procedures.

Gary Grant, F.C.A.S., assistant vice-president with State Farm Fire and Casualty. Testified as an expert on State Farm automobile insurance ratemaking procedures.

Kyleen Knilans, F.C.A.S., associate vice-president of actuarial projects with Nationwide Insurance Co. Testified as an expert on Nationwide's automobile ratemaking practices and procedures.

Michael A. LaMonica, F.C.A.S., senior actuary with Allstate Ins. Co. Testified as an expert on Allstate ratemaking practices and procedures.

Michael J. Miller, F.C.A.S., consulting actuary with Tillinghast, Nelson & Warren, formerly employed by State Farm as an actuary. Testified as an expert on automobile insurance ratemaking.

Robert T. Muleski, F.C.A.S., assistant vice-president and associate actuary with Liberty Mutual Ins. Co. Testified as an expert on automobile insurance ratemaking.

Richard E. Stewart, J.D., Chairman of Stewart Economics, Inc., formerly Superintendent of Insurance of New York and President of NAIC. Testified as an expert on the economics of insurance.

Mavis A. Walters, F.C.A.S., senior vice-president with ISO. Testified as an expert on actuarial and financial considerations affecting prices and profitability of insurers.

13. Entitled *Private Passenger Automobile Insurance Risk Classification, A Report of the Advisory Committee (to NAIC)*, [hereinafter the "*Industry's Sex-rating Compilation*"], it was prepared in response to a December, 1978, recommendation by an NAIC committee that sex and marital status be prohibited as rating factors, but that operator age be retained. *Id.* at 7. It was prepared by 14 employees of insurance companies and their trade associations.

SUBJECT 1: CALIBRATION OF SEX-/UNISEX-PRICED AUTO INSURANCE WITH PUBLIC ACCIDENT DATA

Because insurers choose not to price most cars by sex, they collect no cost data by sex of the driver for most cars.[14] Therefore, it is necessary to use public accident data to assess the extent of overcharges to women. To be used for this purpose, however, the public accident data must be calibrated as a valid measure of insurance cost.

This section considers both sex- and unisex-prices in relation to cost over the entire population of drivers for a driving lifetime of ages 17–70. Particularly informative is the transition from sex- to unisex-pricing in the age range 17–35.

Sex-Unisex Price Distribution

Despite the enormous attention they give to the defense of sex discrimination, insurers do not differentiate their prices by sex of the drivers for most cars. A representative range for the proportion of cars covered under unisex prices is 74 per cent by Allstate to 87 per cent by State Farm (**Exhibit A**).[15] For the individual policyholder, changes between unisex- and sex-pricing are generally tied to the age and marital status of the youngest driver in the household.[16] Moreover, much of the pricing that is counted as sex-divided in Exhibit A actually represents nothing more than token discounts or surcharges.[17]

---

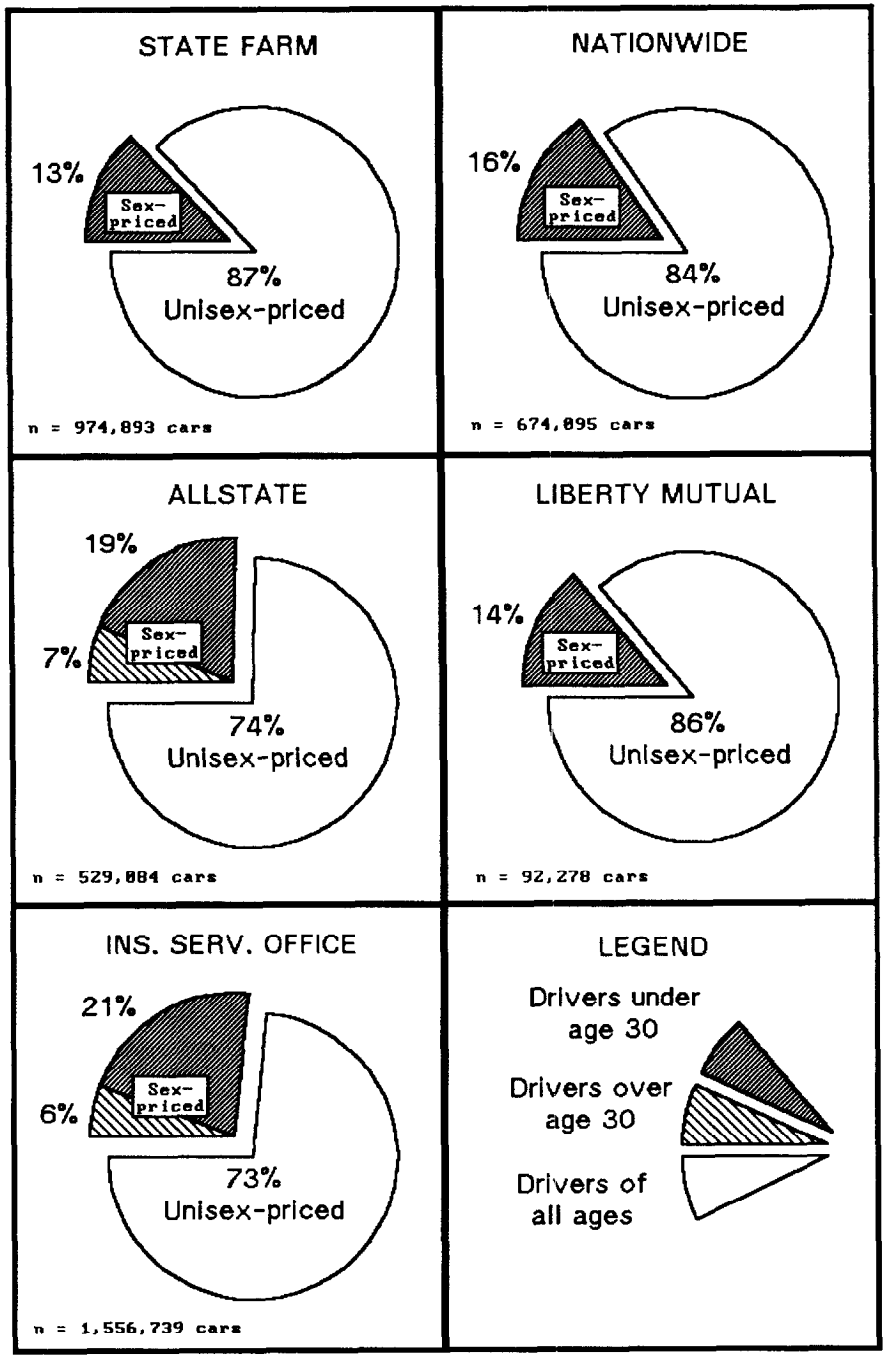
14. Since regulators allow insurers to use sex discrimination selectively in prices for a minority of cars, insurers' choice not to collect cost data by sex for the rest of the cars is guaranteed by statute. This guarantee is provided in the model Casualty and Surety Rate Regulatory Act developed by an "All Industry" committee and approved by NAIC in 1946. The Pennsylvania code adopted the language of the model that "no insurer shall be required to record or report its loss experience on a classification basis that is inconsistent with the rating system filed by it." 40 P.S. §1193.

15. These are the proportions of cars unaffected by the changes filed by insurers (approved in 1986 but not implemented) in response to a regulatory prohibition on sex-pricing. Such changes would have affected not only facially sex-priced premiums on cars, but also cars of some single and married women on which premiums are unisex-priced in the adult class. Therefore the proportions of premiums on cars facially classified by sex and for which insurers separate costs by sex are less than the proportions of sex-priced premiums on cars shown in Exhibit A.

16. Insurers have specific rules for assigning driver surcharge factors to particular cars where there are multiple cars and drivers in a household. In general, the largest driver-pricing factor is applied to the car with the largest base premium regardless of who usually drives the car. Such driver-assignment rules, which differ among insurers and are changed from time to time, also come into play for adult pricing when surcharging for traffic violation penalty points under "safe driver" plans.

17. The deceptive nature of ISO's 10% discount for unmarried women age 30–64 is considered under Subject 5: Across-Class Prices. *infra*.

EXHIBIT A
Pennsylvania Cars Affected by Sex-Priced Insurance



Prices[18]

All of the sex-pricing that has significant effect occurs in the form of surcharges to the adult unisex price that are lower for cars with young women drivers than for cars with young men drivers. For the youngest unmarried drivers, women's price is about double the adult price and men's price is about four times the adult price (**Exhibit B,** heavy lines).[19] With increasing driver age, the surcharged prices rapidly decrease, by 3/4 for men but only by 1/2 for women, to the "adult" unisex level at age 25 or 30. Thereafter prices are flat or virtually flat by both operator age and sex (Exhibit B).

Insurers' sex-priced classes are typically not symmetrical and do not allow direct comparison of women's prices with men's. The cars owned by one sex are priced separately, while the cars owned by the equivalent other sex are lumped with all other unisex cars into the Adult class.[20] The asymmetry is most commonly achieved by imposing marital status classification onto the sex-classes. Since women of any age have their cars priced in the adult unisex ("all other") class when they marry, even in the teenage years not all women are assigned to the sex-priced class for their age.

Accidents

Accident involvements, like insurance prices for cars with young drivers, decline with driver age (Exhibit B, broken lines). Unlike the insurance prices, however, both men's and women's accidents decline continuously over most of a driving lifetime.[21] Although, for both sexes, the average

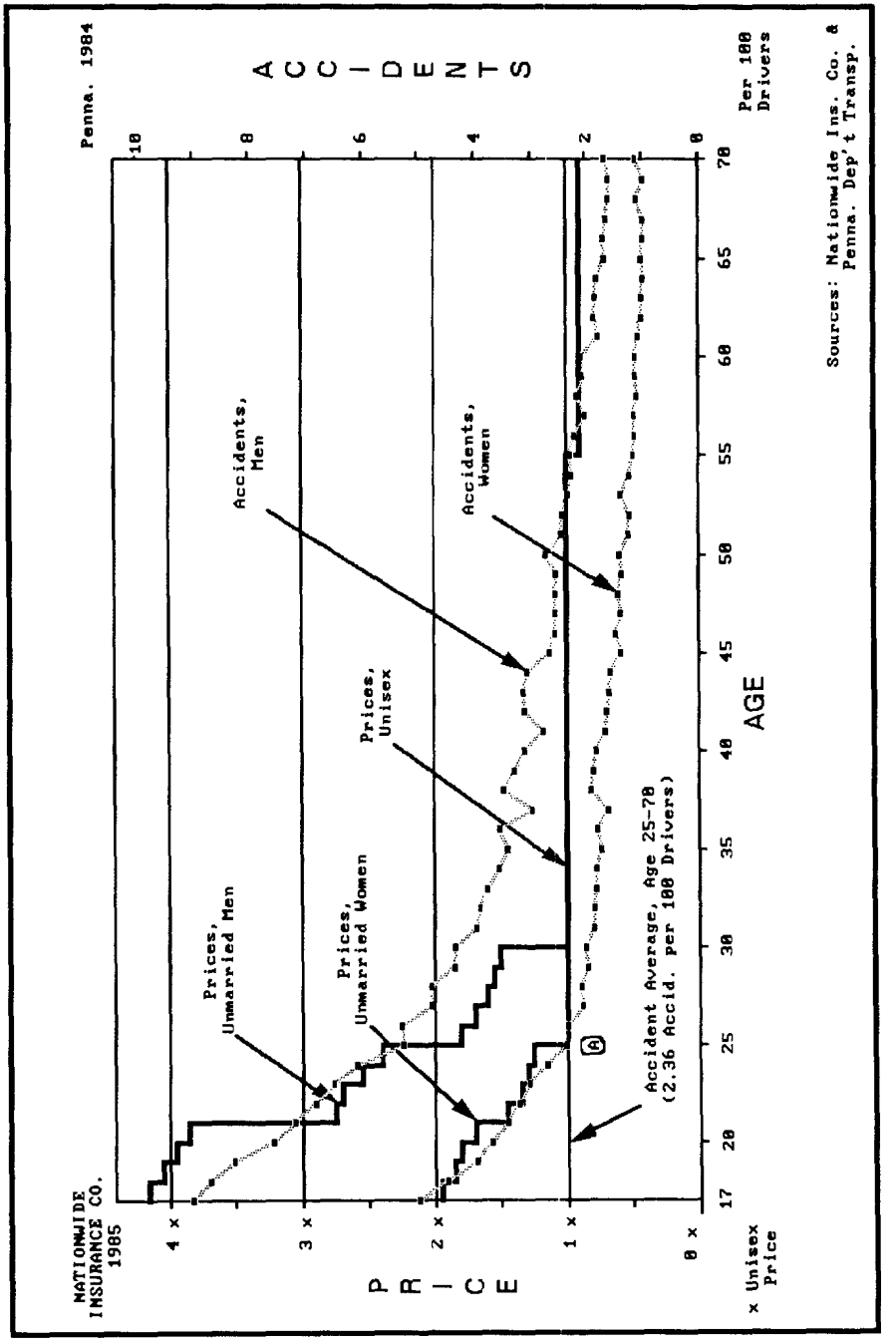
18. Base prices are also modified by price factor discounts and surcharges for such things as car use and number of cars on a policy. The size of such modifications, the proportions of cars affected, and the effects on insurance prices paid by women are considered under Subject 5, *infra.*

19. Nationwide's prices were chosen for the diagram because the surcharged prices change year-by-year from driver age 17–30 (13 changes in the surcharge price levels) whereas the prices of the other defendent-ratemakers in *Pennsylvania NOW* change less frequently with driver age. See Exhibit C for the age-price level patterns for Allstate (3 changes with age in surcharge level) and ISO (6 changes with age in surcharge level), and Subject 8, *infra,* for State Farm's surcharge levels (2 surcharge levels). Liberty Mutual has 3 changes in surcharge level with age.

20. *E.g.,* Insurance Services Office's class of cars owned by unmarried women age 30–64 represents a 10 point discount from the price for the Adult class, with which are lumped the cars, and thus the costs, of the equivalent age 30–64 unmarried men. Nationwide's class of cars owned by unmarried men age 25–29 represents a 50 to 80 point surcharge to the price of the Adult class, with which are lumped the cars owned by the age 25–29 unmarried women.

21. Nationwide "recognizes" this decline with a 10-percentage point discount at age 55, as shown in Exhibit B. Irving Plotkin, Ph.D., testifying for Hartford Insurance as

EXHIBIT B
Price and Accidents by Driver Age (17–70)



number of accidents drops by about half between ages 17 and 25, men's accident average stays at twice women's and continues to do so at all subsequent ages.

By repeated use of state accident data to justify pricing car insurance by driver sex, insurers validate state accident data by driver-sex for younger drivers as a good indication of relative insurance costs between cars driven by men and women for selected sex-priced classes.[22]

Prices and Accidents Compared

For comparison, the price and the accident variations were combined in Exhibit B by making two lines coincident: the line for the adult accident average (2.36 accidents per 100 drivers in 1984 over the age range 25–70)[23] and the unisex price line. As a reference point, the intersection of the adult accident line with the accident curve for women at age 25 is labelled "A" in Exhibits B and C. Price differences by sex for cars with the youngest unmarried drivers agree with the accident differences and, for women drivers, the year-by-year decrease in price with increasing age matches the decrease in accident involvements.

Price levels for cars with married operators typically put married men at about the same price levels as unmarried women of the same age (**Exhibit C**, Chart 1).[24] Although the equivalent married women are priced at the "adult" unisex level, the percentage differences in price by sex up

---

an expert in regulation and economics, commented on the pricing and accident involvement of older drivers:

> Older drivers . . . shake. Their eyesight isn't good. One insurance company said . . . but they hardly drive at all . . . there is little risk and we can charge them less. It had the freedom to discriminate on age and the freedom to post a lower price. It made a killing.

Hearing Record, In *re* Mattes v. Hartford Accident Indemnity Co. before Pennsylvania Insurance Dept., Docket No. R78–7–2 (March 15, 1979), [hereinafter *Mattes v. Hartford*] (alleged sex discrimination against men in violation of state Equal Rights Amendment), at 109.

22. The industry told NAIC in 1979, with regard to studies of public accident data, that

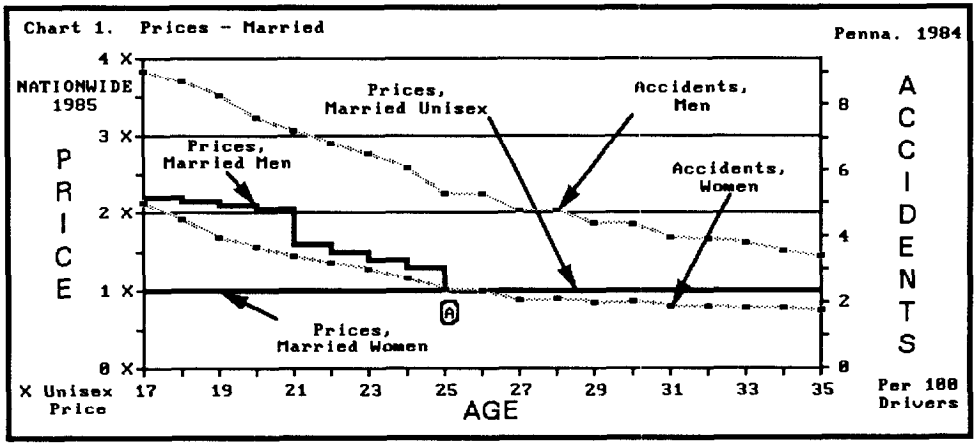
> the combined experience of ISO and NAII demonstrates that these observable differences in driving patterns translate into significant statistical differences in insurance data.

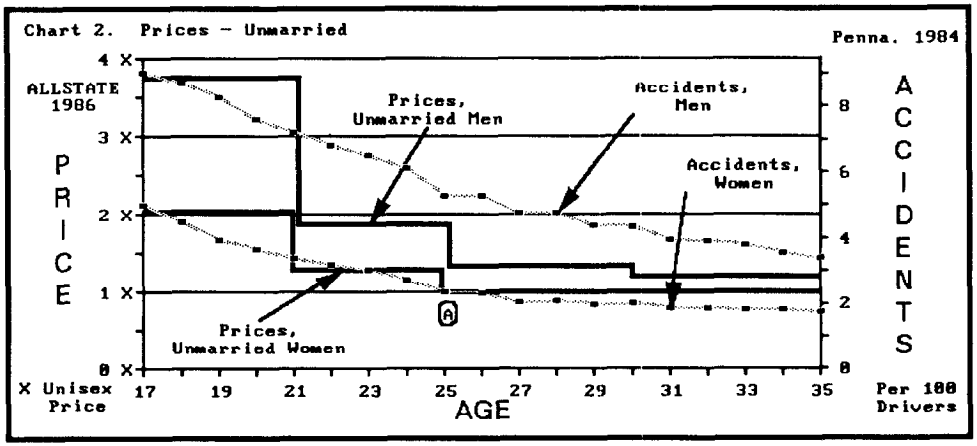
Industry's Sex-Rating Compilation at 35.

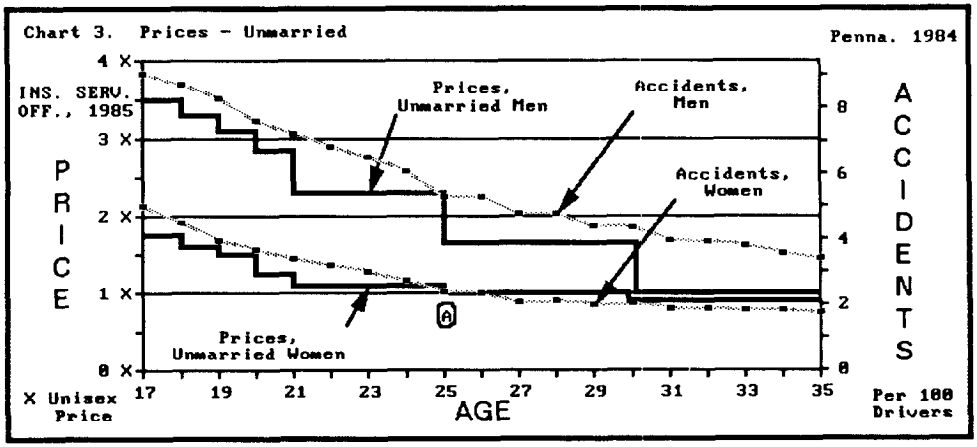
23. Although the choice of method is arbitrary, it appears to produce agreement in several characteristics between the heavy price lines and the dashed accident involvement lines. See also Exhibit C, *infra.*

24. This practice is true of the pricing by all five defendants in *Pennsylvania NOW.*

EXHIBIT C
Price and Accidents by Driver Age (17–35)







to age 20 are approximately equal to the percentage differences in accident involvements.

Of the five defendants in *Pennsylvania NOW*, Allstate and ISO are the only two whose pricing systems are at all sex-divided for drivers over age 30 (Exhibit A). Allstate puts a token surcharge of about 20 per cent on the cars of unmarried men relative to prices for the "all other" mixture of the cars of married men, unmarried women, and married women lumped together in the adult unisex class (Exhibit C, Chart 2), and then lumps everyone together in the unisex class at age 50.

ISO's pricing system provides unmarried women age 30 to 64 with a token 10 per cent discount relative to the prices for the "all other" mixture of the cars of married men, unmarried men and married women lumped together in the adult unisex class (Exhibit C, Chart 3).

In 1982, State Farm converted all cars with drivers over age 25 to unisex pricing despite the relative costs. This change was made as a sales response to competition for young men's business and is considered in Subject 8, *infra*. State Farm does not sex-price premiums for any cars with drivers over age 25.

ISO testimony in 1979 related the prices for unmarried women (Exhibit C, Chart 3) to insurers' costs ("loss experience"):

> Looking at the factors [relative to the adult factor at 1.00] for youthful unmarried females, starting with age 17, the highest factor is 1.75. The factors go down as the age of the driver goes up and this is based on actual insurance loss experience. . . . When you reach the 21 year old female, you are down to 1.15 . . . Continuing on, the . . . 24 unmarried female['s] experience is . . . 1.00 . . .Since already females are at the [adult] rate, it is not practical or cost effect[ive] to collect further data for age 25 to 29 when they are already at the unity rate.[25]

Percentage Sizes of Differences[26]

Percentage price differences between women and men show reasonable agreement with mileage and accident differences by sex only for cars with the youngest drivers[27] after which they diverge rapidly to no agreement

25. Hearing Record, *Mattes v. Hartford Accident Indemnity Co.* at 44.

26. Annual mileage averages by age and sex are considered under Subject 2, *infra*.

27. Insurers deny the mileage-accident frequency relationship for young drivers on the pretext that

> young men and women drivers under age 20 have only a very slight difference in annual miles driven (1900 miles), but an enormous difference in accident frequency

EXHIBIT D

Age Group Percentage Differences by Sex in Mileage, Accidents, and Insurance Prices

Age Group of Drivers	DIFFERENCE BETWEEN WOMEN AND MEN Percent Increase(+)/Decrease(-) From Women's to Men's Values										
	Public Data		Insurance Prices								
			For Unmarried Drivers					For Married Drivers			
	Ann. Miles	Acci-dents	S.F.	N'W.	All.	L.M.	ISO	S.F.	N'W.	All.	L.M.	ISO
17		+81%	+90%	+113%	+83%	+108%	+100%	+90%	+120%	+88%	+115%	+95%
18	+52%	+94%	+90%	+119%	+83%	+108%	+106%	+90%	+115%	+88%	+115%	+85%
19		+108%	+90%	+119%	+83%	+108%	+107%	+90%	+110%	+88%	+115%	+75%
20		+106%	+90%	+126%	+83%	+108%	+128%	+90%	+105%	+88%	+115%	+65%
21		+111%	+67%	+90%	+45%	+54%	+109%	+50%	+60%	+21%	+40%	+30%
22	+89%	+113%	+67%	+100%	+45%	+54%	+109%	+50%	+50%	+21%	+40%	+30%
23		+115%	+67%	+96%	+45%	+54%	+109%	+25%	+40%	+21%	+40%	+30%
24		+124%	+67%	+92%	+45%	+54%	+109%	+25%	+30%	+21%	+40%	+30%
25		+122%	0	+80%	+34%	+50%	+65%	0	0	0	0	0
26		+125%	0	+70%	+34%	+50%	+65%	0	0	0	0	0
27	+133%	+131%	0	+60%	+34%	+50%	+65%	0	0	0	0	0
28		+128%	0	+55%	+34%	+50%	+65%	0	0	0	0	0
29		+120%	0	+50%	+34%	+50%	+65%	0	0	0	0	0
30-34	+136%	+108%	0	0	+21%	0	+11%	0	0	0	0	0
35-39	+126%	+87%	0	0	+21%	0	+11%	0	0	0	0	0
40-44	+144%	+82%	0	0	+21%	0	+11%	0	0	0	0	0
45-49	+110%	+82%	0	0	+21%	0	+11%	0	0	0	0	0
50-54	+148%	+87%	0	0	0	0	+11%	0	0	0	0	0
55-59	+127%	+90%	0	0	0	0	+11%	0	0	0	0	0
60-64	+128%	+80%	0	0	0	0	+11%	0	0	0	0	0
65-69	+117%	+63%	0	0	0	0	0	0	0	0	0	0

Sources:
Accidents: Penna. D.O.T. 1984.
Annual miles: U.S. D.O.T., Nationwide Personal Tansp. Study, 1983.
Prices (for auto liability coverage) from Pennsylvania Manuals:
S.F. (State Farm), N'W. (Nationwide), All. (Allstate),
L.M. (Liberty Mutual), and ISO (Insurance Services Office.).

(Exhibit D). While the excess of men's accident and mileage averages over women's averages remain in the range 50 to 150 per cent over a driving lifetime, the differences in sex-pricing after age 25 or 30 are 0 (for most cars) to 20 per cent (for a few cars).

