

**PRIVATE PASSENGER AUTO PREMIUMS AND RATING FACTORS –
ARE THEY ACTUARIALLY SOUND?**

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ABSTRACT

Using quotes for minimum auto liability coverage for five of the leading writers of auto insurance in the nation, we analyze several questions relating to the actuarial soundness of auto insurance pricing in America.

First we consider the premiums quoted by each insurance company in relation to the other companies. We review the variation of rates charged to identical drivers by the insurers and discuss the question: Do the premium differences among companies raise actuarial soundness and market competition issues? In the second part of the report, we analyze the difference in price between high economic status drivers and low economic status drivers to measure the cumulative impact on price of five socioeconomic rating factors. We then discuss the question: Do the price differentials, and the variation in price differentials, between high and low economic status raise questions of actuarial soundness of the factors and pricing mechanisms? We also consider whether the use of these factors comports with the standards of actuarial practice. Finally, we offer a series of recommendations to state insurance department actuaries and, ultimately, commissioners as to how they might expand upon this research to determine if rates are actuarially sound in their states.

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INTRODUCTION

Auto insurance must be maintained by drivers in every state but New Hampshire, and the regulation of that insurance falls to the states. As such, the affordability of auto insurance is of critical concern; public policy that requires the purchase of a product but does not ensure its affordability is doomed. In 2016, the United States Treasury Department's Federal Insurance Office developed a definition of affordability that will be used to roughly evaluate auto insurance affordability across the country. This could prove an informative and widely used tool for assessments of the affordability of the insurance marketplace, but it will not replace an existing need for deeper investigation into the actual marketplace premiums confronted by drivers who struggle with cost of coverage.

While the statutory obligations and authority of insurance regulators vary widely from state to state, most generally proscribe rates that are excessive, inadequate, or unfairly discriminatory, based on standards that date to the early 20th century (Miller, 2009). Further, actuaries in the regulatory departments who review rates, as well as company actuaries who propose rates, are expected to abide by the American Academy of Actuaries' Actuarial Standards of Practice (ASOPs) and the Casualty Actuarial Society's Statement of Principles. At its most basic, the intersection of state laws and actuarial standards requires that rates and the premiums charged to individual drivers are meaningfully and demonstrably related to the risk of loss and cost of providing insurance to policyholders. Any effort to grapple with questions of auto insurance affordability will be improved by an analysis of the actuarial soundness of the market and corrective actions that might spring from that analysis. In this paper, we consider new findings regarding auto insurance pricing that suggests premiums charged by at least some large insurers do not meet the minimally

required threshold of the law and actuarial principles, and we suggest research that should be conducted to further explore these initial findings.

The paper presents two different but related analyses of datasets developed for or by the Consumer Federation of America. First, it reviews the price dispersion for a basic auto insurance policy among the nation's five largest insurance carriers and considers questions of actuarial soundness and competitiveness. Second, it evaluates premium differences for the same coverage for good drivers whose only differences are demographic (but not geographic) in nature within companies, between companies, and both within and between jurisdictions. These two items, though superficially distinct, find coherence (and are brought together for this paper) when the insurance market is assessed from an equity perspective. That is, if the larger question is whether a product, the purchase of which is statutorily mandated, is priced fairly in the marketplace, then assessing both intra-company and inter-company pricing are different approaches toward answering that question.

LITERATURE REVIEW

Much has been written about the relationship between insurance rates and regulatory intervention with widely varying conclusions (e.g. Harrington, 2002; Rosenfield, 1998; Saito, 2006; Weiss, 2010), and the actuarial literature is well developed concerning ratemaking methodologies (e.g. Werner and Modlin, 2010), but the research is sparse with regard to both the market implications of price dispersion and insurers' use of socioeconomic rating factors, both of which we discuss here.

The level of competitiveness in the market overall has been considered, even in the affordability context that serves as the backdrop to the present research, but it has focused largely on the macro-evaluation of market participation and concentration offered by the Herfindahl-Hirschman Index (Hunter et al, 2013; Schmid, 2014, p.214) rather than dispersion of prices among market participants. Dahlby and West's 1986 research into auto insurance pricing in Alberta, Canada focused on the cost of switching carriers, which Honka (2014) also addresses, but there has been very little research considering either the actuarial reasonableness of severe price dispersion or its implications for assessing levels of market competition.

Although a focused review of insurers' use of non-driving, socioeconomic factors – a subject of this paper – has not previously been undertaken, there are strands of research looking at rating factors and both their actuarial legitimacy and public policy implications. Ong and Stoll (2007), are part of a long line of researchers (Etgar, 1975; Brissman, 1980; Harrington and Niehaus, 1998, for example) who have considered the validity and impacts of ZIP code and geography-based pricing in auto insurance. Another line of research, which has begun, if only implicitly, to question the reliance on non-driving related rating factors, is the growing body of literature on the importance of annual mileage as a risk factor. Butler (2006) found that many of the rating factors used by insurers are actually proxies for odometer mileage per car year. Lourens et al (1999) found that annual mileage and violations are significantly correlated with accidents, but, after correcting for mileage, sex differences and level education show no significant relationship to risk. Analyzing a wider range of potential risk variables, Guelman's (2012)

algorithms did not place any of the socio-economic risk factors that he tested (marital status, gender, insurance lapse, dwelling unit type) among the top ten most relevant loss predictors for frequency or severity. Following these findings, and research into the efficacy of the bonus-malus approach that has been a central part of the pricing paradigm in many insurance markets around the world since the 1950s (Lemaire, 2012), Lemaire et al (2015) suggest that “[a]n accurate rating system should therefore include annual mileage and bonus-malus as the two main building blocks, possibly supplemented by the use of other variables like age and territory” (p. 22).