Selective Sex-Pricing Not Justified

As is evident from price patterns by age and sex, sex-pricing is selective and arbitrary in light of public data which show that men's average accident involvement and mileage remain consistent with increasing age at about two times the women's averages while the price differences rapidly disappear. *Nothing in the public accident and mileage data justifies the limitation of sex-pricing to cars with the youngest operators.*[28]

Since men's and women's relative insurance costs—presumed to be reflected by prices[29]—and men's and women's relative accident involvements are in reasonable agreement with each other in the age range where sex-pricing is most consistently applied and since there are no discontinuities in the accident involvement trends with age from the youngest drivers to adults, relative accident involvement frequencies can be used with confidence as a measure of relative insurance costs between men and women throughout the range of driver ages. For insurers to argue otherwise would be to argue against sex-pricing where they do use it.

The remaining Subjects focus on adult-priced insurance where women as a class are most negatively affected by the current unisex pricing schemes.

(for instance, male drivers average 83 per cent higher than female drivers).

Hearing Record, *Pennsylvania NOW*, at 1662 (Walters). They neglect to mention that the *percentage difference* in mileage is comparable to the percentage difference in accident frequency. In the 16–19 age group, men averaged 5,907 miles and women averaged 3,874 miles. This is a 52% difference that is far from the "very slight difference" implied by actuary Walters. 2 U.S. DEPT. OF TRANSPORTATION, 1983–1984 Nationwide Personal Transportation Study, *Personal Travel in the U.S.* at E–11 (1986).

When sex-pricing was a relatively new discounting practice and not yet a sensitive issue, insurers spoke more freely about the relationship between mileage and accident frequency. In describing a new class plan in 1966, an officer of Liberty Mutual observed that

> marital status is really an indirect way of measuring total mileage. Sex is a way of measuring mileage . . . The young female—God bless her—is obviously a better insurance risk than her male counterpart if only because her use of the car is substantially less than her male counterpart.

1 PROC. MUTUAL INS. TECH. CONF. (Nov. 1966 in New York City) at 33 and 36.

28. This is a conclusion about logical inconsistency, and *not* a recommendation to do sex discrimination "better." See subsection discussion at 245, *supra*.

29. Evidence of regulatory approval of price differentials purposely set at variance to relative costs is cited under Subjects 5-8, *infra*.

SUBJECT 2: ACCIDENTS ARE PROPORTIONAL TO MILEAGE

Zero is a firm data point for the consideration of variation by mileage with respect to both accidents and accident claims. When there is zero mileage, there are zero accidents and zero accident claims.[30] From that point, accident frequency increases in direct approximate proportion to annual mileage. The annual accident data on drivers by sex published by the National Safety Council support this conclusion.[31] Insurers commonly cite these and other National Safety Council automobile accident data by driver sex and age in rate filings and other matters before regulators and legislators.[32] This section considers data on proportionality first for drivers of all ages, and then for drivers aged 30–64 where virtually no sex-pricing is used by auto insurers.

National Statistics on All Men and All Women

Annually, the number of men drivers involved in accidents is about twice that of women drivers (21.4 million men to 11.6 million women in 1985 (**Exhibit E**). Concurrently, the average annual mileage of men drivers is about twice the average annual mileage of women drivers (13,962 miles for men and 6,382 miles for women in 1983 (**Exhibit F**). That is, men, as a group with average mileage about twice that of women, have about twice as many accident involvements as women have. This two to one relationship of both average mileage and average accident involvement demonstrates the proportionality of accidents to mileage.[33]

Per-Mile Accident Rates Vs. Mileage. Since 1975 the per-mile accident rates for men and women have been approximately the same

---

30. Insurers argue that significant insurance costs arise from accident claims paid to owners of parked cars, but they produce in support of this argument no data more rigorous than an Allstate expert actuary's speculation that "[t]here may be a situation where your car is parked somewhere and a deer might run into you." Hearing Record, Pennsylvania NOW, at 1084.

31. Nat. Safety Council, *Accident Facts*, annually. Also republished INSURANCE INFORMATION INST., PROPERTY/CASUALTY FACT BOOK, annually.

32. *E.g., Industry's Sex-Rating Compilation* presented to the NAIC. The industry stated that National Safety Council information

> is particularly useful since the data have been compiled on a reasonably consistent basis for a number of years now, thus permitting analysis of changes in these accident profiles over time.

Id. at 271. In addition, their trade associations republish the same material as public information.

33. Insurers attempt to explain the mileage and accident difference between men and women as arising from the predominance of men as professional drivers. The proportionality between mileage and accidents, however, is unaffected by whether or not the driver is at work.

EXHIBIT E

Accidents and Per-Mile Accident Rates by Sex, U.S. 1962–1986

	Drivers in All Accidents					Drivers in Fatal Accidents				
			Per-mile Accident Involvement Rate*					Per-Mile Fatal Acc. Involvement Rate**		
Year	Women	Men	Women	Men	DIFFER-ENCE	Women	Men	Women	Men	DIFFER-ENCE
	Millions					Thousands				
1962	4.0	15.0	193	268	+39%	7.0	43.0	34	77	+126%
1963	4.3	15.7	198	267	+35%	7.8	46.2	36	79	+119%
1964	4.8	16.7	210	270	+29%	8.6	48.9	38	79	+108%
1965	5.3	18.3	221	282	+28%	8.9	50.3	37	78	+111%
1966	5.7	18.6	218	276	+27%	9.7	54.6	37	81	+119%
1967	5.8	18.5	205	272	+33%	9.9	54.6	35	80	+129%
1968	6.4	19.6	211	275	+30%	10.5	59.5	35	84	+140%
1969	6.8	20.0	209	268	+28%	10.9	59.8	33	80	+142%
1970	7.2	20.5	209	265	+27%	10.7	57.8	31	75	+142%
1971	7.4	20.9	199	256	+29%	11.1	56.7	30	70	+133%
1972	8.1	21.0	201	243	+21%	11.9	59.0	28	68	+143%
1973	7.9	20.2	189	227	+20%	11.4	55.9	27	63	+133%
1974	7.3	17.8	177	205	+16%	9.8	48.0	24	55	+129%
1975	8.4	19.1	195	212	+9%	9.6	46.5	22	52	+136%
1976	8.8	19.6	191	206	+8%	10.9	48.1	24	51	+113%
1977	9.3	20.6	193	209	+8%	11.8	51.9	25	53	+112%
1978	9.8	21.7	192	209	+9%	15.5	51.5	30	50	+67%
1979	9.1	20.6	180	202	+12%	12.5	52.7	25	52	+108%
1980	9.7	20.1	192	200	+4%	12.2	56.1	24	56	+133%
1981	9.5	20.5	183	200	+9%	11.8	53.2	23	52	+126%
1982	9.9	20.6	186	198	+6%	11.5	48.8	22	47	+114%
1983	10.3	20.4	184	187	+2%	11.7	46.3	21	43	+105%
1984	11.2	21.8	190	192	+1%	13.3	47.6	23	42	+83%
1985	11.6	21.4	191	185	-3%	12.7	46.8	21	40	+90%
1986	12.9	22.1	177	196	+11%	13.1	46.4	18	41	+128%

* Number of drivers in all accidents per 10 million miles driven.
** Number of drivers in fatal accidents per 1 billion miles driven.
Sources: Nat'l Safety Council via Insurance Information Inst. Fact Books (1974 - 1986 data) and Comments by State Farm in re proposed regulation amending 31 Pa. Code, Part VIII, adding Section 145.6 and amending Section 145.1, filed Penna. Ins. Dep't, June, 1980 (1962 - 1978 data).

EXHIBIT F
Miles Driven Per Year by Sex, U.S. 1969–1985

	Average Miles of Driving per Year		
Year	Women	Men	DIFFERENCE
1969*	5,411	11,352	+110%
1977*	5,940	13,397	+126%
1983*	6,382	13,962	+119%
1985**	8,023	14,021	+75%

* Nationwide Personal Transportation Surveys/Studies, U.S. Dept. of Transportation and Census Bureau.

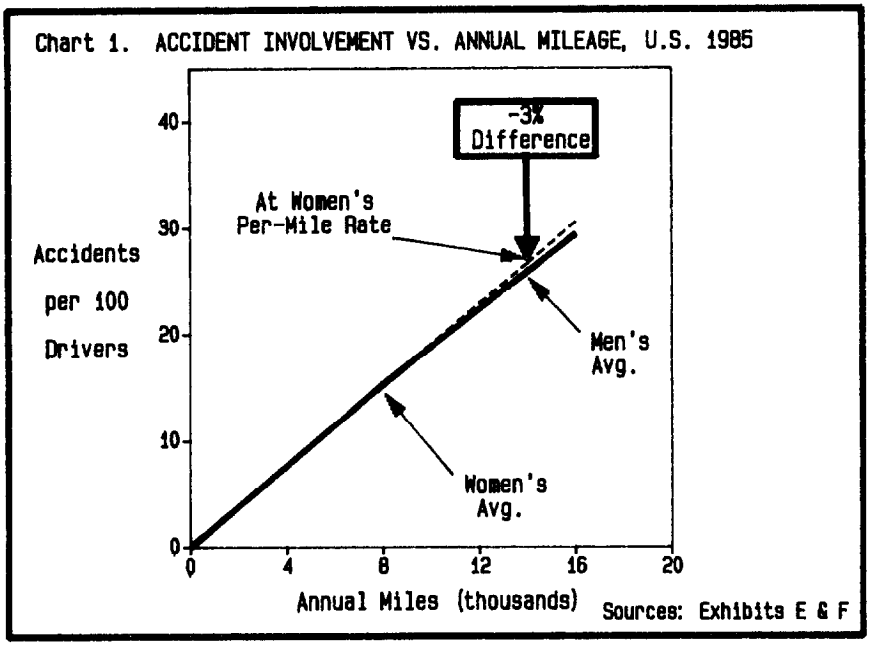
** Calculated from National Safety Council accident data, Exhibit E, and number of 1985 licensed drivers accompanying the accident data in the Insurance Information Institute Fact Book for 1986-1987: 75.7 million women drivers and 82.5 million men drivers.

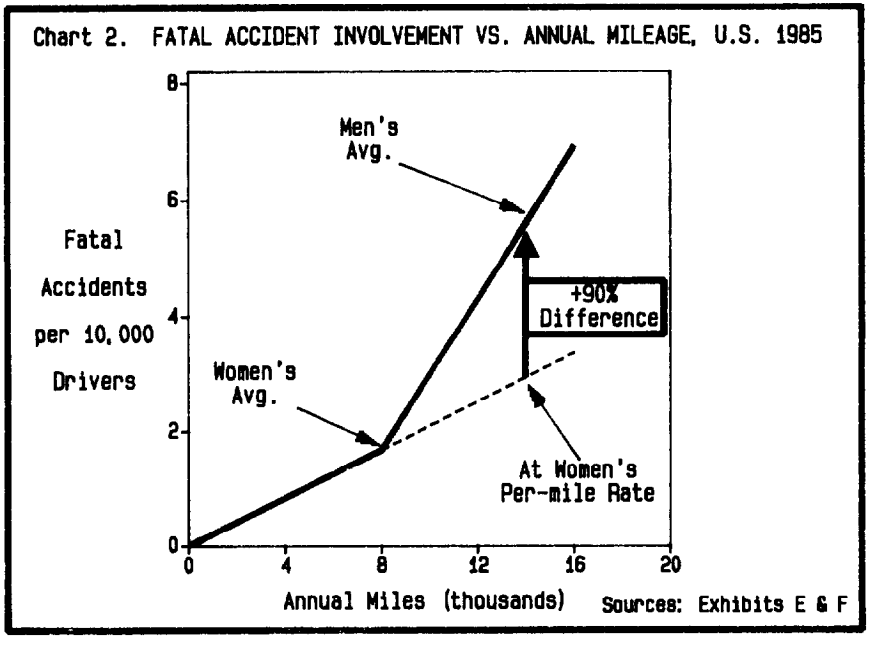
(about 200 accidents per 10 million miles, Exhibit E). That is, the doubling of mileage from women's to men's annual average does not affect per-mile accident rates.

The significance of similar per-mile accident rates [Exhibit E] at very different annual mileages [Exhibit F] to the question of proportionality can be demonstrated by plotting accident involvement vs. mileage (**Exhibit G**). Since accidents must go to zero as mileage does, zero, men's average, and women's average[34] define three widely separated data points for the variation of accidents with annual mileage. In 1985, for example, accident involvement increased slightly less than proportionally with the increase from women's to men's average annual mileage. Consequently in 1985, men's accident average was 3 per cent less than what it would have been with strict proportionality to mileage at women's per-mile accident rate (Exhibit G, Chart 1). In all of the other years from 1962 to 1986, the positive differences between men's and women's per-mile accident rates (Exhibit E) indicate an increase in accidents that, recently at least, is not significantly greater than proportional to annual mileage.

34. The totals for men and women drivers needed for calculating the averages are given for the most recent year by the annual reports, note 31, *supra*.

EXHIBIT G
Proportionality Between Accidents and Mileage





Per-Mile Fatal Accident Rates vs. Mileage. As a function of annual mileage, fatal accident involvement data indicate a much greater than proportional increase with the change from women's to men's average annual mileage. In 1985, for example, men's accident average was 90 per cent more than what it would have been with strict proportionality to mileage at women's per-mile rate (Exhibit G, Chart 2). All of the years from 1962 to 1986, show similarly large positive differences between women's and men's per-mile fatal accident rates (Exhibit E).[35]

Age Variation in Accident Rates and Annual Mileage. The foregoing discussion has examined per-mile accident involvement rates and annual mileages by sex averaged over drivers of all ages. Both per-mile accident rates and average annual mileage vary significantly with driver age, however.[36]

Accident rates per mile are highest and change most rapidly with age at either end of the driver age spectrum. This age variation produces "U" shaped curves having broad bases in the middle years (**Exhibit H,** Chart 1). Nonetheless, men's and women's rates at each age, as well as overall, show little significant difference.[37]

Annual mileage averages, like accident rates, vary with age, but the lowest rather than highest values are at either end of the age spectrum. Such variation with age produces inverted "U" shaped curves similar in shape for both sexes (Exhibit H, Chart 2). In sharp contrast with similar accident rate values for men and women at each age, however, the annual mileage values for men are about double the values for women at each age, as well as overall. It is the interaction of the per-mile accident rates with annual mileage that is evidenced in accident involvement statistics by age and sex.

---

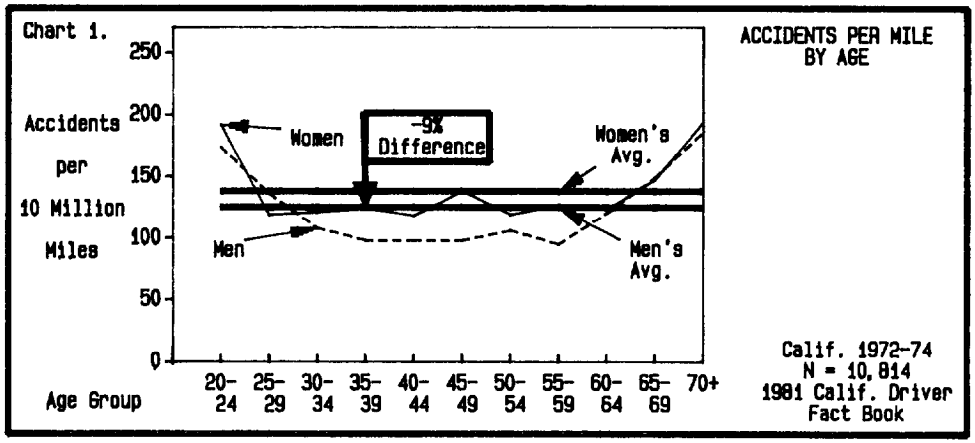
35. Not directly related to sex are such explanatory factors as that drivers with higher mileages do a greater proportion of driving at night and at higher speed than do lower mileage drivers. Factors more directly related to sex are that men predominate as operators of heavy trucks and motorcycles—vehicles with greater likelihood of fatality when involved in an accident—and that the proportion of men driving while intoxicated is twice that of women. (Data on driver intoxication by Mid-America Research Institute, reported by INSURANCE INSTITUTE FOR HIGHWAY SAFETY, January 24, 1987.)

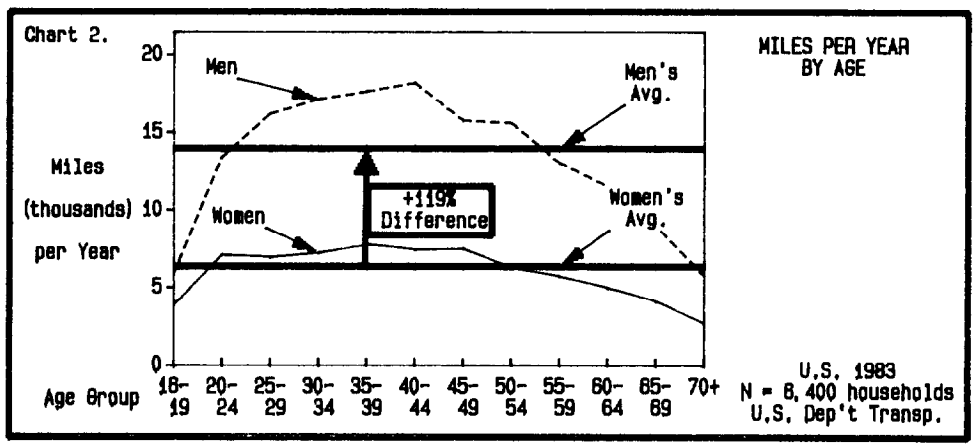
36. Continued pricing of auto insurance by driver age was recommended in 1978 by the NAIC committee that recommended prohibition of pricing by driver sex and marital status, *Industry's Sex-Rating Compilation* at 7, and is not considered in this paper. Any difficulties in associating drivers with cars, which would affect per-mile insurance rates in the same way driver characteristics affect the current flat yearly premiums, are apparently routinely handled by insurers, as described in Note 16 *supra*.

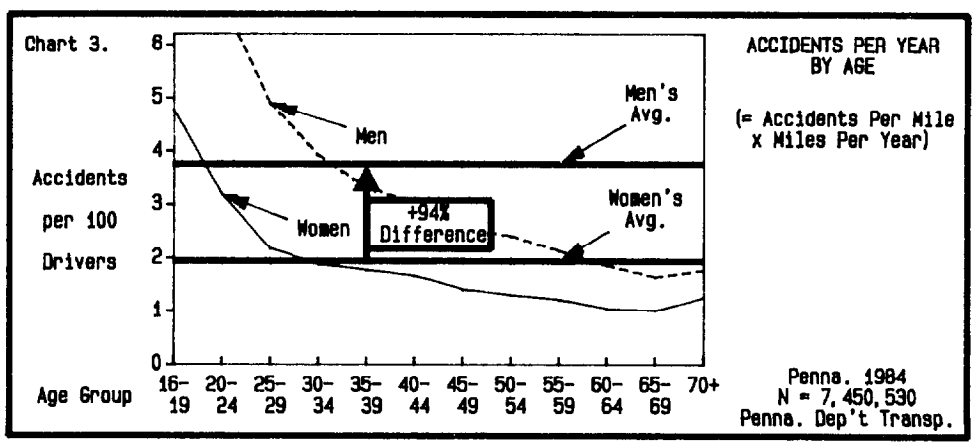
37. While women's per-mile rate overall and for most age groups exceeds men's in the California sample shown in Exhibit H, Chart 1, the national data for 25 years (Exhibit E) show men's overall accident rate to be almost always greater than women's. In both sets of data, however, the differences in the per-mile accident rates between men and women are small relative to the differences in annual mileages and accident involvement frequency.

EXHIBIT H

Age Group Accident Rates, Mileage, and Accidents







Accident involvement varies with age much more simply than annual mileage or per-mile accident rates do. Involvements per year are highest for the youngest drivers and decline steadily with age over most of a driving lifetime. The curves for men and women are very similar in the details of their shapes, and differ simply in that men's involvement at each age is about twice women's (Exhibit H, Chart 3).The state values shown in Exhibit H, Chart 3 are not samples; they are actual direct measures of the whole population of Pennsylvania drivers and of all reported accidents in 1984.[38] Therefore, the smooth behavior of the state accident curves are a much more accurate representation of accident variation by age and sex than the relationships produced from relatively small samples that determine the curves in Charts 1 and 2.

No Insurance Data on Proportionality. Because they do not collect verified mileage exposure data for insured cars, insurers cannot provide credible claim frequency data to contest the proportionality between average annual mileage and accident involvement. The way that insurers choose to collect claim data precludes development of insurance data which could be compared objectively with external data relating mileage, sex, and accident involvement: First, insurers do not record verified, odometer-measured annual mileage for each insured car, and thus by their own admission[39] have no accurate or reliable mileage data. Second, insurers do not classify by driver sex from 74 per cent to 87 per cent of cars insured (92 per cent to 100 per cent of Adult class cars are unisex, Subject 1 and Exhibit A), nor do they collect accident data according to the identity or sex of the actual driver involved for *any* of the cars they insure.

As evidence against the proportionality shown by annual national and state accident data and national mileage data, insurers rely partic-

38. Only a fraction of accidents for which there are insurance claims appear on driver records. An insurance industry study of company claim records found that in a sample of 1,046 non-minor accidents in Pennsylvania, only 49 per cent appeared on the state records for the drivers involved. No age or sex bias in the degree of under-reporting was detected, however, in the 37-state study of 27,402 accidents (which included the Pennsylvania sample). All-Industry Research Advisory Council, *Evaluation of Motor Vehicle Records As a Source of Information on Driver Accident and Convictions* (1984), at 30. Assuming no bias in the reporting, the percentage differences in accident involvement between age and sex groups would be the same for insurance and state records even though significantly more accident involvements were on insurance records than on state records. (The incompleteness of state driver records, however, should be of concern to regulators when insurers use the records as a basis of surcharging premiums for insurance on cars.)

39. *E.g.* "When you are talking about mileage in particular, the problem that you run into, first of all, is that people have difficulty estimating their mileage. People both intentionally and unintentionally mis-estimate their mileage." Hearing Record, *Pennsylvania NOW* at 1059 (LaMonica, Allstate); "We do not get any information reported by mileage." *Id.* at 1218 (Boison, ISO).

ularly heavily on a single table of California data, presented three times in the *Industry's Sex-Rating Compilation*,[40] extracted from a study report entitled *The Effects of Exposure to Risk on Driving Record*[41] [hereinafter *"Exposure-to-Risk Study"*].

Exposure-to-Risk Study. Interpretations of data and findings of the *Exposure-to-Risk Study* have been the subject of several controversies about mileage, accidents, and insurance pricing. Insurers' table of mileage and accident data from the *Exposure-to-Risk Study* stirred controversy when it was used against their defense of legal sex discrimination in 1983. The National Insurance Consumer Organization ("NICO") used the mileage and accident data from the table, which insurers had submitted to Congress as evidence in support of sex-pricing, to prepare an estimate for Congress that women as a class would save $1 billion annually for auto insurance under unisex prices with mileage taken into account.[42]

Another controversial aspect of the *Exposure-to-Risk Study* is its finding that the proportion of commuter driving relative to other driving (occupation and pleasure) bears no statistically significant relationship to accident involvement frequency.[43] This finding challenges insurers' assertion that their drive-to-work price classes reflect more hazardous mileage, and not simply classes of cars which, on average, are driven more miles.

Most of the drivers in the *Exposure to Risk Study* were from age levels at which auto insurance is unisex-priced. Nevertheless, in defense

---

40. Note 13 *supra* at 37, 77, and 263.

41. A. Burg, University of California, 1973 (Distributed by U.S. Dep't of Commerce, Nat'l Tech. Info. Service as PB-236-483.)

42. Press Release with documentation, NICO (Oct. 4, 1983); *also* U.S. GEN'L ACCOUNTING OFFICE, ECONOMIC IMPLICATIONS OF THE FAIR INSURANCE PRACTICES ACT, (GAO/OCE-84-1, 1984) at 22; *also* SOC'Y OF CPCU, IN PURSUIT OF EXCELLENCE: A CPCU RESEARCH ANTHOLOGY (1985) at 37 (tabulation and discussion of NICO calculations).

The NICO study was based on a breakthrough analysis by NOW published in an advertisement, "Will The ERA Be Sacrificed For the Insurance Numbers Game?," in the *New York Times* on June 3, 1982, and further detailed in NOW's 1983 auto insurance fact sheet. Apparently the NICO $1 billion estimate of overcharges was applied solely to unmarried women. If so, the total overcharges to all women as a class would be in excess of $2 billion. (The mileage-accident data on which NICO's estimate was based included all women.) Overcharge totals of considerably more than $2 billion are obtained using differences between men and women in either average mileage or average accident involvement as measures of relative insurance cost. These estimates can be made from yearly state and national accident statistics and studies of average mileage, and can be done according to age group as well as overall. (Unpublished calculations by authors.)

43. The *Exposure-to-Risk Study* found that of all exposure variables studied, "only per cent rural and per cent [to and from] work driving failed to show a substantial relationship" to driving record. *Id.* at 16.

of sex-pricing (and in apparent defiance of logic), insurers use data from the study to argue that "mileage is not a substitute for sex."[44] These data show that when drivers are grouped by annual mileage, men in each mileage group show higher per-mile accident rates than women with the same annual mileage.[45] The differences in accident rates are particularly large for the lower mileage groups. For example between 0 and 4,999 miles, the per-mile accident rate recorded for men was 148 per cent greater than that for women **(Exhibit I)**. In the higher mileage groups, the differences in accident rates were less, 32 per cent and less in the groups from 5,000 to 19,999 annual miles (Exhibit I). Such differences are within

EXHIBIT I
Mileage Group Accident Rates from the *Exposure to Risk Study*

Annual Mileage	Average Age		Per-Mile Accident Rate (Accidents per 10 million miles)		
	Women	Men	Women	Men	DIFFERENCE
0 - 2,499	42.2		192		
2,500 - 4,999	41.7		106		
0 - 4,999(1)		49.1	(138)*	342	+148%
5,000 - 7,499	41.5		92		
7,500 - 9,999	41.7		73		
5,000 - 9,999		45.7	(87)*	115	+32%
10,000 - 12,499	40.4		79		
12,500 - 14,999	40.5		42		
10,000 - 14,999		41.9	(74)*	81	+9%
15,000 - 19,999(2)	39.1	40.3	53	67	+26%
20,000 - 24,999(3)	41.1	38.9	**	56	
Women 7,211 avg.	41.3		97		
Men 17,671 avg.		41.8		90	-7%

(1) 31% of the women and 6% of the men were in this mileage group.
(2) 4% of the women and 16% of the men were in this mileage group.
(3) Over 25,000 miles categories for women and men are not comparable.
* Average of 2 values above weighted by numbers of drivers.
** Value is illegible in NTIS reproduction of report.
Source: A. Burg, Effects of Exposure to Risk on Driving Record, 1973.

44. The data basis for the industry's argument is a table of data (like that in Exhibit I) extracted from the *Exposure-to-Risk Study* and published in the *Industry's Sex-Rating Compilation* in 1979, at 37, 77, and 263.

45. The *Exposure to Risk Study* included drivers aged from 18 to 92 years old; and the average age of both men and women drivers was about 41 years old (Exhibit I), an age at which virtually all auto insurance is unisex-priced (Exhibit A).

the range of per mile rate differences shown by the National Safety Council data (Exhibit E).[46]

It is notable in the *Exposure to Risk Study* data that men in the lower annual mileage groups were older on average than women in the same group. For example, the age of men averaged 49.1 years vs. 42 years for women in the 0 to 4,999 mile group (Exhibit I). It appears that older men—those from ages with higher per-mile accident rates (Exhibit H, Chart 1)—are being compared with women from the middle parts of the driver age spectrum—those with lower per-mile accident rates. Exhibit H, Chart 2 confirms that men from both the younger and, particularly, older ends of the age spectrum would predominate in the lower mileage groups, in which most women are found. The result of this age mixture is that men at ages with elevated per-mile accident rates are probably being compared to women at ages with lower per-mile accident rates (Exhibit H, Chart 1). With the effects of age minimized in the overall averages for men and women, the difference in their accident rate shrinks to 7 per cent (Exhibit I). This difference is similar to the differences in accident rates between men and women shown by the National Safety Council data (Exhibit E).

The data and findings from the *Exposure to Risk Study* seem entirely consistent with the National Safety Council data showing that accidents are proportional to annual mileage. The only inconsistency associated with the data is the way in which insurers interpret men's greater per-mile accident rates to demonstrate the need for sex-pricing, which falsely implies that the drivers represented by the study are actually charged different prices by sex.[47]

Accident-Mileage Proportionality for Drivers 30–40 Years Old

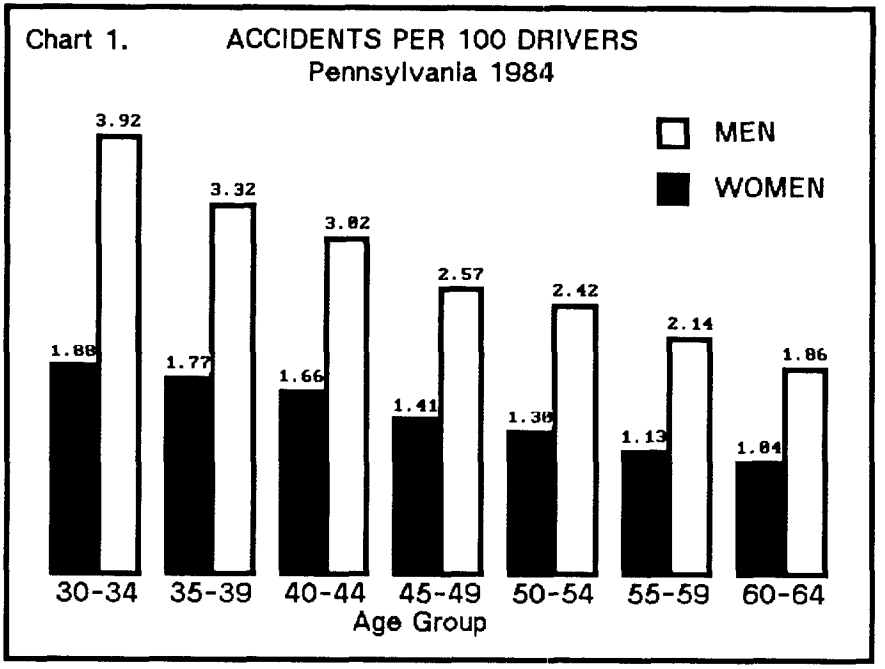
According to Pennsylvania driver-accident data for each age group between the ages of 30 and 64, the proportion of men drivers involved in accidents is about twice that of women drivers. For example, 3.02 per cent of men drivers and 1.66 per cent of women drivers ages 40–44 years old were involved in accidents in Pennsylvania in 1984 (**Exhibit J**, Chart 1).

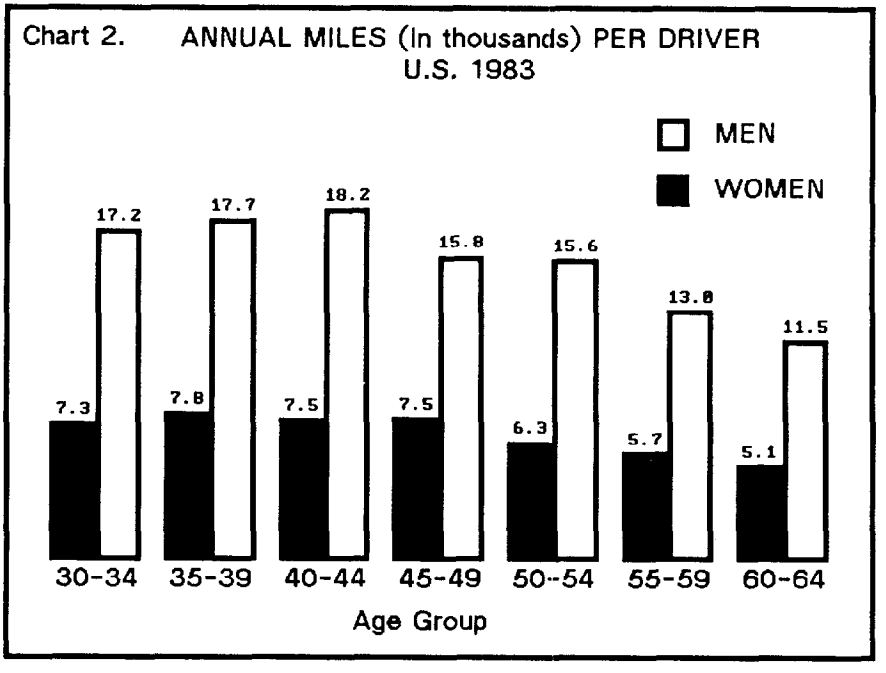
Although there are no mileage data by age and sex of driver for Pennsylvania alone, the national data, which include Pennsylvania, show that for each age group between the ages of 30 and 64, the average annual

46. Different accident definition and reporting criteria probably account for the average per-mile accident rates in Exhibit I being about 1/2 those in Exhibit E (about 100 per 10 million miles vs. 200 per 10 million miles).

47. See note 3, *supra.* and accompanying text for discussion of this false implication technique.

EXHIBIT J
Adult Driver Accidents and Mileage





mileage for men drivers is about twice that for women drivers (Exhibit J, Chart 2). For example, in the 40–44 year old age group, the averages are 18,223 miles for men vs. 7,465 miles for women.

For each age group of men and women, the approximately two to one ratio of men's to women's accident involvement is consistent with the approximately two to one ratio of men's to women's annual mileage. Therefore, annual mileage and accident involvement frequency are approximately directly proportional.

Fatal/Serious Accidents Not Proportional to Mileage For Drivers 30–64 Years. Fatal accident involvements of men age 30–64 are disproportionately higher than can be accounted for by differences in mileage. Men's fatal accident frequency is from three to more than four times that of women (**Exhibit K**, Chart 1). For example, in the 40–44 year old age group, 4.29 men were involved in fatal accidents per 10,000 drivers compared to 1.07 women per 10,000 drivers.[48]

Other public data indicate that insurers' costs for insuring age 30–64 men might be disproportionately greater than the increase in mileage from women's to men's averages. The frequency of men's involvement in alcohol-related accidents is about four times that of women. For example, in the 40–44 year old age group, 4.41 men were involved in alcohol-related accidents per 1,000 drivers compared to 1.03 women (Exhibit K, Chart 2).[49]

In an apparent attempt to defend sex-pricing young single men's cars and also to deny that insurance costs are proportional to mileage, the defendant-insurers in *Pennsylvania Now* averred that:

> Serious accidents occur unevenly among groups of persons . . . [and are] not directly proportionate to total miles driven. Certain groups of insureds have a substantially higher frequency of involvement in serious accidents[.] [B]y way of example only, single male drivers under age 25 are involved in accidents with fatalities at approximately four times the frequency of other groups of insureds and that those groups thereby pose a substantially greater monetary risk to the insurer which is properly borne by such groups and not all insureds on an equal mileage basis.[50]

---

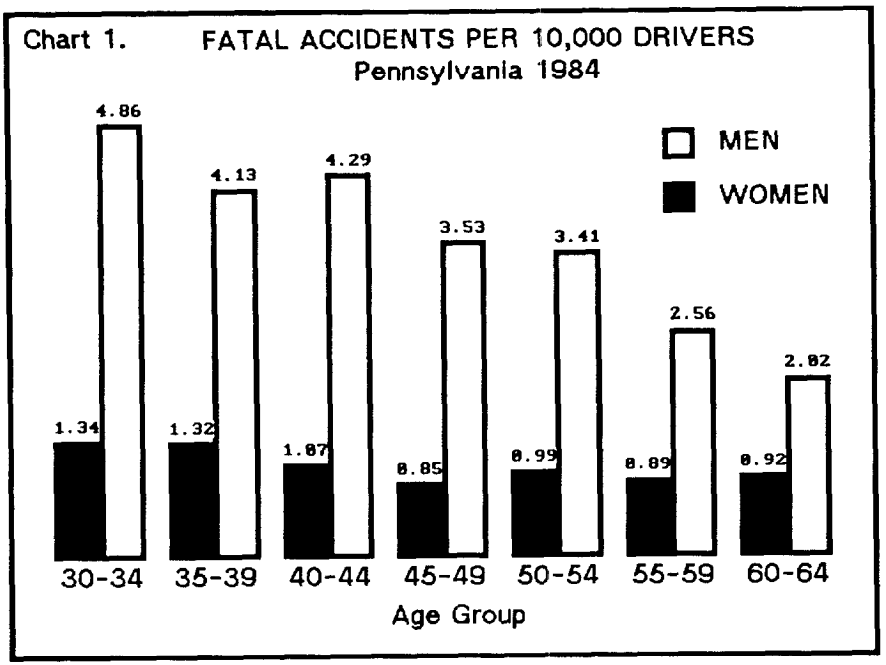
48. Even in the 17–24 year old age range where women's prices are surcharged, women averaged only 2.31 fatal accidents per 10,000 drivers, fewer than men their fathers' age (Exhibit K, Chart 1).

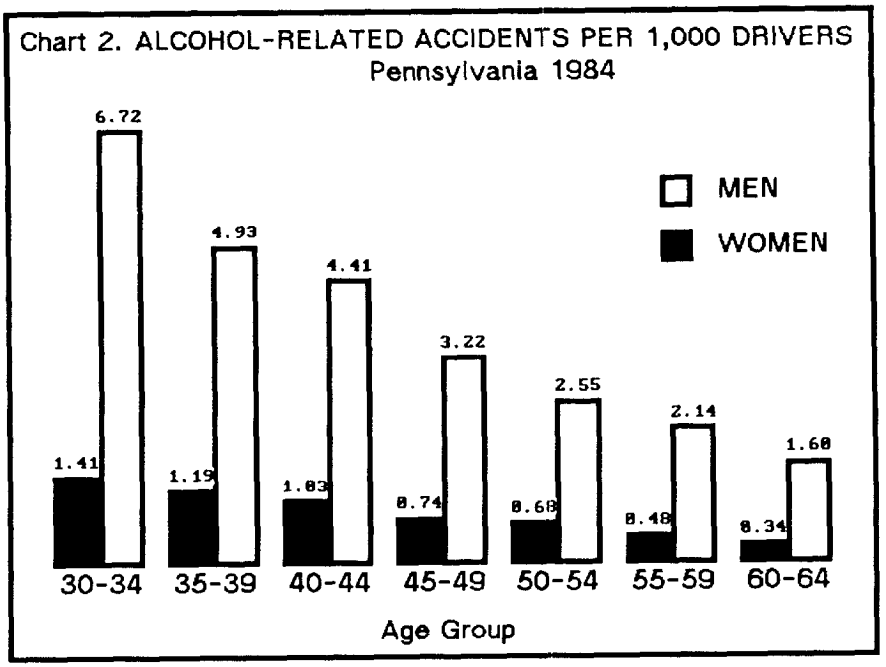
49. In 1979 ISO actuaries wrote at length in the *Industry's Sex-Rating Compilation* on the effects on accident statistics of drinking and driving by men, with special note of the 25–34 and 45–54 age ranges. *Id.* at 163. (Most drivers at these ages are charged unisex prices.)

50. Defendants' Answers, filed Dec. 24, 1986, in *Pennsylvania NOW*, at para. 86.

In the hearing six months later, the defendants' actuary Michael Miller seemed to be attempting to revise this conclusion with the opinion "this may sound wrong, but in terms of dollars, it may not be the most severe accident." Hearing Record, *Pennsylvania NOW*, at 894.

EXHIBIT K
Adult Driver Fatal and Alcohol-Related Accidents





According to the Pennsylvania data cited above, the large group consisting of men aged 30–64 fits this criterion of disproportionate monetary risk to insurers relative to the large group of women the same age whose fatal accicent frequency is one-fourth as large. Nonetheless, in direct contradiction to their averment above, insurers do not differentiate insurance prices between these groups by either sex or mileage in any way.

Drivers and Cars. The historically consistent proportional relationships of accidents to annual mileage between the widely separated averages for men and women demonstrate that the probability of a driver being involved in an accident during the year varies directly with that driver's annual mileage. Mileage and accident involvement data for drivers are understood to apply to vehicle mileages and accident involvements because no vehicle operates on-the-road without a driver, and no driver drives without a vehicle. The probability of an automobile being involved in an accident during a year is, therefore, directly proportional to that car's actual mileage, which by law is registered on its odometer.

SUBJECT 3: MILEAGE MEASURES BOTH AVERAGE AND INDIVIDUAL COST TO INSURERS

When average driving increases, the consequent rise in accident and claim frequency requires insurers to raise premium levels. When average driving decreases, insurers recognize the opposite effect in setting rate levels. In Pennsylvania filings and testimony on rate levels from 1981 to 1987, State Farm, Nationwide, Allstate, and ISO relied almost exclusively on the amount of driving as the measure of change in insurance cost due to claim frequency.

For example, in 1986 Nationwide projected a 2 per cent increase in claim frequency because:

> [I]ncrease in driving results in increased accidents. As people spend more time on the road, they will have more accidents.[51]

At a 1982 conference, Allstate's Vice President for Research and Planning described the two factors that Allstate uses to predict auto insurance claim frequency:

> [P]eople tend to do less pleasure driving when unemployment rises, cutting the accident rate. Similarly, as gasoline prices rise, miles driven falls, which

51. Hearing Record, In *re* Rate Revision, Nationwide Mutual Insurance Co., Pennsylvania Ins. Dep't, Docket No. R87-1-10. (1987) at 99.

again cuts the accident rate. In effect, both variables are surrogates for miles driven or exposure.[52]

- In 1982, State Farm's actuary Miller testified that: "PD [claim] frequency . . . has been decreasing since 1979 . . . as a result of, I suspect . . . reduced driving at that time."[53]
- In 1982, ISO's actuary Boison testified to the Pennsylvania Insurance Department that: "[M]ileage has rebounded. It is now going up again, which is why . . . we will see the claim frequency has actually started to increase."[54]
- In 1986, ISO stated "[a]lthough the current large fuel price decrease will not have the exact inverse effect of the shock price increases during the energy crises, it will nevertheless increase miles driven and hence claim frequency."[55]
- In its 1986 filing, Nationwide indicated: "Due to lower gasoline prices, we anticipate that vehicle miles driven will increase, and consequently, so will [claim] frequency."[56] Testifying on the filing, Nationwide's actuary stated: "People tend to drive more, and [claim] frequency goes up."[57]

It is apparent that when their revenue is involved, insurers believe that claims and resulting costs are directly connected to the amount of driving being done. Insurers deny the cost connection to individual driving when it is the individual premium payer's money that is at stake. In fact such denial can be very profitable to insurers.

Actual Reduction in Accidents and Claims. The proportionality between accident frequency and claim frequency is long established. From 1979 to 1983, reported accidents per registered vehicle in Pennsylvania fell 18 per cent and have risen somewhat since. Concurrently insurers' claim frequencies decreased as much as or more than the accident frequency, and have risen somewhat since (**Exhibit L**). The four-year decline in frequency of property damage liability claims was 22 per cent for State Farm, 25 per cent for Nationwide, and 21 per cent for ISO. As a result

52. Gragnola, *Corporate Modeling at Allstate Insurance Company*, in STRATEGIC PLANNING AND MODELING IN PROPERTY-LIABILITY INSURANCE 139, 147 (J. Cummins ed. 1984).

53. Hearing Record, In *re* State Farm Mutual Automobile Insurance Co, Revised Automobile Insurance Rates and Rules, Pennsylvania Ins. Dept., (June 17, 1982) at 67.

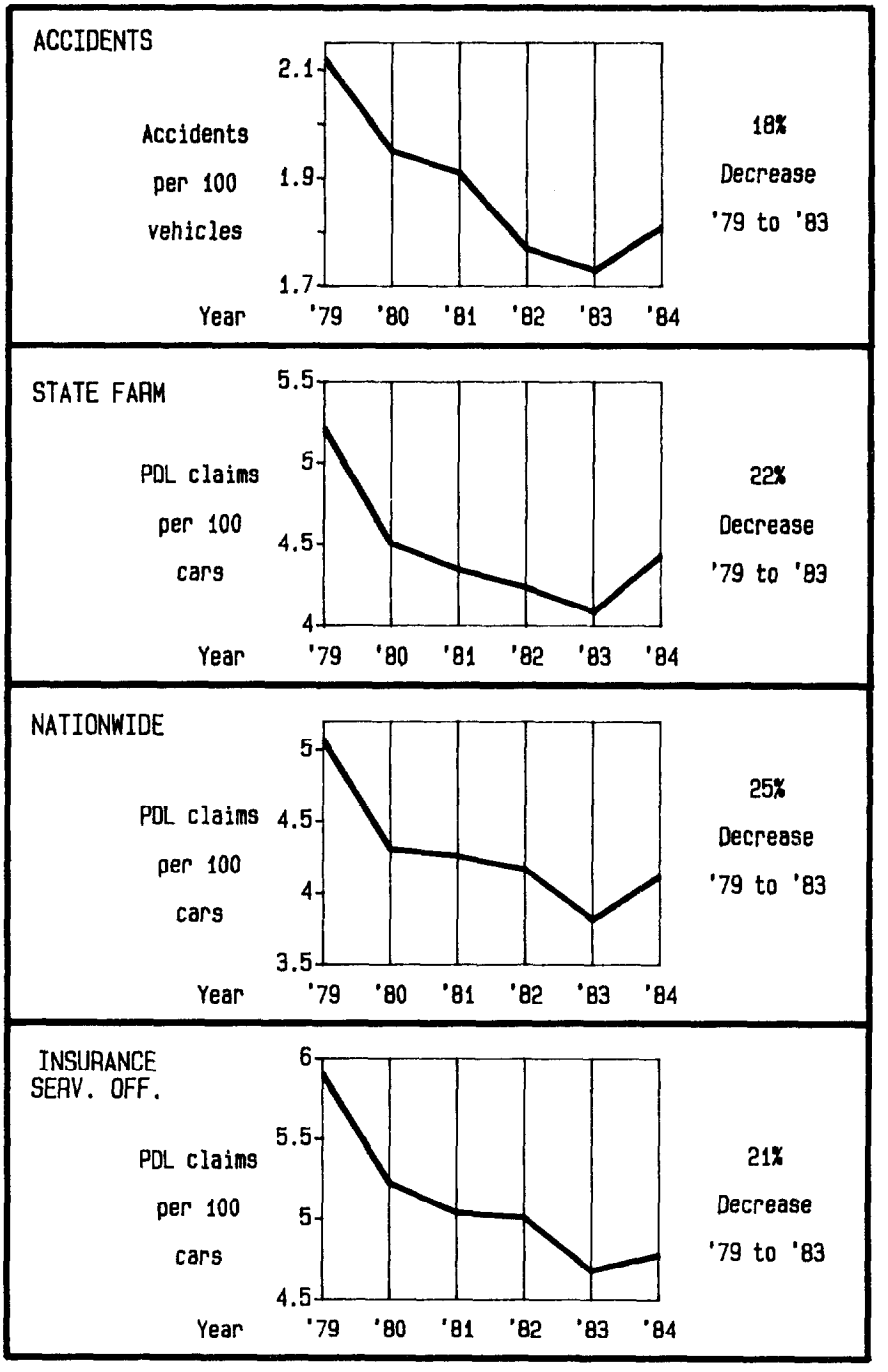
54. Hearing Record, In *re* ISO, PPA Basic Limits Rates and Rules Revision, Pennsylvania Ins. Dept., (June 16, 1982) at 63.

55. Rate Filing, ISO, Pennsylvania Ins. Dep't, (July 15, 1986), at C–29.

56. Filing Memorandum, Nationwide Mutual Insurance Co., (Dec. 1, 1986), at 2.

57. Hearing Record, In *re* Rate Revision, Nationwide Mutual Ins. Co., Pennsylvania Ins. Dep't, Docket No. R87–1–10 (1987) at 95.

EXHIBIT L
Decrease in Accidents and Insurance Claims in Pennsylvania



the average annual decline was more than 5 per cent for each of these rate-filers and the cost of claims per insured car dropped by the same amount (excluding inflationary changes).

Hypothetical Reduction in Driving. A hypothetical reduction in average driving based on the situation described above shows the discriminatory allocation of cost-savings among policyholders under the pricing system currently used by the five defendant ratemakers in *Pennsylvania NOW*.

Assumption One: It is assumed that before the reduction in driving, the policyholders of each insurer all drive their cars 12,000 miles annually (**Exhibit M**, Table 1). The Harrisburg premium charges of five ratemakers are about $400 annually (for somewhat different coverages and car types),[58] which result in insurance costs to policyholders for car operation of 3.2 to 3.8 cents per mile (Exhibit M, Tables 2 & 3).

Assumption Two: It is assumed that average driving is reduced 5 per cent caused solely by a reduction in annual driving (from 12,000 to 6,000 miles) by 10 per cent of policyholders. The annual mileage for the rest of policyholders remains at 12,000 miles (Exhibit M, Table 1).

Assumption Three: Further it is assumed that insurers reduce their premium levels 3 per cent when they detect the effects of the reduction in average driving (Exhibit M, Table 2),[59] and that the owners of the cars now driven 6,000 miles know about and take advantage of the "low mileage" discount.

The outcome is that policyholders still driving 12,000 miles annually receive a 3 per cent premium reduction without having done anything to reduce insurance costs. The minority of policyholders, those who have reduced driving by 50 per cent and are responsible for the reduction in insurers' costs, receive from 3 per cent to 16 per cent reduction in premiums. Their expense for car insurance has nearly doubled from less than 4 cents up to more than 7 cents per mile (Exhibit M, Table 3).

Allstate's expert actuary LaMonica testified as to the cost and price effects of this hypothetical 5 per cent reduction in average driving that would result from the mileage changes of only 10 per cent of drivers. He would expect to see a "frequency drop in our rate reviews,"[60] and described the allocation of price benefits from such a frequency drop: "some

58. These are the actual premiums used to test responsiveness of the premium charges to differences in the actual mileage exposure of cars. The composition of the premiums is shown in Subject 6 *infra*. Expert actuaries employed by each of the ratemakers testified to the correctness of the information.

59. Responsiveness of premium levels to reductions in driving is assumed for the purposes of this hypothetical. Insurers have an incentive to respond slowly to reductions in their costs resulting from reductions in driving, as discussed *infra*.

60. Hearing Record, *Pennsylvania NOW* at 1141.

EXHIBIT M

Price Response to a Hypothetical Decrease in Driving

Table 1. CHANGE IN ANNUAL MILEAGES

BEFORE:	Each car 12,000 miles.	Average 12,000 miles.
AFTER:	90% of cars 12,000 miles 10% of cars 6,000 miles	Average 11,400 miles. (5% reduction)

Table 2. CHANGE IN PREMIUMS FOR HARRISBURG[1]

	Annual miles	State Farm	Nationwide	Allstate	Liberty Mutual	Insurance Serv. Off.
BEFORE:	12,000	$382	$452	$420	$387	$442
AFTER:	12,000 (0%)[2]	$371 (-3%)[3]	$438 (-3%)	$407 (-3%)	$375 (-3%)	$429 (-3%)
	6,000 (-50%)	$320 (-16%)	$398 (-12%)	$347 (-17%)	$327 (-16%)	$429 (-3%)

Table 3. CHANGE IN PER-MILE COSTS FOR POLICYHOLDERS

	Annual Miles	State Farm	Nationwide	Allstate	Liberty Mutual	Insurance Serv. Off.
		Cents Per Mile				
BEFORE:	12,000	3.2	3.8	3.5	3.2	3.7
AFTER:	12,000	3.1	3.7	3.4	3.1	3.6
	6,000	5.3	6.6	5.8	5.4	7.1

Notes to tables:

1. The "before" premiums, with and without estimated future mileage discounts, were validated by the defendants' actuaries in Pennsylvania NOW. The premiums are for 12,000 annual miles, single car, adult drivers, pleasure use for the Harrisburg territory of each defendant. Limits are the minimum for the mandatory coverages (liability and first party benefits). The optional physical damage coverages are for the most recent model car that has 1.00 as the base premium multiplier.