Alongside the academic research in these areas are the public policy debates and attendant research that have animated discussions in regulatory fora, particularly at the National Association of Insurance Commissioners (NAIC) and, more recently, the Federal Insurance Office (FIO). FIO spent two years developing a methodology for evaluating auto insurance affordability, with an emphasis on low-income and minority communities and, in January 2017, published its first national report on auto insurance affordability (Federal Insurance Office, 2017). In 2012, the NAIC formed a Working Group charged with “review[ing] issues relating to low-income households and the auto insurance marketplace and to make recommendations as may be appropriate.” Among its proposed tasks have been the collection of data related to both risk classification and geographic pricing, though little progress has been made on either task. Each of these areas of public inquiry, in addition to the lack of literature directly on point, bolster the need to engage questions of actuarial soundness and equitable pricing of auto insurance. It is in this context and the outstanding need for a more directed look into pricing

methods in the contemporary auto insurance market, the validity of those methods, and their impacts on consumers that we proceed with our research.

BACKGROUND AND METHODOLOGY

The research below is based on an analysis of premium quotes for minimum auto liability coverage for the five leading writers of auto insurance in the nation (State Farm, GEICO, Allstate, Progressive and Farmers³, which have a market share of over 50 percent of the business nationally).⁴ We have reviewed and incorporated findings derived from two data sources. For the first data set, the nonprofit organization Consumer Federation of America used the websites of these five auto insurers to determine the premium that would be offered to four different drivers (two men and two women with different socio-economic characteristics) in 15 cities across the country. The four drivers tested are described in Figure 1a. The second data set was compiled by Quadrant Information Services, a third-party vendor of insurance premium data, and includes premium quotes for a single driver profile from the same five companies in virtually every U.S. ZIP Code. The driver tested for that dataset is described in Figure 1b.

³ USAA, which has a slightly larger market share than Farmers, was excluded due to its unique underwriting rules that prevent many American consumers from accessing its policies.

⁴ Some of this data was used in a 2016 study by the Consumer Federation of America, “Major Auto Insurers Raise Rates Based on Economic Factors, Low- and Moderate-income Drivers Charged Higher Premiums” (Heller and Styczynski, 2016). There the analysis was raising questions about the fairness of significant increases in prices for lower-income Americans compared to higher-income people with all characteristics held constant but socioeconomic factors. Here we are looking at what we see as significant actuarial questions raised by the same data set.

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In the following sections we analyze these data.⁵ The first part of this paper will consider the premiums quoted by each insurance company in relation to the other companies. We review the variation of rates charged to identical drivers by the five insurers and discuss the question: *Do the premium differences among companies raise actuarial soundness and market competition issues?* In the second part of the report, we will take a look at the difference in price between high economic status drivers and low economic status drivers to measure the cumulative impact of the five socioeconomic factors we study (homeownership, occupation, education, break in coverage when the driver did not own a car, and marital status) on the premium quote presented to customers. We then will discuss the question: *Does the variation in price differential between high and low economic status raise any questions of actuarial soundness of the factors and the pricing mechanisms?* We conclude this section with a review of the actuarial standards of practice and discuss whether the use of these socioeconomic rating factors comports with each of those standards.

Much of the data in this paper are derived from a premium testing process in which Consumer Federation of America researchers sought premium quotes from the five aforementioned companies' websites for each of four customer profiles in the 15 cities studied. CFA has deployed this method for evaluating premiums charged to different customers in several previous studies the nonprofit organization has issued over the prior five years, and we are satisfied with the method and quality assurance process involved in that data collection.⁶

⁵ The premium quotes from major insurers' websites is attached as an Appendix. The second dataset, as described below, contains the lowest and highest premiums available from the nation's five largest auto insurers in virtually every U.S. ZIP code and is derived from a larger dataset of nearly 300,000 premium quotes procured from Quadrant Information Services in 2014.