   The "after" premiums include any estimated future mileage discount applicable for the 6,000 annual mile cars, and all are reduced 3%.

2. Percent change in annual mileage from before the reduction.

3. Percent change in annual premium from before the reduction.

of it is going to be seen in overall rate level that applies to everyone," and some benefit "is going to be seen in change in the mileage category to other people."[61]

These "other people" described by actuary LaMonica are the hypothetical 10 per cent of drivers who changed from 12,000 miles to 6,000 miles annually. In response to this large change in exposure that might eventually lower everybody's prices a few per cent, the drivers responsible for it receive at most a token reduction through the estimated future mileage discount.

ISO expert actuary Boison admitted that gasoline prices and unemployment affect mileage of some drivers more than others. Boison considered ISO rates responsive to individual driving:

> [I]f a person became unemployed and stopped driving to work, he would get an immediate discount under some of the companies' plans, to the extent he would fall under the ISO plan to the extent he doesn't drive to work any more. That would be reflected in this actual insured's rate.

Boison opined, however, that being unemployed does not determine mileage:

> [I]f you are unemployed, granted, you can't pay for gas; obviously you can't drive. By the same token, if you are out of a job, maybe driving around looking for a job or driving around doing other things.[62]

Clearly, change in insurance cost in response to change in average driving, up or down, is not produced by uniform changes in driving by all policyholders. Although only some drivers cause the change in the average, all policyholders experience equally any response in insurers' overall rate levels. Insurers' costs are attributable to individual mileage, but their pricing schemes are incapable of allocating individually these costs to the consumers responsible for the increases or decreases in cost which mileage measures.

Windfall Profits. Regulators have recognized that windfall profits result when the cost levels on which premiums are set decrease sharply, as occurred through gasoline shortages and sharp price increases during the 1970s.[63] When a locality is economically stressed, however, reduction

---

61. *Id.* at 1141.

62. *Id.* at 1264.

63. Gasoline shortages in the 1970s sharply curtailed driving and thereby decreased costs to insurers. Insurance regulators, recognizing the unexpected reduction in claim frequency and thus in insurers' costs, attempted to reduce premium levels and to recover some of the windfall profits for policyholders. Some of these efforts are documented by

in driving by the affected individuals brings not only an immediate windfall reduction in insurers' costs, but may also eventually lower the state average premium charge per car, and ultimately may even decrease the territorial relativity for the impacted locality.[64] In situations where falling gas prices and improved economic conditions could lead to an increase in average driving and thus in costs to insurers, insurers protect themselves by anticipating such changes through rate level requests. *In effect insurers are insuring themselves at the expense of consumers against the possibility of more driving.*

Further, each family that reduces its driving—because of illness or unemployment for example—also reduces insurers' costs. Finally, policyholders who perennially drive less than the average while paying fixed premiums based on the average provide the insurance system with a huge continuing subsidy that is given no consideration whatever. Women and older drivers predominate in this group.

Delay in Response to Change in Costs. Insurers acknowledge an inevitable delay between, for example, the occurrence of a gasoline shortage or a recession, which triggers a reduction in driving, which causes a decrease in claim frequency, which subsequently may prompt insurers to seek a lower rate, which may eventually be approved and implemented–and the ultimate effect on policyholders' premiums. (Insurers' price and profitability expert Walters estimated the time lag before competition causes prices to reflect costs at from three to five years.)[65]

---

these cases:

ISO v. State Bd. for Prop. & Cas. R., 530 P.2d 1359 (Okl. 1975) (State Board ordered a 10% premium reduction effective Feb. 1, 1974).

Caldwell v. INA, 218 S.E.2d 754 (Ga. 1975) (Ga. Ins. Comm'r. ordered premium reductions and refunds effective March 24, 1974).

State ex rel. Ins. Comm'r. v. N. C. Auto. Rate Office, 214 S.E.2d 98 (1975), (N.C. Ins. Comm'r. ordered premium reductions effective March 26, 1974).

Monroe v. ISO of Arkansas, 522 S.W.2d 428 (Ark. 1975) (Ark. Ins. Comm'r. ordered a premium reduction effective May 1, 1974).

Travelers Indemnity Company v. Monroe, 522 S.W.2d 431 (Ark. 1975) (Ark. Ins. Comm'r. ordered a 17% premium reduction effective May 1, 1974).

64. The 1979 to 1983 decrease in accidents per 100 registered vehicles showed by an overall 18% decline in the statewide Pennsylvania average varied considerably from county to county. Some counties experienced declines of over 30% in vehicle accident frequency, while others showed increases of a few per cent over the same four years. Since some large decreases were in recreational counties, the concurrent decreases in frequency of insurance claims would appear in the home territories for the vacationers involved. The increases, however, probably indicate that driving habits are considerably insulated from recession and high gasoline prices. Source: PENNSYLVANIA STATISTICAL ABSTRACT, ANNUAL 1978–1985, Pennsylvania Dep't of Commerce.

65. Hearing Record, *Pennsylvania NOW* at 1603.

Insurers choose to profit from the time lag, token responsiveness, and resulting windfall profits rather than choosing to produce premium charges for individual cars that respond proportionately to changes in the actual exposure of each car. Insurers make it necessary to factor into the base premium levels for ratemaking the changes in claims frequency that result from changes in average driving.[65]

Proof of Price Discrimination. Averages are made up of individual values. An average mileage is composed of individual mileages, and an average cost reflects individual costs. If premium charges actually reflect individual differences in driving cost as insurers assert, the windfall profits that concern regulators could not possibly occur. The premium charges to individuals would instead decrease proportionally with individual contribution to the decrease in the average cost.

Regulators should be much more concerned, however, with the ongoing individual overcharging that is evidenced by the occasional occurence of windfall profits from reduced average driving. The failure of individual premiums to respond to changes in average driving proves that policyholders with mileage different from the average for their price class are subject to price discrimination. Because premium levels are not responsive to changes in average costs, they can not be responsive to measurable differences in individual costs, which is a violation of insurance rate law against pricing that ignores cost differences.

SUBJECT 4: ONLY MILEAGE MEASURES EXPOSURE OF INDIVIDUAL CARS TO ACCIDENT LOSS

In their current rating scheme for private passenger auto insurance, insurers choose to measure exposure as if the car were a human life constantly exposed at every hour of every day to the hazards of living and the risk of dying. Consequently, they treat private passenger automobile exposure as coterminous with the premium billing period of six months or one year. The car, however, is obviously not constantly exposed at every hour of every day to the hazards of driving and the risk of an accident. In fact, a car which is not driven is scarcely at risk of an accident.

Consistent with that intuitively obvious logic, Paul Dorweiler's classic 1930 paper *Notes on Exposure and Premium Bases*[67] stated: "The mileage exposure medium is superior to the car-year medium in yielding

66. There is no need for metered electric utilities to increase the kilowatt-hour rate when average consumption increases because the individual consumers responsible for the increase automatically pay the increased cost.

67. See Note 8 *supra*. The 1930 Dorweiler paper is a basic text for the ratemaking portion of the qualifying examinations for fellowship in the Casualty Actuarial Society. It was reprinted in 1971 (68 PROC. CAS. ACTUARIAL SOC'Y at 59).

an exposure that varies with the hazard, as it responds more[68] to the actual usage of the car."[69]

In commenting on Dorweiler's statement, insurers' expert actuary Miller attempted to equate mileage as a quantitative measure of exposure with insurers' use of class factors tied to estimated future mileage: "[T]he classes evolved substantially since the 1930's . . . Mileage is one [rating factor] that has been tested and continues to be used."[70]

Further distancing exposure from physical reality, insurers' price and profitability expert Mavis Walters testified that classification can somehow measure the exposure of individual cars:

> [T]here are very refined auto insurance class plans, which measure, in my opinion quite accurately, expected loss potential of individual insured cars. You don't need a quantitative measure in your exposure base. You can use a very simple exposure base [car-year] and reflect the different hazards or the different risk elements through the application of the risk classification plan.[71]

Insurers' experts generally fail to differentiate estimated future mileage from verified odometer mileage when addressing the cost of implementing an exposure basis premised on verified odometer mileage. The

---

68. Stating that mileage responds "more" than the car-year to the actual usage of the car is actuarial hedging on criticism of auto insurance pricing. Clearly the car-year medium does not respond *at all* to the actual usage of the car.

69. Dorweiler also notes, from the viewpoint of 1930 technology, that "the devices and records necessary for the introduction of [the mileage exposure] medium make it impractical under present conditions," *(id,* at 338) and that while the car-year "measures the exposure prospectively, [mileage] requires a final adjustment which would be determined retrospectively." *Id.* at 339. In the 1930s, residential water was unmetered in most places and was sold at a fixed annual charge.

70. Hearing Record, *Pennsylvania NOW* at 922.

In 1987, Travelers Insurance Company testified that in 1977 it stopped using the rating distinction by annual mileage, at 7500 miles, because

> We found the business was gravitating to the lower annual mileage. We reached something like 60 or 70 per cent of our book of business as being forced into the lowest mileage category. The simple reason for that is competition. We couldn't verify it.

Hearing record, Pennsylvania Ins. Dep't, (March 4, 1987) at 205.

71. See note 70 *supra* at 1590.

Auto insurance actuaries seem unable to explain how classification "measures" the on-the-road exposure of a car. One of the three implied untruths illustrated by the Aetna ad, text at Note 5 *supra,* is that insurers have indescribable ways of determining the right price for everyone. This testimony simply asserts that something is done without describing how that is accomplished.

use of mileage estimates to calculate discounts is a disincentive to making a clear distinction between real and imaginary mileage; but cost concerns expressed by insurers' experts seem intended to serve as a defense against possible rulings from insurance regulators that would require additional "refinement" of estimated future mileage price classes. Without any accurate mileage data, insurers turn to estimated future mileage categories to support their assertions of lack of proportionality between mileage and costs, further blurring this distinction.

Exposure Bases Related to Exposure Reality

In contrast with their practice for private passenger auto insurance, insurers adopt a rational process for the purpose of calculating premiums for individual commercial entities that distinguishes classification of like entities from measurement of individual exposures. Commercial property is first classified to obtain the rate applied to all similar properties, as explained in testimony by insurers' expert actuary Walters.

> There is, for example, in commercial general liability [insurance] a rate for drug stores. There is a rate for plumbing establishments . . . It's simply a rate that applies to drug stores or plumbing establishments or barber shops or what have you.

An appropriate measure of exposure is then used in conjunction with the class rate.

> In order to get some measure of increased risk, increased hazard, we use a quantitative exposure basis, whether it's per hundred square feet or per $1,000 in sales or what have you.[72]

The actual premium paid by individual stores in the same class depends on size of each or upon the amount of business activity each has had during the insured period as a measure of the amount of liability exposure. To operate otherwise, would be to assume that the large chain store would represent the same possibility of liability as would the small "mom and pop" store.[73]

Under insurers' commercial contracts "[t]hose who generate sales of, say, $50,000 would pay more . . . premium than those who generate sales of $25,000." With zero sales, except for a minimum charge for expenses, no exposure results in no premium.[74]

---

72. Hearing Record, *Pennsylvania NOW*, at 1590.

73. The small store, of course, would be the one to be overcharged under a store-year exposure measure used to price liability protection for the drug-store class.

74. *Id.* at 1590.

Odometer mileage is a similar, equally logical, exposure measure that is used with a small number of commercial vehicles with pricing prepared by ISO and Liberty Mutual, also after the application of classification factors.

Per-Day Exposure Basis

Insurers acknowledge the need to reflect days of non-driving premium charges for insuring commercial vehicles. In explaining why an option of per-mile exposure is convenient for commercial entities, insurers' expert actuary Miller explained that otherwise "whatever vehicles come in or out of the fleet . . . adjustments are made on a pro rata basis based on the risk classification factors in the rate manual." Miller further suggested a great deal of work would be involved in making such adjustments "virtually every day as vehicles are added or go out of service."[75] ISO actuary Boison described a similar problem arising every time a commercial vehicle "was down."[76]

In dealing with private passenger automobiles, however, insurers are far more reluctant to reflect days of non-use in reduced premiums.[77] For example, Allstate allows its insureds periods of suspension (of all coverages except comprehensive) during extended periods of nonuse. Allstate's senior actuary LaMonica did not know whether the company imposes a minimum time period for such a suspension, but "suspect[s] it is not the type of thing, just from a practical aspect, that they are going to be taking coverage off and putting it on and doing that back and forth." In describing the expense involved in frequent use of the suspension provision, LaMonica indicated "[s]omeone has to make a notation on the policy and recalculate the premium; but again, from a practical standpoint, that is not done for short periods of time."[78]

A private passenger automobile is no more likely to be involved in an accident while "down" or "out of service" than is a commercial vehicle. Nonetheless, unless the private auto is "down" for an extended period of time and the owner is sophisticated enough to know that coverage can be suspended, insurance premiums for that vehicle are just as high for periods of nonuse as for periods of on the road exposure.

---

75. *Id.* at 1004.

76. *Id.* at 1213.

77. The reasons cited by actuary Miller for the "convenience-related" need to base commercial rates on mileage, are the same as those cited by actuary Knilans as reasons why such a conversion would not be administratively advantageous for private passenger automobiles. *Id.* at 1422. Company defendants' expert economist Stewart opined that the true reason for more "precision" in commercial rates than in private passenger rates is the value to insurers of "big casualty accounts." *Id.* at 1350.

78. *Id.* at 1081.

Insurers' method of applying an exposure basis for commercial entities illustrates the need for an exposure basis to reflect actual exposure to the risk insured against. It also illustrates the two-step way in which classifications are used in combination with an exposure basis. Each insured is first classified (for vehicles by territory, use, driver age, and type and model as appropriate), which gives it the class rate per exposure unit (*e.g.*, 5 cents per mile for a particular class and coverage). An advance premium may be paid on the basis of estimated exposure. Then at the end of an exposure period, actual exposure is measured and multiplied times the per-exposure rate to determine the actual premium charge, against which the advance premium is credited.

'Type of Miles' Nonsequitur

Insurers support their use of the day-exposure basis for private auto insurance by arguing that no mile is like any other mile, while ignoring the fact that no day is like any other day. Their theory seems to be that the infinite variation in types of mileage makes measuring the number of miles irrelevant, and therefore that the measurement of exposure must be made coterminous with the time period for which the car is insured.

> It is specifically averred that each mile driven does not involve the same risk of loss as other miles driven; and that some miles impose greater risk of on the road accident than others because of the conditions and circumstances under which they are driven. As a single example only, a one mile drive to work down a crowded city street in bumper to bumper traffic at rush hour, which must be driven daily regardless of weather conditions, imposes a substantially greater risk of on the road loss or of an accident than one mile driven for pleasure on a rural interstate highway while on vacation, or even while commuting to work if such mileage is driven before reaching a congested or urban area. Statistically, many more accidents occur within short distances of home while commuting or driving locally than on long trips resulting in far greater mileage. Commuting mileages to and from work involve a substantially greater risk of loss than pleasure or total driving.[79]

Insurers have no way of distinguishing one day's driving or any other "type" of mile from another and in fact make no effort to do so. Current pricing methods do not quantify or even estimate vacation days, bumper-to-bumper days, (Allstate does not ask its insureds what shift they work or on what highways they travel), seasonal driving conditions, (ISO pro-

79. Defendants' Amended Answers and New Matter, *Pennsylvania NOW*, at ¶85, (filed Dec. 24, 1986). See Note 43 and accompanying text *supra* for evidence against insurers' theory of increased risk associated with commuting mileage.

rates summer months identically to winter months), or even non-driving days. Each day is assumed to be like every other, and every car in the same class is charged the same daily premium.

Responsibility

Under state regulation of insurance, who is responsible for protecting consumers when insurance companies publicly misrepresent that their pricing systems account for seasonal variations in driving conditions or individual variations in annual mileage, and when those misrepresentations are not corrected but echoed in the public statements of insurance regulators?[80]

80. *E.g.*, "[M]iles driven simply does not provide an adequate measure of insurance risk" [Penn. Ins. Comm. George Grode] said, "Miles driven in high-pressure rush-hour traffic or on snowy nights are different than miles driven on a touring vacation or on clear summer days." Philadelphia Inquirer, Dec. 3, 1985.

SUBJECT 5: PRICE VARIATION ACROSS ADULT CAR CLASSES COMPARED TO 1) VARIATION IN ANNUAL MILEAGE OF CARS AND 2) DIFFERENCES BETWEEN WOMEN'S AND MEN'S ACCIDENTS AND MILEAGE

Simple Price Categories

Insurers surround the classification of private passenger cars for pricing purposes with an actuarial mystique. A handful of price classes, produced by a few simple and imprecise definitions of car-use and driver characteristics, make the only insurance price distinctions among all cars in the same base price territory, and among cars of the same model and type for physical damage coverage. The mystery is how such a few broadly defined classes are supposed to distinguish actual differences in individual car use.

Rather than consider the class definitions themselves, however, this subject describes in terms of prices actually paid the effects of such classifications[81] as those used by the defendants in *Pennsylvania NOW*. The distributions of cars by base price multiplier are compared with public data on mileage and accidents as indicators of insurers' relative costs. To give the pricing schemes the maximum benefit of the doubt, it is assumed that the cars costing insurers least occupy the lowest price classes.[82]

As they are throughout this paper, the classifications considered in this section are restricted to those applied after classification by territory

---

81. The distribution of cars among price classes depends not only on the class definitions, but also on enforcement of classification rules. Since the agent with motives for pleasing the customer is also often responsible for applying the rules that determine discounts and surcharges, there is a conflict of interest that predictably leads to misclassification. See notes 106 & 107, *infra*, for testimony on the occurence of misclassification because of sales motives. Many of the classification rules in company agent's manuals contain provisions that do not appear to be easily verifiable. For example, the ISO definition of the largest, and lowest-price use class except for Farm Use, states:

> Pleasure Use means: (1) no Business Use. (2) Personal use including driving to or from work or school (a) less than 3 road miles one way; and (b) 3 or more, but less than 10, road miles one way for not more than 2 days per week or not more than 2 weeks in any 5 week period.

Rule 4.C.1.c, Personal Auto Manual, ISO (1985), on file with the Pennsylvania Ins. Dep't. (The ISO agent's manual typically contains no instructions on verification or enforcement.)

82. This is not a realistic assumption. Since classes are not defined by measured mileage, each class includes high- and low-mileage cars. Because mileage measures the amount of physical exposure to risk of accident and thereby insurance cost, the cars in each class—from that with the smallest to that with the largest base price multiplier—represent a broad range in cost to insurers. The existence of a broad spread of within-class annual mileages, with an equivalent spread in accident probabilities, is documented in Subject 7, *infra*.

and car type (for physical damage insurance). The differences thus identify the premium differentials paid for insuring cars in the same territory and in the same car class.

Class Definition

For cars in the unisex category ("Adult" class cars), classifications are defined according to stated use (Farm, Pleasure, Short and Long Drive-to-Work, Business), by estimated future annual mileage over or under 7,500 or 8,000 miles, and by single car vs. multiple cars on the policy. Only two of the five defendent-ratemakers in *Pennsylvania NOW* classify by sex any cars with drivers over age 30.[83]

The defendants repeatedly asserted that their price classes "reflect"[84] mileage, but admitted to a total lack of information about the amount of mileage "reflected" through their classification schemes. Verified odometer mileages are not collected for cars within any classes.

Distribution of Cars By Adult Price

ISO is typical of most insurers in that it uses 20 "key" adult classes.[85] When arranged by increasing size of base-price-multiplier, however, the 20 classes produce only 14 multipliers because some classes share multipliers with other classes. For example, the multiplier 0.85 is applied to cars in both the Farm Use-Single Car class and the Pleasure Use-Multicar class (**Exhibit N**).[86] Ninety per cent of the cars are rated within plus or minus 15 per cent of the territorial base price (the price paid when the-

---

83. Of Pennsylvania cars 6% of those rated by ISO and 7% of those rated by Allstate are rated by the sex of drivers over age 30, Exhibit A, Part I at 251, *supra.*

84. This "it all comes out in the wash" theory was expressed by the defendants' price and profitability expert Mavis A. Walters:

> I don't know if there's a difference in driving patterns between the sexes... If there is a difference and it's reflected in loss experience, then if such a difference does exist and if it influences loss costs, then rates will be reflective of that.

Hearing Record, *Pennsylvania NOW* at 1652–1653.

85. Unisex Rate Filing, ISO, Penna. Ins. Dep't, (June 7, 1985). In comparison with the 20 adult "key" classes, there are 10 classes for cars with drivers 65 and older, and 36 classes for sex-rated cars with drivers younger than age 30. "Key" is the designation in the filing. The remaining, and therefore non-key, classes listed in the ISO Agent's Manual are defined by car performance levels and driver surcharge points for unisex-class cars, and such things as "good student," "away at school," and "driver training" discounts for cars with sex-priced insurance.

86. Class multipliers are applied to the territorial base price to produce the price paid. Exhibits S and T, Subject 6, *infra*, show examples of composing premium charges from territorial base prices and expense fees.

EXHIBIT N
Adult-Class Cars by ISO's Price Multipliers

ISO Class Code	Class Description: Use	Driver Discount	Car Discount	Number of Cars in Class	Base Price Multiplier	Cars with Same Multiplier: %	Cumulative %*
8102	farm	woman only	multicar	134	.60	.01%	.01%
8192	farm	none	multicar	10,333	.70	1.0%	1.0%
8101	farm	woman only	none	128	.75	.8%	1.8%
8142	pleasure	woman only	multicar	8,772			
8191	farm	none	none	1,916	.85	44.8%	46.6%
8112	pleasure	none	multicar	480,884			
8152	short work	woman only	multicar	1,595	.90	5.4%	52.0%
8141	pleasure	woman only	none	56,425			
8122	short work	none	multicar	144,107	1.00	30.9%	82.8%
8111	pleasure	none	none	188,824			
8151	short work	woman only	none	20,443	1.05	1.9%	84.7%
8162	long work	woman only	multicar	501	1.15	6.8%	91.5%
8121	short work	none	none	72,505			
8172	business	woman only	multicar	94	1.20	.01%	91.5%
8132	long work	none	multicar	48,353	1.25	4.5%	96.0%
8161	long work	woman only	none	4,400	1.30	1.6%	97.6%
8182	business	none	multicar	12,626			
8171	business	woman only	none	617	1.35	.1%	97.6%
8131	long work	none	none	21,393	1.40	2.0%	99.6%
8181	business	none	none	4,181	1.45	.4%	100.0%
	(Total "woman only" Cars)			(93,109)	av 0.94	(8.6%)	
	Total Cars			1,078,231	av 0.96	100%	

* Exhibit Q, infra, shows the cumulative percentage of Adult cars by price multiplier graphically for the Adult class cars of all five defendants in Pennsylvania NOW including ISO.

multiplier assigned a class is 1.00). This appears to be the industry's conventional range of discounts and surcharges.[87]

Sex-pricing of nine per cent of adult cars by ISO yields a token 10-point discount to single women. Cars rated with this discount have an average base-price multiplier (0.94) which is higher than that paid by a majority (52 per cent) of adult-class cars and nearly the same as the average for all adult cars (0.96). This situation results chiefly from the effect of the larger 15-point multicar discount applied to two-thirds of

87. The similarity of State Farm class multipliers to those of ISO demonstrates the conventionality of the pricing among insurers. In Pennsylvania, 689,189 State Farm Adult class cars are represented by 20 classes (20 for ISO) with 13 different class multipliers (14 for ISO), and 96.6% are rated at multipliers 1.00 plus or minus 15 points (89.7% ISO).

unisex-priced cars, but to only one-tenth of the sex-priced adult cars. Consequently, when a woman marries, and joins her car with a man's on the policy, she loses her "single woman discount," but her insurance price decreases about five per cent.[88]

Distribution of Household Vehicles By Annual Mileage

Vehicles available to households in the United States, excluding motorcycles, show a continuous distribution of mileages from less than 1,000 miles to more than 23,000 miles annually. For example, 8 per cent (8.3 million automobiles) are driven less than 1,000 miles annually and 20 per cent (21 million automobiles) are driven less than 3,000 miles annually (**Exhibit O**).

Average mileage decreases with increasing car age, as would be expected given the different economics of car ownership and operation for consumers at various income levels (lower-income consumers, who cannot afford newer cars, also cannot afford to do as much driving as higher income consumers). In the "less than 1,000" annual miles category, there are four times more cars 10 years old and older than cars 1-3 years old (Exhibit O). In the "more than 23,000" annual miles category, on the other hand, there are four times more 1-3 year old cars than cars 10 years old and older.

A 1960s study by a predecessor to ISO found that the frequency of liability claims decreased with increasing car age,[89] undoubtedly a result of the decreased average on-the-road exposure of the older cars. Note, however, that millions of newer cars nationally are also used very spar-

88. Changing from a single car to a multi-car policy, as may occur through marriage, means a 15-point decrease for men's price.

89. This study was cited by Daniel J. McNamara, president of ISO for 16 years until his retirement in 1988, in *Discrimination in Property-Liability Insurance Pricing*, ISSUES IN INSURANCE (3rd Ed. 1984) Amer. Inst. for Property and Liability Underwriters.

According to McNamara the study was seeking justification to surcharge owners of older cars for liability insurance. On finding instead that the relative claim frequencies indicated increased charges for insuring newer cars and decreased charges for insuring older cars, the insurance companies chose not to follow the indications because, as McNamara explained,

> no reasonable relationship between the age of the automobiles and the likelihood of an accident leading to a liability claim could be established. . . [T]he basic justification of relativities among classes must recognize that the use of statistics should be leavened with a liberal dose of common sense.

Id. at 44. (Apparently common sense means seeing "no reasonable relationship" if doing so would result in higher premiums for customers who can afford newer cars and more driving. The same common sense solicitude for some customers would explain the selective use of sex-pricing despite the consistent 2:1 ratio of men's to women's accident frequencies.)

EXHIBIT O
Household Vehicles by Annual Mileage and Age

Annual Mileage Group	Number of Cars* (in Millions)					Percentage of Cars	
	1-3 Years Old**	4-6 Years Old	7-9 Years Old	10+ Years Old	All (1+ Yrs. Old)	In Group	Cumulative
0 to <1,000	1.04	1.44	1.57	4.31	8.36	8.0%	8.0%
1,000 to <3,000	1.91	3.31	2.99	4.29	12.50	12.0%	20.0%
3,000 to <8,000	6.46	8.54	6.79	7.12	28.92	27.8%	47.8%
8,000 to <13,000	8.53	9.76	5.92	4.36	28.57	27.5%	75.3%
13,000 to <18,000	5.06	4.36	1.96	1.27	12.66	12.2%	87.5%
18,000 to <23,000	2.50	1.93	1.00	.54	5.98	5.8%	93.3%
23,000 & more	3.36	1.96	.87	.79	6.99	6.7%	100.0%
Total	28.88	31.30	21.11	22.69	103.98	100.0%	

* Includes all motor vehicles owned by or available to a household on regular basis excluding motorcycles and mopeds. Total vehicles was 104 million (120.098 million less 1978 models and vehicles for which either model year or mileage not reported). (Rounding affects totals.)

** Starting with 1977 models because the 1978 models were not a year old and recorded mileage for less than one year of driving. Inclusion of the 1978 models increases the size of the less than 3,000 mile group insignificantly, from 20.0% to 20.2% of cars.

Source: Table 15 in "Household Vehicle Utilization," Report 5, 1977 NPTS, U.S. D.O.T. (1981).

ingly. One million of such cars, many probably bought for reliability and fully insured, were driven less than 1,000 miles annually, an average of less than three miles a day on the road. Their annual exposure to accident was therefore less than one-tenth of the 10,000 mile overall average for cars.

Nationally, owners of most of the 20 million cars with less on-the-road exposure than 3,000 miles appear to have had no choice but to pay

at least 0.85 of the base price that relates to the cost of the average annual exposure of cars, roughly 10,000 miles, of the base price class.[90]

Price Spread Compared To Mileage Spread

By scaling to average values—ISO adult price multiplier 0.96, and car mileage of 10,000 miles—the mileage distribution data for cars (Exhibit O) may be combined with the distribution of price multipliers (Exhibit N) that are said by insurers' experts to "reflect" mileage. The extreme contrast between the two distributions is clear, **Exhibit P.** The distribution of cars across annual mileage categories is very broad, but because the price categories available to "reflect" this broad range in exposure to accidents are confined to a narrow central band, the distribution of cars by price forms a narrow, central peak.

Flat Prices Across Classes

Since the approximately 100 per cent difference between women's and men's average mileage and accidents is not explicitly considered by sex-pricing in Adult classes, insurers have suggested that such large differences are "reflected" by a predominance of women's cars in the lower price-classes and a predominance of men's in the upper price-classes. To test this possibility, cumulative distributions of cars ranked by increasing classification price were prepared (**Exhibit Q**).

Examination of the adult price class distributions of all five of the defendants in *Pennsylvania NOW* shows the prices to be equally flat across classes. In each, more than 9 out of 10 cars are insured at prices within about 15 per cent of the average class multiplier. Therefore, most Adult cars rated by insurers are in a price range defined by the size of token discounts and surcharges.

Maximum Average Price Difference Between Men's Cars and Women's Cars

To obtain the maximum insurance price difference between men's and women's cars (assumed to be equal in number for each insurer), the distribution was divided in half, and the average price multiplier cal-

90. Undoubtedly the owners of many of the lower mileage cars are over age 65 and thereby would get a 5- to 10-point senior discount from the equivalent Adult class price multiplier. Senior discount class cars, however, like the Single Woman discount class cars, are much less well-represented in the 10- to 15-point multi-car discount class than are Adult class cars. In the ISO classes in Pennsylvania, for example, more than two-thirds of Adult class cars receive the 15-point multicar discount, while fewer than one-third of Senior class cars do.

EXHIBIT P
Cars by Mileage and by ISO's Price Multipliers

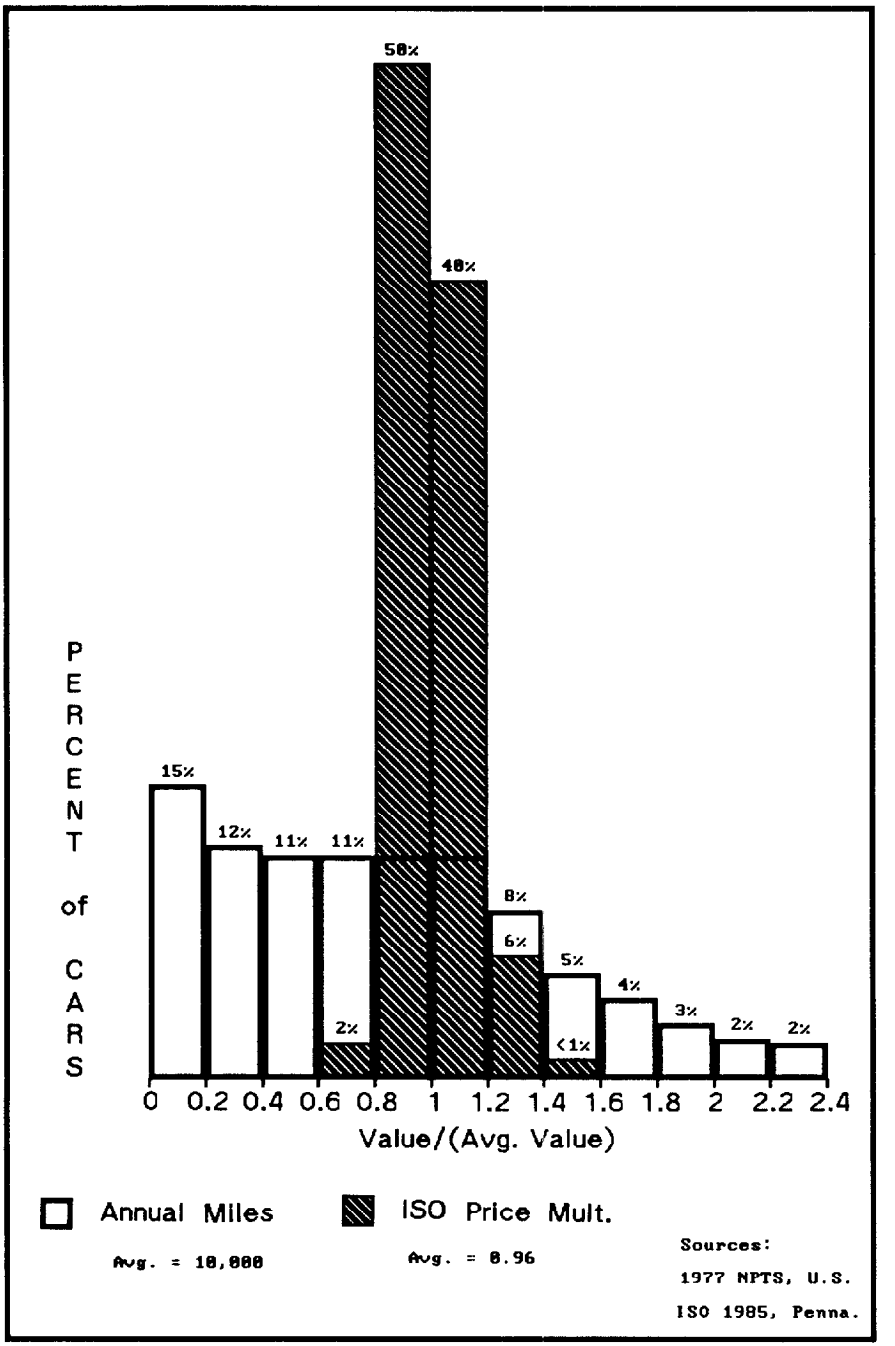
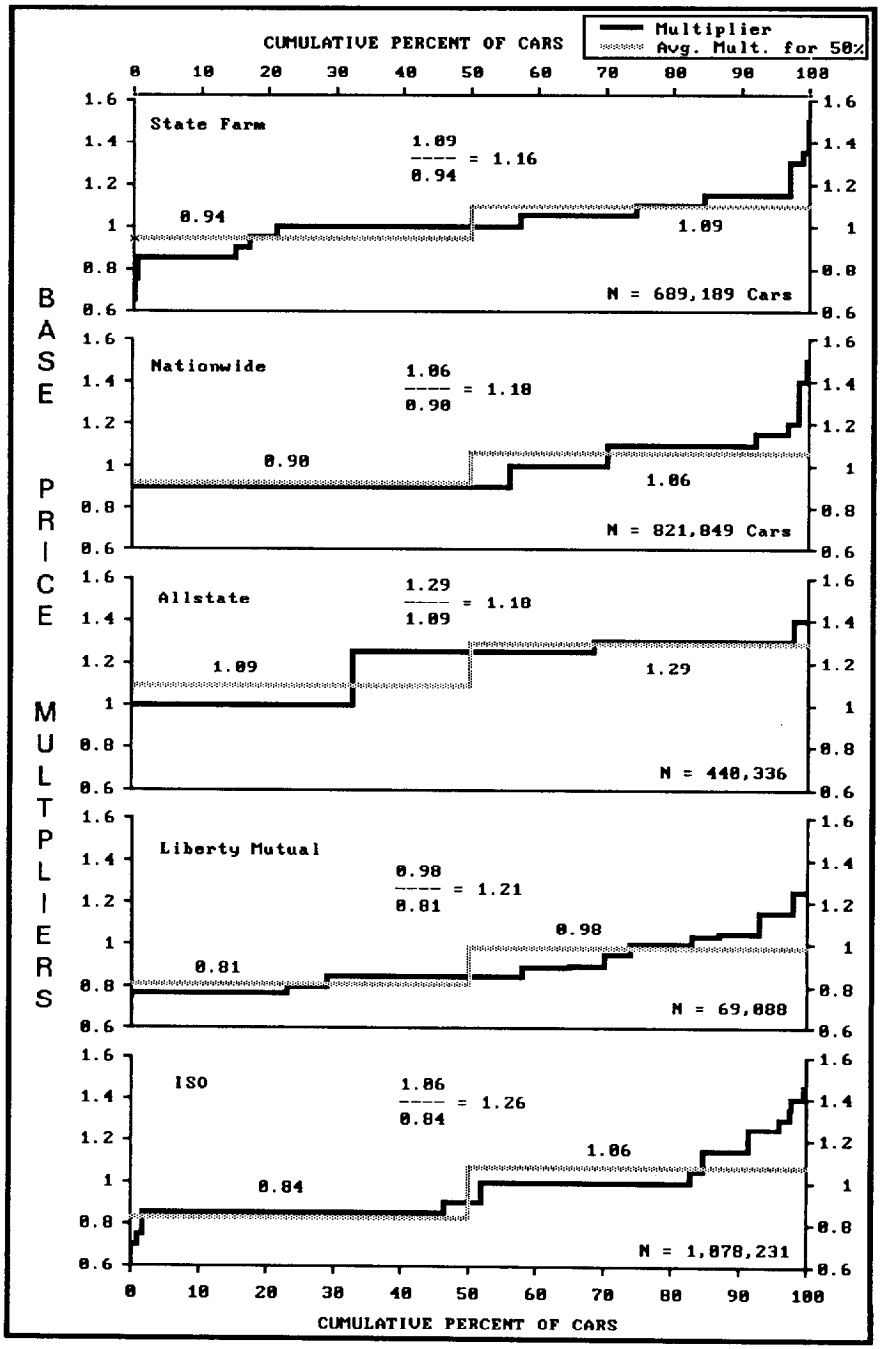


EXHIBIT Q
Adult-Class Cars by Price Multiplier, With Average Multiplier
For Each Half of Distributions



culated for each half. The two averages for each insurer are shown by stippled lines in Exhibit Q. To develop the *maximum* possible difference that could exist through division by sex of principal operator, this division unrealistically assumes that only women are in the Farm Use class, and that all women's cars receive the multicar discount.[91]

The visual flatness across insurers' price classes for adult cars is quantitatively expressed by the small size of the differences between the upper and lower averages. In contrast to the 100 per cent difference between women's and men's mileage and accident averages, the upper price-class average exceeds the lower by only 16–26 per cent for Adult class cars (Exhibit Q).

Price variation across Adult car classes is almost non-existent compared to the difference between women's and men's mileage and accident averages and to the huge variation in the annual mileages of cars.[92]

SUBJECT 6: PRICE RESPONSE TO MILEAGE WITHIN CLASSES AND RESULTING PER-MILE COSTS TO CONSUMERS

In a continuing effort to convince consumers that the cost of automobile insurance is a reasonable part of the cost of operating a car, industry public relations fact books reproduce government statistics on the per-mile cost of operating a car.[93] In fact, per-mile gasoline costs and per-mile insurance costs are approximately the same, in the range of 3–9 cents per mile (**Exhibit R**, Table 1). But here the similarity stops between gasoline and insurance cost under the current fixed annual price system.

The per-mile cost of gasoline for a car does not depend on the number of miles the car is driven. In contrast, the per-mile insurance cost given

---

91. Spread of the "woman only" price discount class across the price multipliers from the lowest to the highest, Exhibit N, *supra*, indicates that the assumption is unrealistic that women predominantly get the lowest prices.

92. Insurers usually deny that flat prices across classes are desirable, but ISO actuaries appear to recommend keeping prices flat by warning of the consequences of attaining greater "efficiency" by increasing the spread across class prices to match the spread of individual risk.

> If greater efficiency is desired, then the class plan must offer a greater spread of rates. Since affordability is the major problem facing automobile insurance today, it seems unlikely that there will be hue and cry for increased efficiency.

Industry's Sex-Rating Compilation at 165. (See comments at Note 123, *infra*, on use of the term "efficiency" as a euphemism for the large overlap of men's and women's accident probabilities.)

93. *E.g.*, one such pamphlet states that "compared to other expenses, such as gasoline ... the overall cost of auto insurance per mile is comparatively low." INSURANCE FEDERATION OF PENNSYLVANIA, EFFECT: THE INSURANCE INDUSTRY'S ROLE IN PENNSYLVANIA'S ECONOMY (1986) at 9 & 13.

EXHIBIT R

Per-Mile Costs of Car Operation for Gasoline and Insurance

Table 1. Cents Per Mile by Type of Car

Type of Car	Gasoline @ $1.389*	Gasoline @ $1.00*	Insurance Averaged Over 12 years and 120,000 miles**
Large	6.8	5.0	4.9
Intermediate	5.5	4.1	5.6
Compact	4.5	3.3	4.3
Subcompact	4.3	3.2	4.9
Passenger Van	8.9	6.6	8.9

Source: Federal Highway Administration. Reproduced in fact books by the Insurance Federation of Pennsylvania and the Insurance Information Institute.

* Price per gallon including taxes. The higher gasoline price is from the source, and the $1.00 value was assumed for this table.

** Total of 12 years of premiums at current (1984) prices for a Baltimore suburb divided by 120,000 miles. Collision coverage for first five years only.

Table 2. Cents per mile cost of Insurance by Car Age.

Year of 12 Year Lifetime	Average Annual Mileage	Fixed Annual Premium*	Per-Mile Cost: Cents For Year	Per-Mile Cost: Difference From 12-year Average
1st Year	14,500	$394	2.7	-31%
3rd Year	12,500	$394	3.2	-20%
5th Year	10,300	$394	3.8	- 3%
7th Year	9,200	$394	4.3	+ 9%
10th Year	7,800	$394	5.0	+28%
12th Year	6,700	$394	5.9	+49%
12-Year ave.	10,000	$394	3.9	0%

Source: U.S. Census Bureau, 1987 Statistical Abstracts, Table 1040 (large car).

* Does not include premium for collision coverage carried through the 5th year. Premium for coverages carried the full 12 years (liability, personal injury protection, uninsured motorist, and comprehensive coverages), is assumed to be the $394 value given in the source for the 7th, 10th, and 12th years as the total premium.

in fact books is the average for a car lifetime—12 years of premiums divided by 120,000 miles. Since the average annual mileage for one-year old cars is 14,500 miles and for 12-year old cars is 6,700 miles, the average per-mile cost for the same insurance coverage doubles from 2.7 cents per mile to 5.9 cents per mile between the two car ages (Exhibit R, Table 2).[94]

This section shows how, under insurers' fixed car-year exposure base, operating costs for consumers range from less than 2 cents to more than 15 cents per mile for identical insurance coverage by the same insurer on cars classified identically.

Test: Response of Prices to Mileage

Insurers in *Pennsylvania NOW* asserted that their price categories "reflect" mileage. To assess the degree of this asserted price responsiveness to on-the-road exposure measured by mileage, Pennsylvania NOW used a test pricing example for each of the five insurers. The test followed the specifications of the Pennsylvania Department of Insurance's 1986 *Guide to Auto Insurance Premiums* 1) by county and city for mandatory coverages as applied to the Harrisburg, Penna., territory, 2) used for pleasure, 3) whose driver is married and between ages 25 and 64.[95] To examine for possible interactions of price components that might have significant effect, prices are built from the base prices by coverage and expense fees filed by insurers with the insurance department. The prices determined were validated by an actuary from each insurer.

The test of price response to mileage consists of applying six annual mileages to the classified car and observing the effect on the premium charged and on the per-mile insurance cost to the owner.

Base Prices from the Territory and Car-Type Classes. The car is first classified by territory to obtain the base prices applicable to all cars in the territory for the required coverages, and to all cars in the territory of a given make and model for physical damage coverages (**Exhibit S**, Tables 1A and 2A, and **Exhibit T**, Table 1A). The rate filings by the defendants in *Pennsylvania NOW* list the base price for each coverage by territory. The territorial base prices for the optional physical damage coverages (collision and comprehensive) refer to a late model intermediate-price car, to which the insurer assigned the unity car-class multiplier. (Insurers

94. Insurers found that accidents decrease with increasing car age, but chose to ignore it. *See* Note 89, *supra*.

95. The Insurance Department obviously chose this driver specification because under it the prices of all insurers are unisex. The choice of the unisex class as the appropriate one for a buyer's guide is tacit acknowledgement that auto insurance prices typically and for the large majority of cars are unisex. The guide does not identify the class as unisex, however.

EXHIBIT S

Price Response to Mileage: Car-Year Basis

Table 1A. State Farm - Base Prices, 1986

	Required Coverages			Phys. Damage (IRG-9,'85 car)		
Harrisburg (Terr. 28) Base Prices	Liability 25/50/25	Medical funeral $10,000	Loss of income $5000/1000	Comprehensive Full	Collision $100 ded.	Sum of base Prices
	$132.8	+ $32.4 +	$14.0 +	$30.4 +	$138.	= $347.6

Table 1B. State Farm - Pleasure-use Unisex Class Prices

Annual Mileage Driven	Sum of base Prices		Class multiplier		Consumer's Cost: Premium	Consumer's Cost: Cents per mile
3,000	$347.6	X	.95	=	$330	11.0
6,000	$347.6	X	.95	=	$330	5.5
9,000	$347.6	X	1.10	=	$382	4.2
12,000	$347.6	X	1.10	=	$382	3.2
18,000	$347.6	X	1.10	=	$382	2.1
24,000	$347.6	X	1.10	=	$382	1.6

Table 2A. Allstate - Base Prices, 1986

	Required Coverages			Phys. Damage ('86 symb S)		
Harrisburg (Terr. 48)	Liability 15/30/10	Medical & Inc. Loss 10/5/1	Uninsured Car 15/30	Comprehensive Full	Collision $100 ded.	Sum of base Prices
Base Prices	$95.6 +	$52.4 +	$31.6 +	$37.2 +	$140.2	= $357
Multipliers						
0-7500 miles	1.00	1.00	fixed	1.00	1.00	
7500+ miles	1.15	1.25	fixed	1.20	1.20	

Table 2B. Allstate - Pleasure-Use Unisex Class Prices

Annual Mileage Driven	Liability x Multiplier	Med. & Inc. Loss x Multiplier	Uninsured fixed	Phys. Damage x Multiplier	Consumer's Cost: Premium	Consumer's Cost: Cts./Mi
3,000	(95.6x1.00) +	(52.4x1.00) +	31.6 +	(177.4x1.00) =	$357	11.2
6,000	(95.6x1.00) +	(52.4x1.00) +	31.6 +	(177.4x1.00) =	$357	6.0
9,000	(95.6x1.15) +	(52.4x1.25) +	31.6 +	(177.4x1.20) =	$420	4.7
12,000	(95.6x1.15) +	(52.4x1.25) +	31.6 +	(177.4x1.20) =	$420	3.5
18,000	(95.6x1.15) +	(52.4x1.25) +	31.6 +	(177.4x1.20) =	$420	2.3
24,000	(95.6x1.15) +	(52.4x1.25) +	31.6 +	(177.4x1.20) =	$420	1.7

EXHIBIT T

Price Response to Mileage: Car-Year and Car-Mile Basis

Table 1A. ISO - Base Prices, 1986

	Required Coverage				Physical damage '86 S-5 car)						
	Liability 15/30/5		First party benefit		Unins. Car UM	Compre-hensive $100 ded		Collis-ion $200 ded.		Total of fees & base Prices	
Statewide Expense Fee	$34	+	$10			+ $6	+	$20	=	$70	
Harrisburg UM (fixed)					$22				=	$22	
Base Prices	$136	+	$62			+ $16	+	$136	=	$350	

Table 1B. ISO - Pleasure-Use Unisex Class Prices

Annual Mileage	Sum of base Prices		Class multi-plier		Total of expense fees + UM		Consumer's Cost	
							Price	Cents per mile
3,000	$350	X	1.00	+	$92	=	$442	14.7
6,000	$350	X	1.00	+	$92	=	$442	7.4
9,000	$350	X	1.00	+	$92	=	$442	4.9
12,000	$350	X	1.00	+	$92	=	$442	3.7
18,000	$350	X	1.00	+	$92	=	$442	2.5
24,000	$350	X	1.00	+	$92	=	$442	1.8

Table 2. ISO - Class Prices Converted to Per-Mile Exposure Base

Car mileage by two odometer readings		Per Mile Rate (cents) *		Fixed Annual Charge **		Consumer's Cost	
						Tot. Charge	Cents per mile
3,000	X	3.56	+	$86	=	$193	6.4
6,000	X	3.56	+	$86	=	$300	5.0
9,000	X	3.56	+	$86	=	$406	4.5
10,000	X	3.56	+	$86	=	$442 ***	4.4
12,000	X	3.56	+	$86	=	$513	4.3
18,000	X	3.56	+	$86	=	$727	4.0
24,000	X	3.56	+	$86	=	$940	3.9

* Sum of Harrisburg territory base Prices for on-the-road coverages ($136 + $62 + $22 + $136 = $356) divided by an assumed 10,000 annual mile average for cars in the Pleasure-Use class, Harrisburg territory.

** Expense fees plus Comprehensive base price ($70 + $16).

*** $442 is the same charge that is assessed currently for all annual mileages.

assign base-price multipliers, such as 1.12 or 0.77, to all other models and types of cars to produce a territorial base price for each.)

Base-Price Multipliers from the Use and Driver-Type Class. The classification pricing process is completed by applying the multiplier for the use and driver class to the territorial base prices. The shorter and longer estimated future mileage multipliers are also applied as though the estimated future mileage were the mileage actually driven during the insured period (Exhibit S, Tables 1B and 2B; Exhibit T, Table 1B). The "exposure-measurement" stage of insurers' current pricing process consists of simply charging a fixed price for a year of protection.

Price Response to Variation in Mileage Exposure. Current premium charges are virtually unresponsive to a car's physical exposure. An increase in exposure from 3,000 to 24,000 miles—700 per cent—increases prices by from zero to a maximum of 16 per cent for insuring individual cars representing this wide range in mileage (Exhibit S, Table 1B (State Farm) and Table 2B (Allstate); Exhibit T, Table 1B (ISO)). Between 9,000 and 24,000 miles, there is no change in price at all.

Car-Year Exposure Base. Under each insurer's fixed annual prices, the costs to the consumer for identical insurance coverage range from less than 2 cents per mile for cars driven 24,000 miles a year, up to 15 cents per mile for cars driven only 3,000 miles in a year.[96] This broad range in the actual cost to consumers of insuring a car exposes the insignificance of small differences among insurers' prices and testifies that such token price variations are sales-based, not cost-based.

Mileage Exposure Base. Since ISO separates administrative expenses from its base prices (Exhibit T, Table 1A), straightforward per-mile charges can be obtained for the portion of prices used to cover the costs of on-the-road accidents simply by assuming an average annual mileage for the cars in the territorial and use class. The mechanical calculation is shown in Exhibit T, Table 2.

The assumed class average of 10,000 annual miles is arbitrary, but the value is within 10 per cent of values widely published.[97] As professionals with access to and familiarity with use of government traffic and economic statistics, auto insurance actuaries are able to determine these

96. In reality, the per-mile insurance costs to some consumers in Harrisburg exceed 15 cents per mile because many cars—one-fifth nationally—are driven less than 3,000 miles annually. For other consumers, however, the cost of insurance under fixed annual prices is considerably less than 2 cents per mile since about 6% of household vehicles are driven more than 24,000 miles annually. See Exhibit O, *supra.*

97. Vehicle mileages and their variation have been studied thoroughly. Average mileage for vehicles on a state-by-state basis in 1984 ranged from a high of 13,898 (District of Columbia) to a low of 7,778 (North Dakota). For 34 states, the average was between 9,000 and 11,000 miles. U.S. DEP'T OF TRANSPORTATION, Selected Highway Statistics and Charts 1984 at 30.

averages for any class of insureds which would otherwise be large enough for reliable cost predictability.

The economic significance of the per-mile premium basis for low mileage drivers is clear. The per-mile operating cost for the 3,000 annual mile car drops from 14.7 cents to 6.4 cents. For the car driven 6,000 miles, the per-mile insurance cost decreases from 7.4 cents to 5.0 cents (compare Exhibit T, Tables 1B and 2).

For owners of cars driven more than the 10,000 mile annual average, both per-mile and total insurance cost would increase on a car-mile exposure basis. With premium charges based on the amount of insurance protection actually consumed, however, the owners of high mileage cars would be as likely to complain publicly about losing their insurance subsidy and having to pay for the amount of insurance protection they use as to complain publicly about having to pay for the gasoline they consume.[98]

Test: Variation in Premium by Household for Identical Physical Exposure

Under the current system of charging fixed prices without regard to actual on-the-road exposure to risk of accident, insurers collect strikingly different total premium for cars within a single use and driver class. Plaintiffs in *Pennsylvania NOW* demonstrated additional unjustifiable consequences of fixed car-year pricing by showing the varying effect on the premium totals collected by insurers for an on-the-road exposure of 12,000 miles, depending solely on whether one or two cars and one or two households are involved. In addition to the same quantity of mileage, the "type" of mileage can be assumed to be the same under the different household arrangements because the territory, car, use, and driver classes which are said to "reflect" type of mileage are identical for all of the cars.

In the Harrisburg territory test case used in *Pennsylvania NOW*, the total premium collected under the unisex Pleasure Use class for the same mileage exposure increases by 46–100 per cent if driven in two cars rather

---

98. Insurers' expert actuary Miller analogized the effects of auto insurance subsidies to the effects of gasoline subsidies.

> If [the price of insurance] is artificially suppressed, . . . It also sends the wrong economic signals. . . [I]t's like suppressing the cost of gasoline. If you artificially suppress the cost of gasoline . . . that encourages people to use more gasoline because it's cheap.

Hearing Record, *Pennsylvania NOW* at 867.

In fact the cost of auto insurance under the current system of fixed prices provides no restraint on above-average driving to those who can afford the gasoline. The cost of additional insurance consumed adds nothing to the premium charges.

than one (**Exhibit U**). Insurers' claims that their multi-car and estimated future mileage discounts provide adequate price responses to differences in on-the-road exposure are obviously without basis.

In this scheme for guessing at mileage exposure by classification, the low-mileage cars owned by women and insured under single-car policies are as badly accommodated as multiple high-mileage cars on a single policy are favorably accommodated. As owners of policies for single cars which average about 6,000 miles annually, women predominate among those who must pay the highest car-mile charges, even though all conditions of the driving (''types of miles'') are presumably made the same through the territorial and use classification process.

EFM (Estimated Future Mileage) Price Classes vs. Mileage Variation

In testing insurers' price classes for responsiveness to the cost differences indicated by the 2:1 differences by sex in annual mileage and accident involvement, this analysis has heretofore given the benefit of the doubt to the price classes as having some meaningful relationship, however inadequate, to costs. Since the insurer-defendants in *Pennsylvania NOW* offer the price and cost differences from their "estimated future mileage" (hereinafter "EFM")[99] class data as valid evidence that their cost-price relationships meet the requirements of the Rate Regulatory Act, however, this subsection examines the validity of EFM as an insurance pricing and costing classification.

How EFM Classification Works. The EFM discount of 10 per cent to 20 per cent is awarded at the beginning of the policy year if the estimate (entered by the customer or agent on the application form) of the mileage to be driven by the insured car in the coming year is less than 7,500 or 8,000 miles.

Given the impossibility of verifying mileage that has not been driven, insurers make little or no effort to do so.[100] In fact, there is no such thing

---

99. The defendants in *Pennsylvania NOW* disingenuously chose to employ the term annual mileage as synonymous with EFM. The direct examination of Defendants' first expert witness, actuary Michael Miller, makes this tactic clear:

> Q: Now, in using the term *annual mileage*, I take it that you are using that term as *estimated future mileage*, not what I drove last year?
>
> A: Yes.

Hearing Record, *Pennsylvania NOW* at 852 (emphasis added). In subsequent cross examinations, defendants' experts therefore found it necessary to refer to "real" mileage to distinguish it from their EFM "mileage." *Id.* at 1256.

100. Actuary LaMonica testified that, except for a "persistent" problem with an agent, Allstate takes no punitive or admonitory action toward the deliberate or inadvertent

EXHIBIT U
Premium Variation by Household for 12,000 Miles Exposure

	Premium for each car*	Premium for 12,000 miles	Excess premium for 12,000 mi. driven in 2 cars vs. in 1 car		Premium rate per mile
STATE FARM					
One car, 12,000 miles	$382	$382	0	0	3.2 cents
Two cars, 6,000 miles each, one household.	$295	$590	$208	54%	4.9 cents
Two cars, 6,000 miles each, separate households	$330	$660	$278	73%	5.5 cents
NATIONWIDE					
One car, 12,000 miles	$452	$452	0	0	3.8 cents
Two cars, 6,000 miles each, one household.	$348	$698	$246	54%	5.8 cents
Two cars, 6,000 miles each, separate households.	$410	$821	$369	82%	6.8 cents
ALLSTATE					
One car, 12,000 miles	$419	$420	0	0	3.5 cents
Two cars, 6,000 miles each, one household.	$305	$611	$192	46%	5.1 cents
Two cars, 6,000 miles each, separate households.	$357	$715	$296	70%	6.0 cents
LIBERTY MUTUAL					
One car, 12,000 miles	$387	$387	0	0	3.2 cents
Two cars, 6,000 miles each, one household.	$291	$582	$195	50%	4.8 cents
Two cars, 6,000 miles each, separate households.	$337	$674	$337	74%	5.6 cents
INSURANCE SERVICES OFFICE					
One car, 12,000 miles,	$442	$442	0	0	3.7 cents
Two cars, 6,000 miles each, one household.	$399	$798	$356	81%	6.6 cents
Two cars, 6,000 miles each, separate households.	$442	$884	$442	100%	7.4 cents

* Premiums of defendants in Pennsylvania NOW for the Adult, Pleasure-Use class, Harrisburg territory. Multi-car and EFM (estimated future mileage) discounts applied where appropriate. Premium amounts were validated by defendants' actuaries.

as an EFM misclassification regardless of the number of miles the car is later driven as long as its classification conforms to the EFM value initially written down by the customer or agent. When prospective estimates prove to be inaccurate (even in the course of claims settlement) insurers do nothing to correct the resulting inaccurate cost data. Nationwide's actuary Knilans testified that if a car is rated in the EFM discount class (EFM under 8,000 miles), but has an actual annual mileage of 12,000, its losses are counted in Nationwide's under-8,000 EFM class.[101]

EFM Data vs. Mileage Reality. Insurers offered direct evidence that EFM classes are inconsistent with the mileage actually being driven by insured cars. For example, Allstate's actuary indicated that despite the increasing average annual mileage of cars (according to government data) over a period of years, the number of cars receiving the low EFM discount has also been increasing.[102]

The Travelers Company testified to the Pennsylvania Insurance Department that it dropped the EFM discount in 1977 because 60 to 70 per cent of the cars it insured were placed in the under 7500 miles category, whereas the average mileage for the cars it insures is about 12,000 miles.[103]

ISO's actuary testified that only 5 per cent of cars were paying the over 10,000 EFM price it uses in Michigan,[104] which is about one-eighth the number of cars that should be in that price category.[105] It is apparent, therefore, that ISO insurers have placed almost all high-mileage cars in the less than 10,000 EFM class in Michigan.

Agent Involvement. Agents have a definite conflict between their interest in making a sale or retaining a customer, and their enforcement of price classifications.[106] This conflict intensifies the problem of asso-

---

misclassifier, whether agent or insured. Allstate and Liberty Mutual attempt verification of mileage estimates by a survey or questionnaire, but admit that not many are returned. Hearing Record, *Pennsylvania NOW* at 949, 1092–1107, 1419.

101. Hearing Record, *Pennsylvania NOW* at 1456 & 1527.

102. *Id.* at 1061 & 1092.

103. See the quotation in Part I at 280 Note 70.

104. Hearing Record, *Pennsylvania NOW* at 1201.

105. Government data show that nationally 41% of household vehicles were driven more than 10,000 miles in 1983. See Exhibit O, *supra*, for the data, and its source, from which this value was obtained.

106. These difficulties were described to the Pennsylvania Insurance Department recently when an expert for Travelers Insurance Company was questioned on why that company had discontinued the EFM discount in 1977. He reported that the EFM value furnished on the insurance application was not a reliable benchmark for miles driven because both agent and policyholder had "motivations" to distort EFM values downward. Hearing Record, In *re* Rate Revision, Travelers Companies, Penna. Ins. Dep't, (March 4, 1987), at 206.

It is apparent from the discussions about the EFM discount that the agent, "motivated" by a wish to make a sale, is implicated in misclassifications. Out of concern that

ciating EFM discount classes with actual mileage driven. (Question: "An agent may be inclined to get a higher commission and, therefore, would rather have that mileage estimate higher than it is. But on the other hand, the agent may want the mileage estimate to be lower than it is actually in order to make the sale. Is that correct?" Answer of Allstate actuary LaMonica: "That is absolutely correct").[107]

The company may establish a quota of low mileage discounts, leading agents to withhold the discount from qualified customers in order to conserve discounts to gain new customers or to retain others not qualified for the discount. State Farm described such a quota:

> Whenever a state or area gets to where we have a much greater amount [than overall mileage would indicate] in the under 7500 [EFM discount class], . . . we go on a campaign to try to get it to the percentage that we think is appropriate.[108]

In describing difficulties in enforcing even a moderate size EFM price differential, State Farm did not distinguish between agent and customer:

> [W]hen there are large rate differentials involved, even at 15 percent we find it difficult when you know that if you say it's under 7500, you are going to get a 15 per cent discount. It's very difficult for people to resist that.[109]

Control of EFM Discount Size. If enforcement is adequate to produce a cost differential beyond the token discount size,[110] it becomes even more "difficult for people to resist" the discount with the result that a greater proportion of higher mileage drivers will be included in the low EFM

---

the insurance protection might be somehow jeopardized, most customers would be hesitant to seek an unjustified discount. Agents, on the other hand, are aware that classifications are policed minimally, if at all, and that deliberate misclassification is virtually without risk, even if such a deviation could be defined, which is not the case with the EFM discount.

107. Hearing Record, *Pennsylvania NOW* at 1102.

108. Hearing Record, In *re* Gender-Neutral Rating of Automobile Insurance, Penna. Ins. Dep't, Oct. 28, 1985, at 176.

109. Hearing Record, In *re* Gender-Neutral Rating of Automobile Insurance, Penna. Ins. Dep't, Oct. 28, 1985, at 177.

In considering the validity of the EFM discount class as a measure of the mileage effect on insurance costs, State Farm's actuary Gary Grant testified that people would not underestimate their future mileage to get a 15% discount. "I think people are honest." Hearing Record, *Pennsylvania NOW* at 1537.

110. In 1982, State Farm's relative cost experience indicated that its EFM discount size should be 27-points rather than 15-points as it was and still is. As examined under Subject 8, *infra*, State Farm chose to keep the EFM discount class overpriced for competitive reasons. To bring the relative cost back into line with the 15-point discount, however, State Farm needed only to relax enforcement of the awarding of the discount.

discount class. Thereby the cost differential will be narrowed, which will justify returning the price differential to a token size.

EFM Data as Measures of Mileage Insurance Costs. Consistent evidence indicates that actual annual mileage averages for vehicles rated in the low EFM discount class are much higher than the nominal mileage designations. Nevertheless, insurers assert that the 10–20 per cent price difference between non-discount and discount EFM classes accurately represents the actual cost difference between higher- and lower-annual mileage cars.[111] This unfounded assertion appears to be the sole basis for their public statements that "mileage is relevant but not proportional to accidents."

The vague claim that mileage is "relevant" seems intended to justify use of the EFM discount, while the claim that mileage is "not proportional to accidents" attempts to justify both the refusal to measure on the road exposure and the resulting price subsidies for owners of high-mileage cars. (Repetition of this assertion in public statements by two Pennsylvania insurance commissioners affirms its political function.)

EFM Fails to Meet Actuarial and Legal Standards. The evidence is conclusive that the EFM discount is non-objective, inherently unenforceable as defined, and arbitrarily granted. As such, the EFM discount class fails to meet actuarial standards of clear and objective definition that is not subject to manipulation. Therefore it fails to meet legal standards for non-discriminatory pricing.[112]

Insurance cost data produced from the EFM discount class may be informative about discounting practices, but provide no credible data on miles actually driven and no valid basis for examination of odometer mileage as an exposure base or for statements about the relationship of insurance costs to mileage. Insurers' experience with EFM classification demonstrates that there is no way to measure something without measuring it.

---

111. Hearing Record, *Pennsylvania NOW* 1047 (Allstate); 1362 (Liberty Mutual); 1499, 1538, 1547 (State Farm); 1439, 1441 (Nationwide).

112. The foregoing evidence on the character of EFM price classes can be compared with published actuarial standards for prices that specify:

> The definition of classes should be clear and objective. Once a factual assessment of an individual risk has been made, no ambiguity should exist concerning the class to which that risk belongs.

And

> The system should minimize the ability to manipulate or misrepresent a risk's characteristics so as to affect the class to which it belongs.

AMERICAN ACADEMY OF ACTUARIES, RISK CLASSIFICATION: STATEMENT OF PRINCIPLES (1980) ("Yellow Booklet") at 18. The EFM discount class defies regulation by failing to meet such essential criteria.

Cost of Operating a Mileage Exposure Base System

Expert witnesses for the defendant insurers in *Pennsylvania NOW* alternated extravagant predictions about the cost of operating a mileage exposure base with admissions that they had never studied the question and knew of no studies which have established even a rough idea of the cost.[113]

To provide a realistic perspective, Pennsylvania NOW presented evidence that 1) fraud in odometer readings was no more a factor than fraud in other metered services, and 2) costs of checking, reading, and reporting odometer readings to insurance companies would probably total no more than $10 per car.[114]

Ultimately, insurers' discussions of the relative weights of cost and benefit of a per-mile rate are meaningless because they include no understanding of the actual costs. To the extent that such discussion has any reference to actual activity by companies of "verifying" estimates of future mileage, testimony showed that companies handle this fundamentally impossible task in a scatter-shot fashion and that there is no penalty for "wrong" answers or inaccurate cost data, so long as class differences support adequately the desired price differentiation.

SUBJECT 7: DISTRIBUTION OF OVERCHARGES AND THE IMPACT ON WOMEN

Judged by both the average accident involvements and average mileages of drivers, men's cars are twice as costly to insure as women's cars. The following discussion looks beyond the averages and considers the accident probability and annual mileage distributions that compose the sex-averages. These distributions are taken as measures of the distribution of men's and women's cars across the range in costs to insurers of insuring them.

Auto insurers have been aware for many years that the spread in accident involvement probabilities for both drivers and cars is far greater than any spread in auto insurance prices. In 1961, for example, in a much-

113. Insurers' price and profitability expert Mavis Walters agreed that she did not know the cost: "It would just be—it boggles the mind frankly, my mind anyways." Hearing Record, *Pennsylvania NOW*, at 1633.

114. On demand of the Hearing Officer for information on the practical aspects of a mileage exposure base, plaintiffs in *Pennsylvania NOW* presented testimony of a Harrisburg mechanic and owner of a car repair, inspection, and sales business as to what he would charge for testing and sealing odometers, and for reporting odometer readings to insurers. The testimony included a review of the severe penalties under law to which his business is currently subject for any odometer fraud. Hearing Record, *Pennsylvania NOW* at 1704–1715.

cited paper titled "Any Room Left For Skimming the Cream?,"[115] Robert A. Bailey compared the spread in accident probabilities determined by earlier insurance record studies of Canadian cars and accident record studies of California drivers with the spread of cars across class prices.[116] Answering the question raised in the paper's title, Bailey concluded that:

> The present multiple classification system in all its complexity takes care of only half of the total variation among risks. The introduction of merit rating...has not eliminated the opportunity to skim off the cream.[117]

What this study confirmed is that many car owners are being overcharged in relation to what it costs insurers to provide them with insurance protection. Although the study did not consider the separate variations among women and men as risks, it apparently took for granted that insurers can identify the customers ("cream") whose cost to insure would be less than the class average and would be available for profiteering ("skimming"). A subsequent study, however, did examine the variation among risks on a sex-divided basis and is discussed next.

Sex-Divided Variations in Accident Probability

Separate distributions of men and women by accident probability were developed in the course of an industry- commissioned study, *The Role of Risk Classifications in Property and Casualty Insurance*, produced by SRI International (formerly Stanford Research Institute) and published in 1976 (hereinafter "*1976 SRI Study*").[118] The study's results were pro-

115. 47 PROC. CASUALTY ACTUARIAL SOC'Y 30 (1961).

116. Bailey's sample for the distribution of cars by price was 50,929 cars in Pennsylvania insured in 1960 under a predecessor to ISO's current classification system. Of these, 4,638 cars (9.1%) were classified by sex—asymmetrically by men drivers younger than age 25. "Woman-driver" was not a part of any class definition.

117. *Id.* at 33.

The term "skim" apparently continues in use among actuaries, judging from a professional publication, submitted as a defense exhibit by the insurers in *Pennsylvania NOW*, which states

> Classes that are homogeneous . . . will minimize the ability of the competition to skim off better than average risks.

Michael A. Walters, *Risk Classification Standards* 68 PROC. CASUALTY ACTUARIAL SOC'Y 1, 8 (1981).

118. Sponsors of the study, which included a range of topics such as pricing by territory, were ISO, State Farm, Amer. Ins. Ass'n, Amer. Mutual Ins. Alliance, and Nat'l Ass'n of Independent Insurers.

The results of the study were published in three documents dated May, 1976: *Executive Summary Report* (26 pp), *Final Report* (108 pp), and *Supplement* (240 pp). The 26-page Summary was included in *Industry's Sex-Rating Compilation* at 127.

duced through testing and fitting of theoretical accident probability curves to the actual distribution of drivers by number of accidents (from 0 to 9) that appeared during nine years on a random sample of California records consisting of 23,872 women drivers (7,988 accidents total) and 30,293 men drivers (19,158 accidents total) with valid licenses for the 14 year interval, 1961–1974. The age range of drivers at the end of the 14 years was 28–94 years old.

Sex-Dichotomy of Accident Probabilities. Commentary by auto insurers in the *Industry's Sex-Rating Compilation*, displays a love-hate attitude toward the conclusions which the *1976 SRI Study* draws from its analysis of sex-divided data.[119] In concluding its two-page summary of studies that support the use of classification by driver-sex in the pricing of insurance for cars, the *Industry's Sex-Rating Compilation* notes that:

> The 1976 SRI study of risk classification in auto insurance found that a simple system partitioning drivers into two classes according to sex produced a surprisingly efficient procedure for the assessment of risk. The report stated that this was "one of the simplest dichotomies . . . though very powerful compared to much more refined classification systems."[120]

According to the *1976 SRI Study*, men's average annual accident probability or "expected loss," derived from the accident involvements, was 7.03 accidents per 100 drivers, nearly twice women's average 3.72 accidents per 100 drivers.[121]

Sex-Overlap of Accident Probabilities. Auto insurers were much less receptive to the finding of the *1976 SRI Study* that the separate distributions of women and men drivers across accident probabilities showed significant overlap even though men's average accident probability was twice women's average. Twenty-eight per cent of men had an accident probability less than women's average and 13 per cent of women had an accident probability greater than men's average (**Exhibit V**, Chart 1).[122]

---

119. More than one-quarter of the 432-page *Industry's Sex-Rating Compilation* was devoted to extracts from and critiques of the *1976 SRI Study's* findings on accident probability averages and distributions.

120. *Industry's Sex-Rating Compilation* at 36. The implication of this passage is that sex-dichotomized pricing is used for insurance on all cars. Indeed, most of the driving records used in the *1976 SRI Study* were for drivers over 30 years old so that a large majority of their cars would have been unisex-priced. Of the 487,485 driver-years of experience, less than 9% of these years are for drivers less than 25 years old. *1976 SRI Study* Supplement at 227.

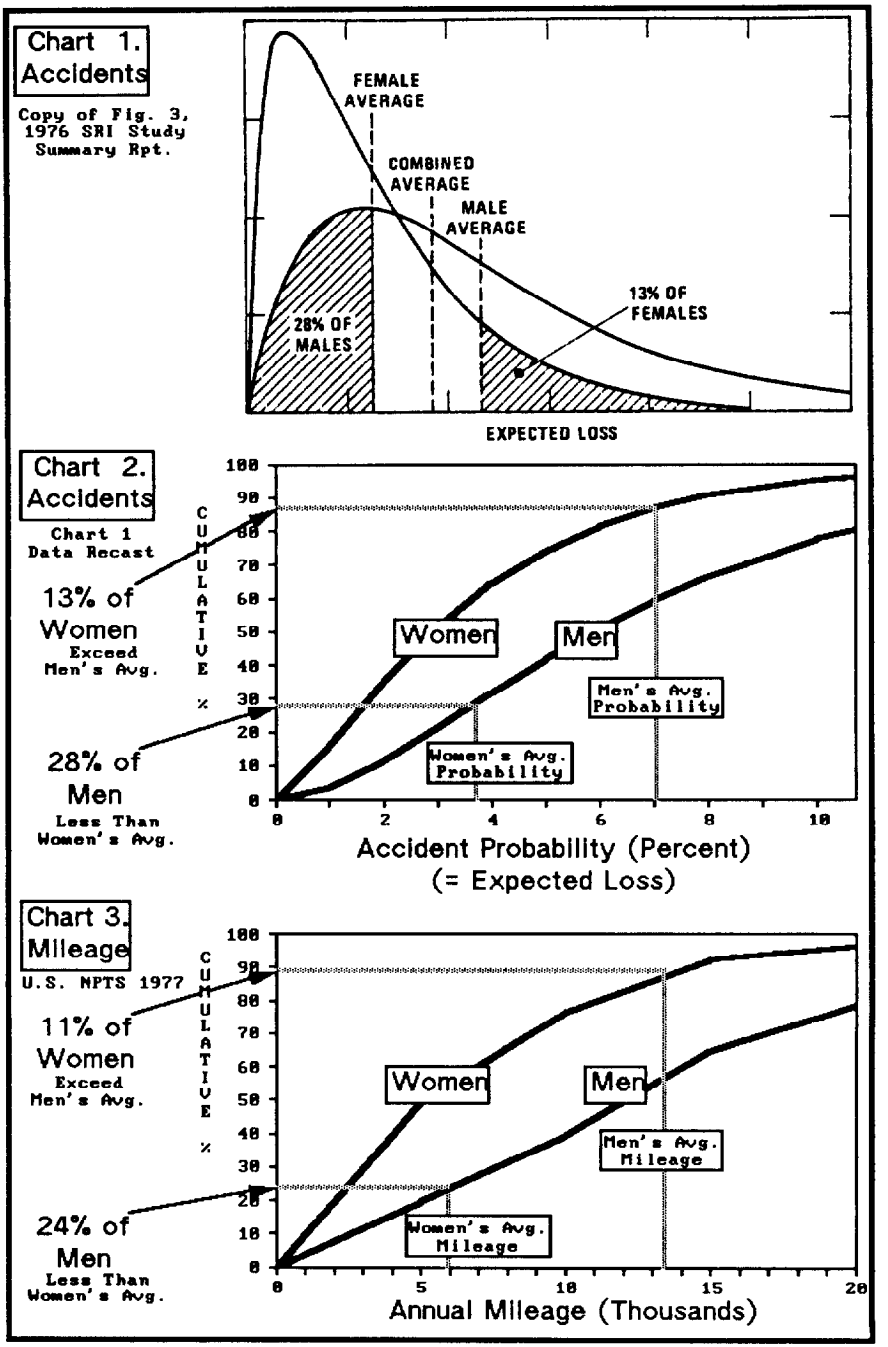
The *1976 SRI Study* apparently failed to note that most cars are not classified by driver sex and therefore that the much less powerful "more refined" system is all that is actually used.

121. *1976 SRI Study, Final Report* at 51 and *Supplement* at 193.

122. Some actuaries apparently questioned the existence of overlaps in the expected

EXHIBIT V

Overlaps of Accidents and Mileages Between Sexes



The finding of sex-overlap presents a clear conflict with the finding of sex-dichotomy. Under a sex-dichotomy classification system for car insurance prices, one class (men's cars) would merit twice the price of the other class according to the difference in average accident probability between the two classes. As a consequence, however, 28 per cent of the men (who with all the other men would be charged twice women's class price for auto insurance) have less accident probability than women's average. Similarly 13 per cent of women would be charged half of men's price even though their accident costs to insurers are greater than men's average cost.

The industry criticisms of the sex-overlap finding seem to focus on the spreads in men's and women's accident probability distributions that result in the overlapping values. The existence of the sex-overlaps themselves—an inevitability according to the analysis below regardless of the degree of overlap—are not confronted directly anywhere in the *Industry's Sex-Rating Compilation* despite the challenge the overlaps between the sex-classes represent to its expressed purpose—justification to the NAIC of sex-pricing—and its implication that sex-pricing is uniformly applied to all cars.[123]

Variation in Accident Probability vs. Variation in Mileage

ISO's Mileage-Spread Hypothesis. In their critique of the *1976 SRI Study* published in the *Industry's Sex-Rating Compilation*, ISO actuaries suggested that the observed spread in the distribution of drivers across accident probabilities (which results in the overlap of men's and women's distributions) is a consequence of the spread in the mileage exposures among drivers.

---

loss/accident probability distributions of women and men. *E.g.*, in 1981, actuary Michael A. Walters, refered to it as an "alleged overlap." 68 PROC. CASUALTY ACTUARIAL SOC'Y at 7 n. 9.

Nevertheless, the overlap in accident probabilities between classes continues to be considered as a problem of undercharging and overcharging when pricing by class averages, as by J. Lemaire in AUTOMOBILE INSURANCE (1985) at 151.

The accident-probability distribution part of the *1976 SRI Study* was endorsed by Richard G. Woll at the 1988 Ratemaking Seminar of the Casualty Actuarial Society. Calling it a "very monumental work," he strongly recommended it to the participants in the seminar session he conducted.

123. Industry actuaries have apparently reduced the existence of the overlap between men's and women's accident averages and probabilities to a semantic question of what is an acceptable per cent "efficiency" of class separation by sex. *E.g.*, at the Casualty Actuarial Society's 1988 Ratemaking Seminar, panelist Jonathan White of ISO discussed the 16% and 30% efficiency values found by the *1976 SRI Study*.

Professional discussion of abstract parameters of the sex-classification of cars serves to reinforce the myth that classification by driver sex is applied consistently to all cars.

> The California data was [sic] based on individual records of licensed drivers. As such, the on-the-road exposure would vary from no exposure for certain licensed drivers who did not have access to a motor vehicle to drivers who average 30,000 or 40,000 miles exposure. In between would fall husband and wife teams that drive a total of 12,000 miles, with the husband accounting for 10,000 miles and the wife 2,000 miles. This leads to a tremendous spread of exposure hazard.[124]

The *1976 SRI Study* apparently did not assess the effects of the distribution of drivers by mileage on the distribution of drivers by accident probability. The variation in amount of driving among drivers was thereby implicitly included as part of the variation among drivers according to all characteristics that might affect probability of an accident.

Woll's Consideration of Mileage. In another analysis of the *1976 SRI Study's* findings on accident probabilities published in the *Industry's Sex-Rating Compilation*, actuary Richard G. Woll commented on the effect of differences in mileage exposure.

> It is helpful to think of the exposure function as a measure of our consumption of insurance. The outcome of driving 1,000 miles or 100,000 miles is often the same [either accident-free or not], but it is not hard to argue that a greater need for protection exists in the latter situation than in the former.[125]

Nevertheless, Woll's mathematical analysis of accident probabilities did not quantify variations in the mileage exposure among drivers separately from unspecified variations in factors called "driver characteristics" and "driving environment," apparently the predecessors of the currently used "type of miles." All possible variations among drivers that would affect accident involvement were considered in terms of a single variable.[126]

---

124. *Industry's Sex-Rating Compilation, ISO Analysis of Technical Aspects of SRI Report on Risk Assessment* 155, 158.

This hypothesized relationship had been suggested by others earlier. *E.g.*, Bailey and Simon noted that "the evidence supports the conclusion that mileage is a very significant cause of variation among individual risks." Bailey & Simon, *Two Studies in Automobile Insurance Ratemaking*, 47 PROC. CASUALTY ACTUARIAL SOC'Y (1960) 1, 6.

Apparently not considered by the ISO actuaries is whether such a husband and wife team accumulates its 12,000 miles on one or two cars. As shown in Exhibit U, *supra*, nearly twice the premium is collected by insurers for an identical 12,000 miles of exposure if two cars are used instead of one.

The term "on-the-road" used by ISO here apparently is not technically acceptable to all actuaries. State Farm's actuary Gary Grant under cross examination about auto insurance claims incurred on-the-road responded "The term on-the-road...means nothing to me." Hearing Record, *Pennsylvania NOW* at 1547.

125. *Industry's Sex-Rating Compilation* at 369.

126. A revised version of Woll's critique states that amount of driving "is affected

ISO's Mileage-Spread Hypothesis Tested. As evidence of the relationship between accident involvement and mileage, Plaintiffs in *Pennsylvania NOW* presented a chart of the distributions of women and men by annual mileage from a national sample[127] for comparison with the distributions of the accident probabilities of the California drivers of the *1976 SRI Study*. Such comparison between the accident and mileage distributions can also serve to test ISO's hypothesis relating spread in accidents to spread in mileage.

To facilitate the comparison, the *1976 SRI Study's* distributions of drivers by accident probability are recast into cumulative curves from which the overlap values can be read directly (Exhibit V, Chart 2). Although the national mileage data are given by 5,000 mile intervals, the data can be fitted by smooth cumulative curves which show clearly the sizes of the overlaps of the two distributions with the two averages (Exhibit V, Chart 3).

The overlaps have similar sizes for the distributions of drivers by both mileage and accident probability. In the national sample, 24 per cent of the men drove less than women's average compared to the drivers in the California sample, in which 28 per cent of the men had lower accident probabilities than women's average (Exhibit V, Charts 2 & 3). Similarly 11 per cent of the women drove more than men's average in the national sample, compared to 13 per cent of the women who had higher accident probabilities than men's average in the California sample (Exhibit V, Charts 2 & 3). Such agreement in sizes of overlap supports ISO's hypothesis that the spread in accident probabilities among drivers is a consequence of the spread in their on-the-road exposures.

Within-Sex Agreement Between Accident and Mileage Distributions. The ISO hypothesis is further supported by comparing the distribution of women by accident probability with the distribution of women by annual mileage, and by comparing the distribution of men by accident probability with the distribution of men by annual mileage. The distributions of women by accident probability and by mileage are very similar to each other (**Exhibit W**, Chart 1), and the distributions of men by accident probability and by mileage are very similar to each other (Exhibit W, Chart 2).[128] In strong contrast to the similarity between the accident

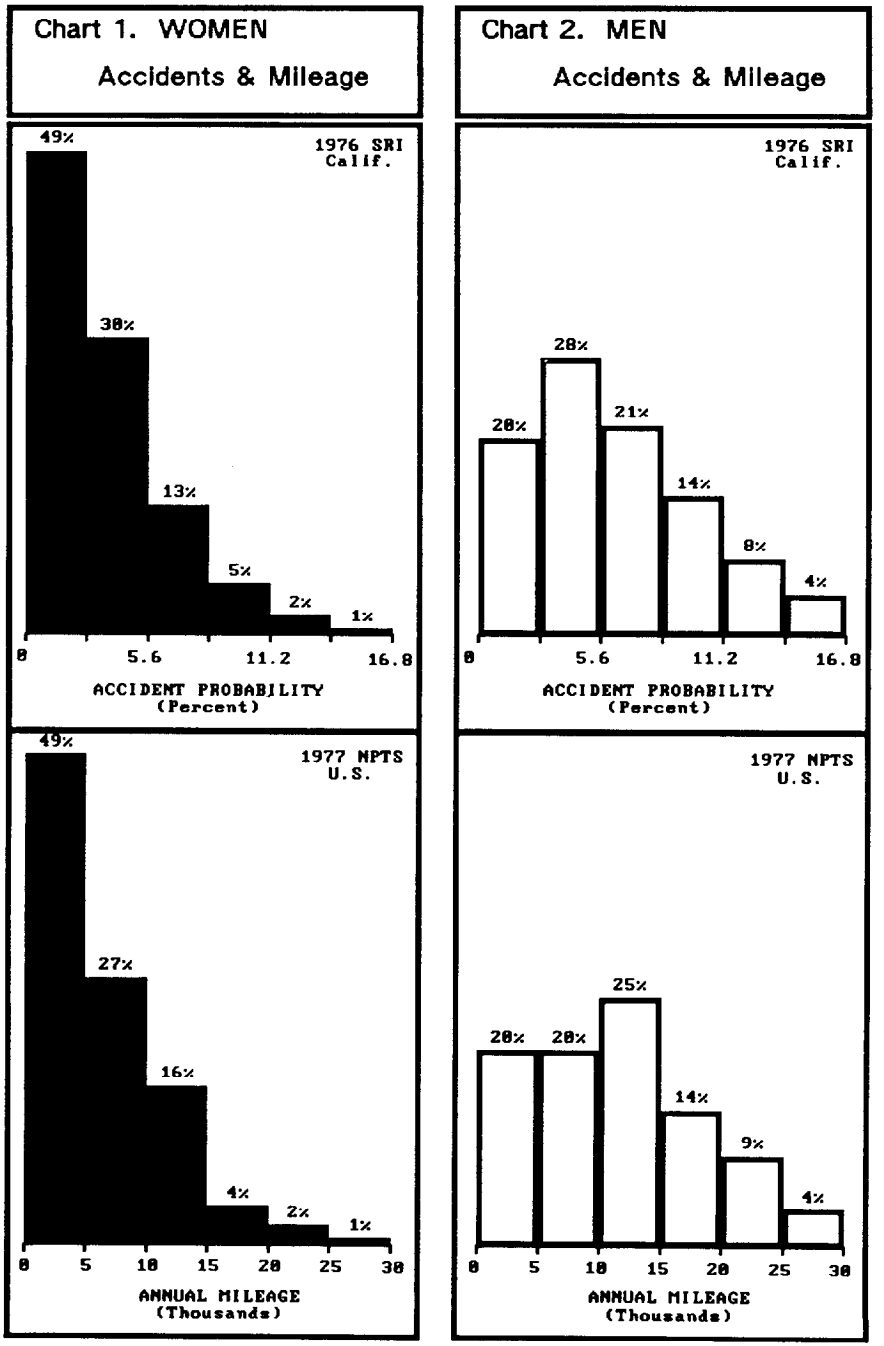
---

by the uncertainties of daily life and should be regarded as random in nature." 66 PROC. CAS. ACTUARIAL SOC'Y 84 at 99 (1979).

127. 1 U.S. DEPT. OF TRANSPORTATION, 1977 NATIONWIDE PERSONAL TRANSPORTATION STUDY, CHARACTERISTICS OF 1977 LICENSED DRIVERS AND THEIR TRAVEL at 17 (1980).

128. The expected loss curves of Exhibit V are recast into histograms. Interval sizes are scaled at 0.5 of the overall average accident probability value, 5.57 accidents per 100 drivers, which the *1976 SRI Study* calculated from men's and women's combined

EXHIBIT W
Histograms by Sex of Mileages and Accident Probabilities



and mileage distributions of each sex, both kinds of distribution for one sex differ greatly from both kinds of distribution for the other sex. Women drivers are concentrated at the lower annual mileages and lower accident probabilities while men drivers are spread to the higher values of annual mileage and accident probabilities (Exhibit W, Charts 1 and 2).

As considered in Subject 2, *supra*, the relationship between the average values for women and men, both overall and within age groups, demonstrates that accident involvements are proportional to on-the-road exposure to risk measured by mileage. The agreement between mileage and accident distributions for two very different pairs of distributions—one for women and one for men— is a consequence of this proportionality between accidents and exposure measured by mileage, and strong evidence in support of it.

Does Mileage-Spread Differ Significantly Between Drivers and Cars?

In their discussion of the spread of accident probabilities found by the *1976 SRI Study*, ISO actuaries emphasized that the data used were for drivers and not insured cars, and concluded that

> This leads to a tremendous spread of exposure hazard. There is reason to believe that the mileage driven in insured vehicles shows a much smaller spread.[129]

National data, however, do not support this ISO hypothesis of a large disparity between variations in exposures of drivers and cars. In fact, the distribution of driver annual mileage is very similar to the distribution of vehicle annual mileage (**Exhibit X**). Certainly the ISO suggestion that there is a "much smaller" spread in the mileage exposure of insured[130] vehicles than the "tremendous" spread in the mileage exposures of drivers is not supported by these national mileage distributions of drivers and of household vehicles. The spread of the values for drivers and cars is not markedly dissimilar; it appears rather that the distribution of drivers by annual mileage is a good indication of the distribution of cars by annual mileage.

---

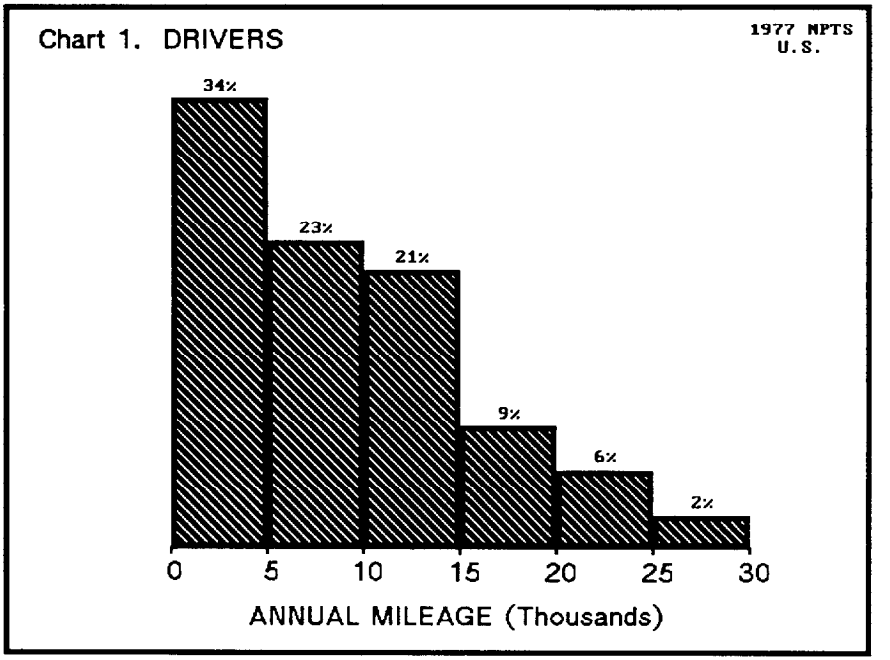
accident totals. *Id., Supplement* at 193.

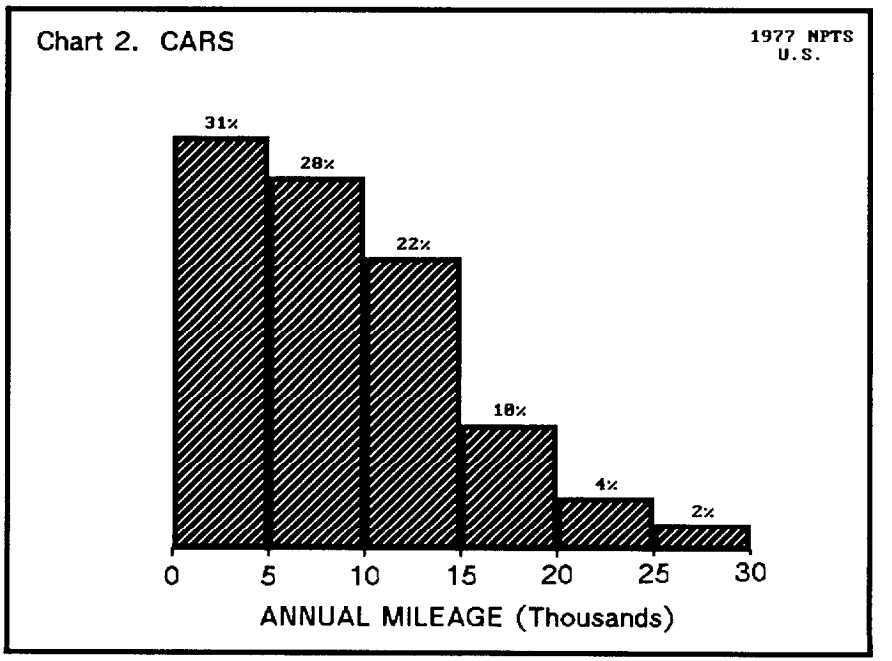
The mileage histogram intervals are scaled at 5,000 miles, approximately half the 9,917 mile 1977 average for all drivers. Data source: 1 U.S. DEP'T OF TRANSPORTATION, 1977 NATIONWIDE PERSONAL TRANSPORTATION STUDY,CHARACTERISTICS OF 1977 LICENSED DRIVERS AND THEIR TRAVEL, at 16–18.

129. *Industry's Sex-Rating Compilation* at 158.

130. ISO's qualification, which was not documented, seems to suggest that low-mileage cars are not insured. In states with mandatory insurance as a condition of car registration (currently 38 states plus the District of Columbia), there probably are no provisions for a low-mileage exemption that would produce such an effect.

EXHIBIT X
Annual Mileages of Drivers and Cars





The agreement in spread of annual mileage distributions between cars and drivers (Exhibit X) is a demonstration of the fact that by and large the cars used by low annual mileage drivers record low annual mileages on their odometers and the cars used by high annual mileage drivers record high annual mileages on their odometers. No assumption about the relative scarcity of low annual mileage cars, however, can justify overcharging their owners. Under insurance rate law, overcharging even one consumer is prohibited.

Large Majority of Adult Women Overcharged

In the driver age range 30–64 years old where auto insurance pricing is almost exclusively unisex, distribution of men and of women by annual mileage—as the measure of insurers' costs for insuring their cars—reveals the extent of insurers' overcharges to women through fixed annual prices. United States Department of Transportation studies show most adult women drivers are in the lower mileage categories and most adult men drivers are in the higher mileage categories, **Exhibit Y.** In 1977, three quarters of adult women drivers drove less than 10,000 miles annually. In contrast, two thirds of adult men drivers drove more than 10,000 miles annually.

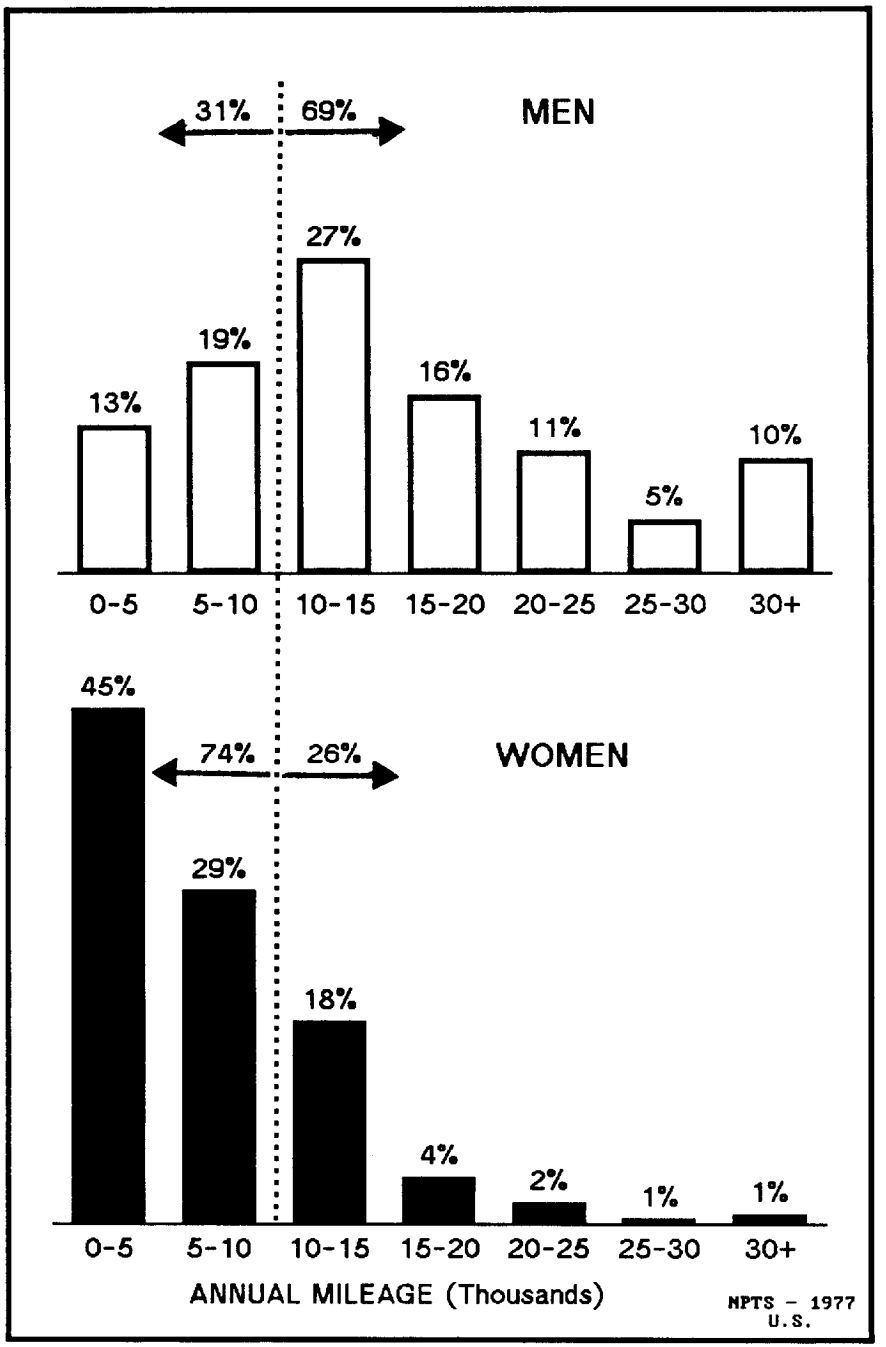
Because all insureds are being sold insurance at a price based in effect on the average annual mileage per car in their price class and because adult price classes are not divided by sex, nearly two and one half times more adult women than men (74 per cent of women vs. 31 per cent of men) are being overcharged. Further, nearly half of all adult women drivers drive from zero to 5,000 miles annually and are being overcharged by 100 per cent and more. In contrast, only about 13 per cent of adult men fall into this category of most severe overcharging (Exhibit Y). In this lowest mileage, and therefore most overcharged, category, women outnumber men by three and one half times (45 per cent of women vs. 13 per cent of men). Insurance regulators have had such information at least since 1979 when the *Industry's Sex-Rating Compilation* included unpublished sex-divided distributions of drivers by annual mileage from the 1969 Department of Transportation survey.[131]

Skimming the Cream: Facial Sex Discrimination

Without using verified odometer mileage, how does an agent know that the customer is the driver of a low-mileage car? The agents do not know, but they can play the odds.

131. *Industry's Sex-Rating Compilation* at 75.

EXHIBIT Y
Mileage Distributions of Women and Men Ages 30–64



When asked how overpriced customers are found, an insurers' expert witness answered "by looking for them."[132] The place to look for low-cost customers is among owners of cars with annual mileages on the low side of the band of prices in Exhibit P, *supra*. These car owners are the "cream" that Bailey wrote was out there waiting to be "skimmed."Accident and mileage distributions show that women car owners are several times more likely to be this "cream" than men car owners. Current pricing schemes function both to maintain a supply of such "cream" and to conceal its existence from consumers.

SUBJECT 8: INSURERS COMPETE BY LOWERING MEN'S PRICES BELOW COST; WOMEN PAY FOR THE SUBSIDIES

Plaintiffs in *Pennsylvania NOW* presented evidence that insurers receive regulatory approval for admittedly large deviations from their cost data in setting class prices. The evidence demonstrates not only that insurers are held to no standard in the setting of prices, but also that they intentionally discriminate against women as a group.

Approval of State Farm's Subsidizing a More Costly Class

In 1982 rate-hearing testimony before the Pennsylvania Insurance Department, State Farm gained regulatory approval to continue overpricing its EFM discount class[133] which presumably contains more women than men[134] in order to continue to subsidize its EFM standard class. The approved discount was for 15 points off the standard price even though State Farm's relative costs indicated the amount should be 27 points off. State Farm's actuary Miller explained:

> If we were to decrease the Class 1A relativity [from 85% to 73%], it would cause an increase in the Class 1B rate to balance the income.[135]

State Farm cited "competition" for the higher cost 1B class as justification for continuing to overcharge the lower cost 1A class:

---

132. Hearing Record, *Pennsylvania NOW*, at 1345 (R. E. Stewart, former N.Y. Sup't of Ins.).

133. See Subject 6, *supra*, for critical analysis of EFM (estimated future mileage) as a valid basis for insurance cost data and as a legitimate pricing classification.

134. See Exhibits W & Y, *supra*, for the difference in the distributions of women and men drivers by annual mileage.

135. Reproduced Record, *Pennsylvania NOW et al. v. Ins. Dept. of Pennsylvania*, Commonwealth Court, (No. 1276 C.D. 1987 and No. 276 C.D. 1988) (Hereinafter "Reproduced Record, *Pennsylvania NOW v. Ins. Dept.*") at 2587a.

> We're already very competitive on the Class 1A, and we're generally tight on a competitive standpoint of Class 1B, and if we widen the differential, we're going to hurt ourselves very substantially on the [1B] class of business.[136]

. . . . .

> [W]e're competing . . . against companies that use no differential though our statistics say that there is a substantial difference [in costs] by annual mileage.[137]

State Farm gained Insurance Department approval to continue to overprice the 1A class in order to subsidize prices for the more costly 1B class.

Approval of Allstate's Subsidizing of Men's Prices

In its 1987 Pennsylvania rate hearing, Allstate's actuary LaMonica proposed

> a downward adjustment in the classification relativity and a larger multicar discount for married males twenty-one to twenty-four years old . . . [W]e don't have specific data to support that specific adjustment.[138]

Cross examination by the Insurance Department at the rate hearing, and later cross examination by plaintiffs in *Pennsylvania NOW*, showed that the old price relativities were "reasonably close" to cost-based and the new price "relativity that we selected is *less than* that which is indicated" by the costs.[139]

---

136. *Id.* at 2588a.

In 1987, testifying on this 1982 rate hearing transcript, expert actuary Miller offered a convoluted explanation notably absent from his 1982 justification. He appears to suggest that as long as the lower-cost customer paid less than the higher-cost customer, State Farm was "moving in the right direction," regardless of the cost/price discrepency. *Id.* at 1644a. To stress that there was "nothing wrong with that," he invoked the Rate Act: "As a matter of fact, it explicitly says that . . . nothing in these rating standards should be construed as to limit your competitive action." *Id.* at 1646a.

137. *Id.* at 2587a.

138. *Id.* at 2708a.

139. *Id.* at 2711a (emphasis added).

Allstate provided as an excuse for the subsidy the statement that the proposed "downward adjustment" for men, amounting to 17% and 27% decreases from what was "reasonably close" at present, would have only a small overall impact on everyone's price levels.

This simply means that since each of the individual sex-age-marital status classes is a very small part of the company's business, even very large changes in the price for any of these classes will have a small effect on other prices. This alibi ignores the undeniable fact that 27% of an annual car insurance premium often has a very large impact on an individual's budget.

Allstate's justification was that

> [W]e believe that we need this lower rate to compete for this business and establish long term relationships with these people.[140]

Later in 1987, under cross examination by plaintiffs in *Pennsylvania NOW* about these price changes for men, Allstate's expert actuary LaMonica testified to his belief that as long as it was done in the name of competition, any price deviation from costs should be allowed.

> [W]hen we develop our rate relativities, we look first at the statistical indications which we have. We also have to balance that with the practical considerations, such as competition, which is specifically provided for in the rate act, that *nothing in the act shall prohibit us from doing things* or nothing shall prohibit competition, so that type of [rate] adjustment can be made.[141]

The Insurance Department approved these new relativities even though they were counterindicated by cost data.[142]

Approval of State Farm's Subsidizing Men's Prices

In 1982 State Farm applied to the Pennsylvania Insurance Department for approval of lowering insurance prices for unmarried 25–29 year old men by 36 per cent to the unisex price level. Questioning by the Insurance Department showed that, according to State Farm's cost factors, the prices should have been *increased* rather than decreased:

> Q: I look at what the present factors are and I look at the indicated factors. They all seem higher, and yet I go over to the proposed factors and they're all lower. Is that accurate?
>
> A: That's accurate.[143]

---

140. *Id.* at 2708a.

141. *Id.* at 1850a (emphasis added).

142. In approving prices below cost for these men, the Insurance Department apparently accepted "competition" as sufficient justification for price decreases of 17% and 27% directly contrary to cost statistics:

> There is no evidence that the larger discount is anything other than reasonable competition. The Commissioner does not find the resultant rates to be unfairly discriminatory.

Insurance Commissioner's Order and Adjudication, In *re* Allstate Insurance Co., Docket No. R87-1-17, at 25 (1987).

143. Reproduced Record, *Pennsylvania NOW* v. *Ins. Dept.* at 2589a.

State Farm, like Allstate, claimed justification in the name of competition:

> We like to follow the statistics where we can. The rating law talks about rates which are not excessive, inadequate or unfairly discriminatory, but your rating [law] also talks about doing nothing to prohibit competition in the marketplace, and as a matter of fact, we simply can't—we just can't always follow the statistical indications.[144]

The logic of insurers' rationale about competition indicates that if a competitor is allowed to subsidize this class of men, then State Farm should be allowed to do so also:

> There are companies out there that do not charge rates based on these loss statistics. There are companies that are charging adult [unisex] rates, and we just can't compete against them.[145]

State Farm evidently gained approval of these new unisex prices in Pennsylvania and probably from most state regulators. State Farm did not publicize this switch from sex-divided to unisex prices.

Cost to Women of 'Unisex' Pricing

Insurers who offer as a credible argument against unisex pricing that lowering men's sex-divided prices to a unisex level would force women to subsidize men's higher costs can hardly deny that this threatened subsidization already exists, as described above.

---

144. *Id.* at 2589a.

145. *Id.* at 2590a. The Insurance Department apparently accepted this justification, asking only for the following:

> [C]ite to me one or two of whoever you're concerned about there in a response . . . You know, of course, that we have all the rate manuals on file . . . And seeing is believing.

Id. at 2590a.

The 1982 arguments that competition for desired classes of customers requires State Farm to move prices away from their cost bases were made by actuary Miller as an employee of State Farm. Miller gave contrary testimony in 1987, however, as defendants' expert actuary in *Pennsylvania NOW*.

> Over time, competition is going to drive rates towards accuracy. The pressure is towards refinement in a classification plan so that the insurers can more accurately price each of the individual insureds.

Id. at 1593a.

Threatened Cost. In 1980 State Farm advised the Pennsylvania Insurance Department that if a regulation to eliminate sex rating were to be adopted, "women will be subsidizing men."[146] According to State Farm, its chosen age-specific "unisex" price for the unmarried 25–29 year old class would mean an 18 per cent price decrease for men that would "require" a 29 per cent price increase for women (**Exhibit Z**, Chart 1).[147]

Actual Cost. In 1982, however, the change that State Farm actually made by eliminating sex-rating for these men amounted not to the 18 per cent decrease threatened in 1980, but to a 36 per cent decrease to the level of the Unisex class (Exhibit Z, Chart 2), which contains cars with drivers of all ages and which currently comprises 87 per cent of the cars covered by State Farm. (Pie diagram, Exhibit A, Part I at 251.) The resulting increase for women was not visible to consumers.

Different Reasons For Adding Women and Men to the Unisex Class. For both men and women, the average accident involvement decreases over the driving lifetime (Exhibit B, Part I, *supra*, at 253). Although accident involvement continues to decrease steadily beyond age 25, insurers merge the cars with young women operators into the Unisex class pool at age 25 when it appears that women's costs will lower the average of the large Unisex class pool (Exhibit Z).[148]

On the other hand, insurers merge men, whose average accident frequency also decreases steadily with age but at every age is roughly twice women's, into the Unisex class pool at the age when insurers want to compete for their business. Despite the already existing gap between accident involvement and prices in the age range 25–29 questioned by the Insurance Department (Exhibit Z, Chart 1), State Farm chose for competitive reasons in 1982 to enlarge this gap to the maximum amount by merging this class of men into the Unisex class pool (Exhibit Z, Chart 2).

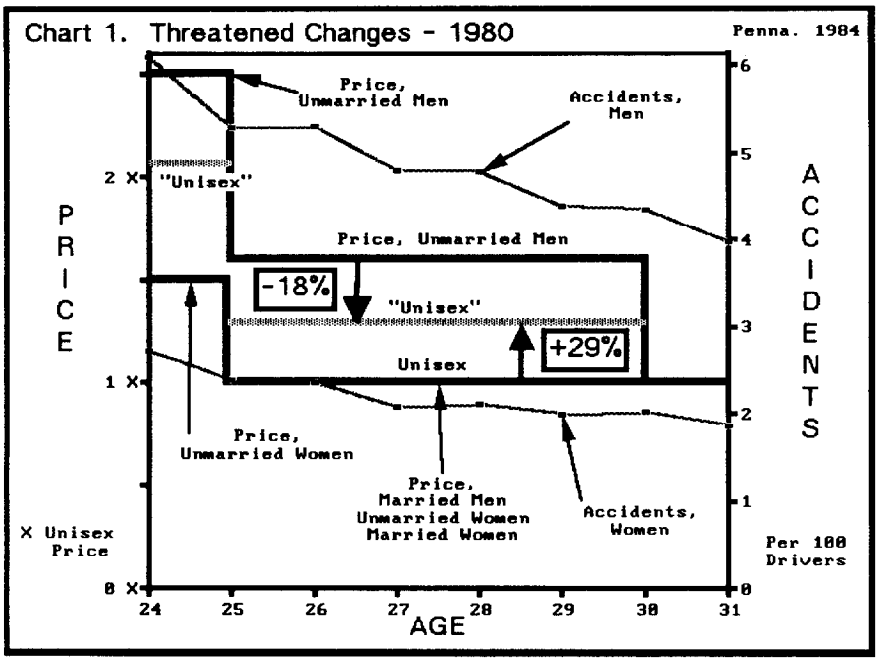
---

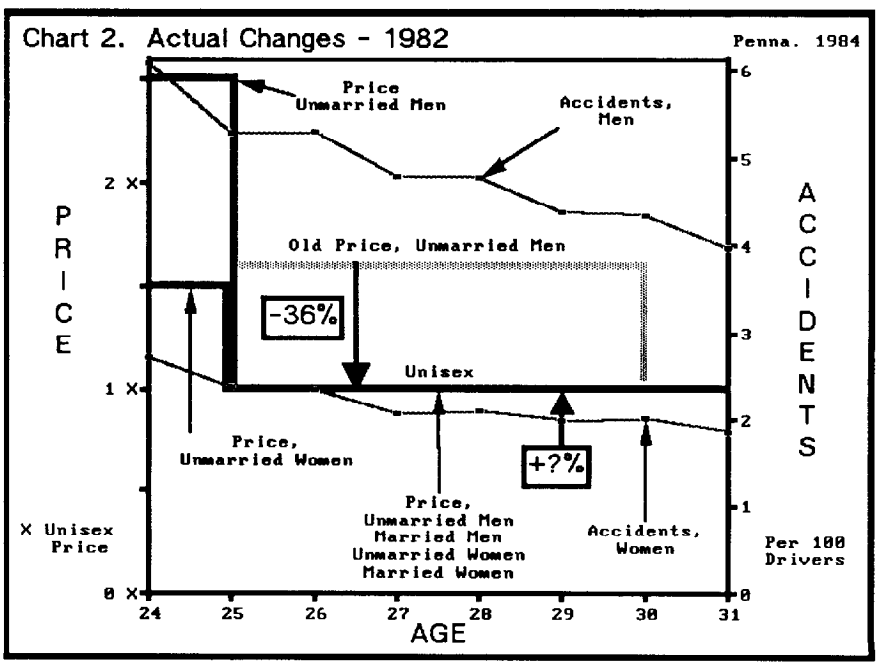
146. Comments of State Farm Opposing the Proposed Regulation, In *re* proposed regulation amending 31 PA. CODE, Part VIII, adding Section 145.6 (Published May 10, 1980) and Amending § 145.1 (Published May 24, 1980), before the Insurance Commissioner of the Commonwealth of Pennsylvania, at 15. Such threats successfully delayed implementing the Commissioner's unisex order until the Pennsylvania legislature intervened on behalf of the industry in 1986 by adding to the Casualty and Surety Rate Regulatory Act the provision that the Act "shall not be construed to prohibit rates for automobile insurance which are based . . . on . . . sex if . . . supported by sound actuarial principles." 40 PA.STAT. § 1183 (e). On April 25, 1988, the Pennsylvania Commonwealth Court declared this amendment unconstitutional under the state ERA in *Bartholomew v. Insurance Commissioner* (challenge to facial discrimination against men in auto insurance prices.)

147. *Id.* at Exhibit "B." (Table with percentage changes in prices from the current 1980 sex-divided levels to the new "unisex" levels State Farm had devised.)

148. An ISO actuary described how the cost to insure young women's cars decreases from age 17 to 25 to the "adult" rate level, as quoted in Part I at 256.

EXHIBIT Z
Unisex Price Changes by State Farm for Men Ages 25–29





Rate Regulatory Law, Competition, And Subsidized Prices for Men

As the preceding examples show, insurers cite "competition," "reasonable competition," and "our competitors are doing it," as their only justification for requesting approval to create or maintain a price subsidy.

Literature on insurance regulation has long noted the adverse effect of unregulated competition on some classes of insureds. It was identified as early as 1911 by the New York State Legislature in its examination of the need for regulation of fire insurance:

> In a state of open competition the rates adjust themselves not to the hazards but largely to the strength of the insured so that the *man of influence*, whose patronage is desired, will get his insurance too cheaply, as against the *small man* who is not in a position to drive a sharp bargain. That is, competition results in discrimination.[149]

The quotation above refers to "open competition," or *laissez faire* price-setting without state interference. Although Pennsylvania, like most states, formally regulates auto insurance prices, virtually all of the serious regulatory attention appears to be given to average price levels, both statewide and to some extent territorial. Since there appear to be no standards for matching prices to class costs, not to mention measurable individual costs, however, the result is truly a *laissez faire* situation in which price discrimination is either unchecked or gets explicit regulatory approval.

The strength of an insured in today's society, in which women are paid much less than men for their work, depends on money, knowledge and the power to drive a sharp bargain. Insurers' insistence that they alone understand rating information, their refusal or inability to provide data in support of their public assertions, and their refusal to collect or examine their own data—all of this done without visible regulatory dissent—place women in the "small man" category and men, as high-volume customers and high-mileage drivers, in the "man of influence" category.

Insurers' choice to compete for men's business is the force that keeps facial sex discrimination in place and keeps it selective. To obscure the fact that most women are overcharged to subsidize lower prices for men, it is essential to have a highly visible "break" for women, a carefully circumscribed demonstration that sex discrimination "helps" women. The cheapest way to meet this need is to discount a surcharge.[150] Hence,

---

149. JOINT COMMITTEE OF THE SENATE AND ASSEMBLY OF THE STATE OF NEW YORK APPOINTED TO INVESTIGATE THE AFFAIRS OF INSURANCE COMPANIES OTHER THAN THOSE DOING LIFE INSURANCE BUSINESS, Report, Assembly No. 30, at 41 (emphasis added) (1911), ("THE MERRITT COMMITTEE REPORT").

150. Discounts are available on men's surcharges and not women's. The "good-student" discount for example may not be available to women students where it is for men students. An insurer explained that this is because "young women already get a discount."

insurers surcharge cars with young operators on a sex-divided basis for a brief time period. Heavy emphasis on the idea that young men are more "accident prone" exploits stereotypes of male aggressiveness to persuade consumers that such differential surcharges are necessary, and also makes everyone else's prices (including young women's) appear reasonable by comparison.

The well-publicized relationship of sex-divided youth prices to public accident statistics for the first four or five years of driving fosters the illusion that all prices are cost-based and that women drivers, being "safer," are somehow favored by sex pricing for a lifetime.[151]

Generally, consumers are in no position to judge whether they are being cheated on insurance purchases; they must rely on regulation to prevent discrimination. The Rate Regulatory Act directly harms consumers if it allows regulators to harbor insurers' deceptive acts by endorsing those acts and the unlawful results they conceal and promote. *Laissez faire* "regulation" is more harmful to consumers, women in particular, than none at all.

SUBJECT 9: REGULATORS' RESPONSIBILITY TO PROVIDE CORRECT INFORMATION AND AN EFFECTIVE REMEDY

Insurers publicly assert that men have more accidents and cost more to insure than women do, strongly implying that men pay more for insurance than women do. Insurers' double-talk, however, keeps the public from knowing 1) how inconsistently they apply sex-pricing to auto insurance and 2) how their pricing schemes ignore the fact that accident involvement is quantitatively related to driving exposure.

Misrepresenting Prices

A 1985 direct-mail campaign sponsored by insurers told women policyholders of all ages in Pennsylvania that unisex auto insurance would make their rates "rise dramatically" by $35 to $1000 per year. The letters indicated that women were currently receiving "lower auto insurance rates simply because they were women" and stated that

> Because women have far fewer and less costly accidents than do male drivers, insurance companies are able to *pass those savings along* to the individual woman driver.

---

151. This deceptive marketing strategy was strongly promoted by Aetna's national ad campaign in 1981, "Our Case for Sex Discrimination," *See* description, *supra*, Part I at 244-245. *See also* Appendix III (added in reprint) for a copy of the ad.

See the agreement-disagreement comparison by driver age of the sex differences in insurance prices and public accident data, Exhibit D, *supra*, Part I at 257.

> The principle behind cost-based pricing is simple: *we do not believe that individuals who have a very low risk should pay the same insurance premium as individuals who have a very high risk.*
>
> Of course, this is not a perfect system—but it is based on fairness and common sense. This system permits you and me to pay premiums based on our own likely insurance costs. . . [T]his simple, common sense system is based on intricate statistical research. . . *Most importantly, it is based on facts.*[152]

Every pricing principle asserted by this description is contradicted by actual practice. Prices charged to women and men for insuring their cars are not distinguished directly by sex of the driver for eight out of 10 cars. Furthermore, prices make no distinction based on the 2:1 ratio of men's to women's average mileage. Regulators in Pennsylvania refuse to take action against the sponsors of this false and threatening information.

Concealing the Dependence of Costs on Mileage

It has been remarked of insurers that "they have taken a simple subject and made it very complicated." Still, because they are perceived as authorities on this complicated subject, it is easy for auto insurers to promote a moralistic illusion that there are good drivers who are "safe" and bad drivers who are "unsafe" and that most of the accidents are attributable to "bad" drivers. Regulators who promote "merit rating" are reinforcing the illusion that people can be made to pay for the way they drive.

With this moralistic perspective established, the experts can persuade consumers that mileage driven has little to do with accidents and therefore that large differences in mileage warrant only token recognition in the current fixed price system.

Because a predictable portion of low-mileage drivers do have accidents, all can be kept ignorant of their entitlement to prices that correspond to the low exposure of their cars to risk of accident. Similarly, because a predictable portion of high-mileage drivers escape accidents (and men especially are easily persuaded to attribute this to merit and not luck), all can feel entitled to defend their right to the same, or virtually the same, car insurance prices as the low-mileage drivers.

Rate Law Violation: Women are Being Overcharged for Auto Insurance

Because insurers know that women average half men's mileage, and that insurance premiums are not distinguished by driver-sex for more than

---

152. Reproduced Record, *Pennsylvania NOW v. Ins. Dept.* at 293a (copies of the letters, which were mailed over the signature of agent Norma Bair), (emphasis in original).

In 1983, letters with nearly identical messages were sent to women policyholders by name in the Congressional districts of sponsors of federal legislation to prohibit sex discrimination in insurance by the industry's ad hoc Committee for Fair Insurance Rates.

80 per cent of cars and not distinguished by mileage for any cars, insurers are knowingly charging women as a group twice as much per mile as men for insurance protection of their cars. The cost of the overcharges to Pennsylvania women exceeds $100 million per year. In *Pennsylvania NOW*, the defendents' rates overcharge the six individual women plaintiffs by 10 per cent to 64 per cent for on-the-road insurance coverage for their cars.

Remedy for Rate Law Violation

Essential Character of Any Remedy. The range in amount of insurance consumed in a year is exemplified by the 2:1 ratio of men's to women's average on-the-road exposure and accident involvement. It is absolutely essential to have an objective and completely enforceable pricing method to assure that the average charges for on-the-road insurance coverages of men's and women's cars are in the same 2:1 ratio. The current scheme, based on guesses as to future consumption and dominated by sales involvement, utterly fails to proportion prices to costs.[153]

The correlation between consumption of gasoline and consumption of insurance has been long understood. The relationship was successfully used during World War II through the gasoline rationing system. Because the amount of driving was limited by gasoline rationing, auto insurers moved quickly to make the price of liability insurance proportional to the gasoline allocation for the car.[154] Consequently, proposals to pay for insurance through surcharges on gasoline are offered perennially as a solution to the affordability problem.[155]

Odometer Remedy to Illegal Overcharges. Evidence of the 2:1 ratio of men's to women's mileage and accidents demonstrates on a large scale the proportionality of insurance costs to mileage.

---

153. William Vickrey similarly noted that "the manner in which premiums are computed . . . fails miserably to bring home to the automobile user the costs he imposes." *Automobile Accidents: An Economist's Critique,* 33 LAW & CONTEMP. PROBS. 464, 470 (1968).

154. Lawrence W. Scammon, *Automobile Accident Statistics by "Age of Driver."* 37 PROC. CASUALTY ACTUARIAL SOC'Y 43 (1950).

Apparently to avoid post-war continuance of measuring the actual exposure of the car to risk, insurers argued (illogically) that the reason that gasoline and insurance consumption were correlated, as substantiated by claim data, was that, owing to military service, most of the young men were not driving. *Id.* at 44.

155. *E.g.*, in April, 1988 by writer Andrew Tobias at a hearing before the U. S. House Subcommittee on Commerce, Consumer Protection and Competitiveness.

Obviously such a measure would end territorial differentials, would require coordination on a national level for the same reason, and would be inappropriate for collision insurance.

Since it is the car and not the driver that is insured, it is clear that the exposure meter—the odometer—is attached to the appropriate object. Given this fact, intentional price discrimination is the only logical explanation for insurers' refusal to use this method. It is the most direct and objective method of measuring the physical exposure of the insured object and the only method which can provide a valid statistical baseline for classifications of cost data.[156]

Immediacy of Remedy. Justice delayed is justice denied and the overcharging continues. To end price discrimination on the basis of sex, there is no substantive impediment to implementation of a mileage exposure base for calculation of individual premiums. As plaintiffs in *Pennsylvania NOW* conclusively demonstrated, insurers' entire argument against a mileage exposure base collapses into misrepresentation of data from a single study[157] coupled with the irrelevant observation that estimates of future mileage are unreliable.Recording of odometer mileage is currently required by law as the basis for money transactions such as warranty determination and resale value.[158] Under existing law, odometer fraud is punishable with severe fines and jail.[159]

Resistance to Remedy. Selective overcharging of one group necessarily means subsidization of another group. Predictably, the subsidized group will resist any effective remedy against the overcharging.

To provoke opposition to such a remedy, insurers resort to two strategies of disinformation, neither of which can survive rational scru-

---

156. A consistent and objective measure of exposure to risk of accident is absolutely essential if classification for pricing is to have any meaning. Currently the extent to which differences between territories depend on driving environment or on variations in average driving can not be determined. Similarly, car make and model classification can not distinguish between costs that relate to characteristics of the cars themselves, and costs that are attributable to the average driving done by the owners and drivers of the different types of cars.

157. *Exposure to Risk Study*, Part I, at 266, Note 41.

158. *E.g.*, in odometer roll-back cases, the effects of the mileage change on the purchase price determined by courts are in the range 4 to 7 cents per mile. NAT'L CONSUMER LAW CENTER, ODOMETER LAW, 1987 Cumulative Supplement (Boston, Mass.) at 30–31. These per-mile rates are similar to those for gasoline and insurance cost, Exhibit R, *supra*.

159. The Federal Odometer Act (15 U.S.C. §§ 1981–1991) provides that

> No person shall disconnect, reset, or alter . . . the odometer of any motor vehicle with intent to change the number of miles indicated thereon, (§ 1984);
>
> . . . . .
>
> No person shall, with intent to defraud, operate a motor vehicle on any street or highway knowing that the odometer of such vehicle is disconnected or nonfunctional, (§ 1985).

Criminal penalties, in addition to civil damages and costs, provide for fines up to $50,000 and imprisonment up to one year (§§ 1990b, 1990c). The intent of odometer law is protection of purchasers of vehicles from misrepresentation of mileage.

tiny: threatening agents that odometer reading will be an additional uncompensated service they will be forced to perform; cautioning legislators that a new state bureaucracy will have to be created which will burden constituents with more red tape.

Regulators' Responsibility

Power, it has been said, is not having to make sense in order to be believed. The most striking feature of insurers' statements about sex discrimination (which are uncontradicted and even echoed by some insurance regulators) is their denial of the real world of physical and economic fact in which auto insurance is sold and regulated. These statements rely on expert assertions about intentionally uncollected insurance data that contradict public data. In the face of direct evidence to the contrary, insurers invoke the actuarial mystique that competition guarantees accuracy of pricing. Such obfuscation insulates both insurers and regulators from public accountability and allows serious harm to consumers. Systematic overcharges to women as a class exemplify such harm.

How is it possible for individual women to know if the premiums charged them relate correctly to auto insurers' costs? Is it the consumer's burden or the regulator's to challenge the damning disparity between state accident statistics and auto insurance prices? What recourse do consumers have if regulators fail to act on their behalf?

Insurance law makes regulators responsible for both accurate information on the relationship of prices to costs, and for remedying ratemaking that favors men as a group over women as a group. The conflict of interest facing regulators is that to tell the public the truth about sex discrimination in auto insurance would be to admit that most women and all owners of low mileage cars are overcharged.

For insurance regulators to evade their obligation to act against these industry-wide rate act violations and deceptive practices makes state government a party to defrauding women and to deceiving both insurance consumers and the public at large.

APPENDIX I

Part I

Table of Contents

APPENDIX II

List of Exhibits

*APPENDIX III**

Copy of Aetna 2-page advertisement
Our Case For Sex Discrimination

Critical discussion of the ad, and the dates and places of its publication, are on pages 244 and 245, *supra*.

* The advertisement reproduced here did not appear in the *Journal* article but is included here for the convenience of the reader.

Our case for sex discrimination.

Sex no longer determines who, if anyone, wears the pants. So why, a lot of you are demanding, should it determine insurance rates?

Consider the nearly double crack-up rate of male drivers 25

and under versus female drivers 25 and under.

Suppose we at Ætna Life & Casualty ignored this statistical reality. Sister Sue would pay 40% more for auto insurance so Brother Bob could pay 20% less. Unfair![1]

Now let's sauce the gander. Say we had unisex insurance rates. Collective Bobs would more than chivalrously pay for collective Sues' annuities, since women live to collect longer. *Equally* unfair!

Accusations of Neanderthalism aside, Ætna simply isn't going to toss out cost differences based on criteria like sex and age when the results would be inequitable.[2]

But we *do* have squads of experts studying the impact of changing life patterns on auto, life, and other insurance.[3] And ongoing analysis has already eliminated some risk criteria and instituted others, including *factors you control personally.*

Example: We give young driver-training graduates an average 12.3% discount.[4] And we now reduce individual life premiums for non-smokers.

That's fairer, we think, than changes that would make insurance *less* affordable for a lot of us — men and women alike.

Ætna wants insurance to be affordable.

[1]According to an Ætna study of auto insurance made in 1979, people generally warmed to the idea of equal rates for different groups. But when they were informed of the effect on their pocketbooks, the majority turned thumbs down.

[2]We admit it can be rankling to be treated as a statistic. But the whole idea of insurance is the pooling of risk among groups of individuals. Those groups are defined by the loss experience of up to millions of cases, and are charged accordingly — what we in insurance call "cost-based pricing."

[3]At last count, we had some 135 people looking into how risk can be measured in life, casualty-property, and group insurance.

[4]Ætna also charges less to accident-free drivers, for cars less prone to damage or theft, and for homes equipped with burglar and fire alarms. We think *positive incentives* make more sense than experimental policies that turn their backs on actual experience.

Ætna
LIFE & CASUALTY

For Ætna "Backgrounders" on pensions, auto theft, health care, national health insurance, the rise of hospital costs and arson, write: Rebecca Cantor, Ætna Life & Casualty, Corporate Communications DA20, 151 Farmington Avenue, Hartford, CT 06156. If you're on a deadline, call (203) 273-3682.