⁶ The series of auto insurance premium studies conducted by CFA is available at <http://consumerfed.org/cfa-studies-on-the-plight-of-low-and-moderate-income-good-drivers-in-affording-state-required-auto-insurance/>

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In both the CFA and Quadrant datasets, the quotes gathered for this analysis are for the minimum coverage required under the financial responsibility laws of each state, except where a company did not offer state minimum limits coverage through its website.⁷ In total, CFA sought quotes for 300 customers for its study and received 259 online premium quotes; there were 20 tests where a company did not appear to operate in a state and 21 instances in which an insurer would not provide an online quote for the driver with the lower economic status profile. Where a company provided a quote through an affiliate, we included that quote. All premiums were quoted for six-month policy terms and have been annualized for this report.⁸

Figure 1a. About the driver profiles used for CFA's Website Premium Quotes

All Drivers: 30 years old and licensed for 14 years; no accidents; no violations; drives a 2006 Toyota Camry 10,000 miles each year; all drivers have the same address for each city tested.	
Female A: Bank executive with a master's degree, is a homeowner, has had auto insurance coverage with the same company for three years, and is married.	Male A: Manufacturing executive with a master's degree, is a homeowner, has had auto insurance coverage with the same company for three years, and is married.
Female B: <i>Bank teller with a high school degree, is a renter, has not had auto insurance for six months because she has not had a car, and is single.</i>	Male B: <i>Factory worker with a high school degree, is a renter, has not had auto insurance for six months because she has not had a car, and is single.</i>

⁷ In two instances in CFA's testing – in Boston and Jersey City – Allstate would not provide online quotes for policies that only covered the states' minimum liability limits. For those tests, CFA reported the premium quote for the lowest limits policy that could be obtained through the company's website.

⁸ These data were annualized as part of CFA's research, which has included analyses in the context of annual household income and other annual data points. The only factor of the five tested in this report that would likely change upon renewal for customers with six-month policy terms is the consideration of prior insurance coverage. Through testing, CFA has found that the impact of this change on the total annual costs to consumers is generally insignificant and does not alter any of the analyses in this paper.

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The web-based prices tested for this paper are for these four risks in 15 cities: Minneapolis, Houston, Jacksonville, Chicago, Atlanta, Boston, Kansas City, Seattle, Phoenix, Pittsburgh, Oklahoma City, Jersey City, Baltimore, Queens (N.Y.) and Los Angeles.

In addition to CFA's web-based quotes, Part 1 incorporates a national data set of prices from the same five leading writers for a single risk profile in 29,664 ZIP Codes. These data include 293,010 premium quotes from 64 standard market⁹ subsidiaries of the Allstate, Farmers, GEICO, Progressive, and State Farm insurance groups. The data were purchased in 2014 from Quadrant Information Services (QIS), a third-party data vendor that compiles property and casualty insurance rate sets and conducts market pricing analyses.

Figure 1b. About the driver profile used in the QIS dataset

The Driver: 30 years old and licensed for 14 years; no accidents; no violations; drives a 2000 Honda Civic EX; 10,000 miles each year; clerical worker with a high school diploma; rents her home; has a fair credit rating.

In Part 2 we test the price difference from CFA's set of web-based quotes between the high socioeconomic status female and the low socioeconomic status female as well as the price difference between the high and low socioeconomic status male profiles. The variable being tested - socioeconomic status - consists of five socioeconomic characteristics that differ between the high and low economic status profiles noted above: homeownership status, level of education, occupation, prior car ownership/insurance coverage, and marital status. Aside from using both male and female profiles, CFA controlled for other variables (rating factors) by providing the same responses to all other questions asked of consumers by the insurers. As Figure 1a explains, all customer profiles tested have a perfect driving record, drive the same number of miles each year,

⁹ We eliminated from the analysis any insurer that was on A. M. Best's list of predominantly non-standard auto insurance writers, which we purchased from A. M. Best for that purpose.

live at the same address (within each city tested), drive the same car, purchase the same coverage, etc.

PART 1 – ARE THE RATES BEING CHARGED TO GOOD DRIVERS ACTUARIALLY SOUND?

From Casualty Actuarial Society “Statement of Principles Regarding Property and Casualty Insurance Ratemaking”

Principle 1: A rate is an estimate of the expected value of future costs. Ratemaking should provide for all costs so that the insurance system is financially sound.

Principle 2: A rate provides for all costs associated with the transfer of risk.

Ratemaking should provide for the costs of an individual risk transfer so that equity among insureds is maintained. When the experience of an individual risk does not provide a credible basis for estimating these costs, it is appropriate to consider the aggregate experience of similar risks. A rate estimated from such experience is an estimate of the costs of the risk transfer for each individual in the class.

Principle 3: A rate provides for the costs associated with an individual risk transfer.

Ratemaking produces cost estimates that are actuarially sound if the estimation is based on Principles 1, 2, and 3. Such rates comply with four criteria commonly used by actuaries: reasonable, not excessive, not inadequate, and not unfairly discriminatory.

Principle 4: A rate is reasonable and not excessive, inadequate, or unfairly discriminatory if it is an actuarially sound estimate of the expected value of all future costs associated with an individual risk transfer.

As the Principles demand, the rate charged to an individual risk must reflect the cost associated with the transfer of risk, and the "cost" is primarily built on the loss projection associated with that risk. While the principle anticipates variation – a rate is developed as an estimate, after all – it also limits the variation by something called “actuarial soundness.” Different estimates for the same risk can be calculated under these principles, but not all estimates are reasonable or fairly discriminatory. In the data reviewed, we find evidence that at least some companies are likely

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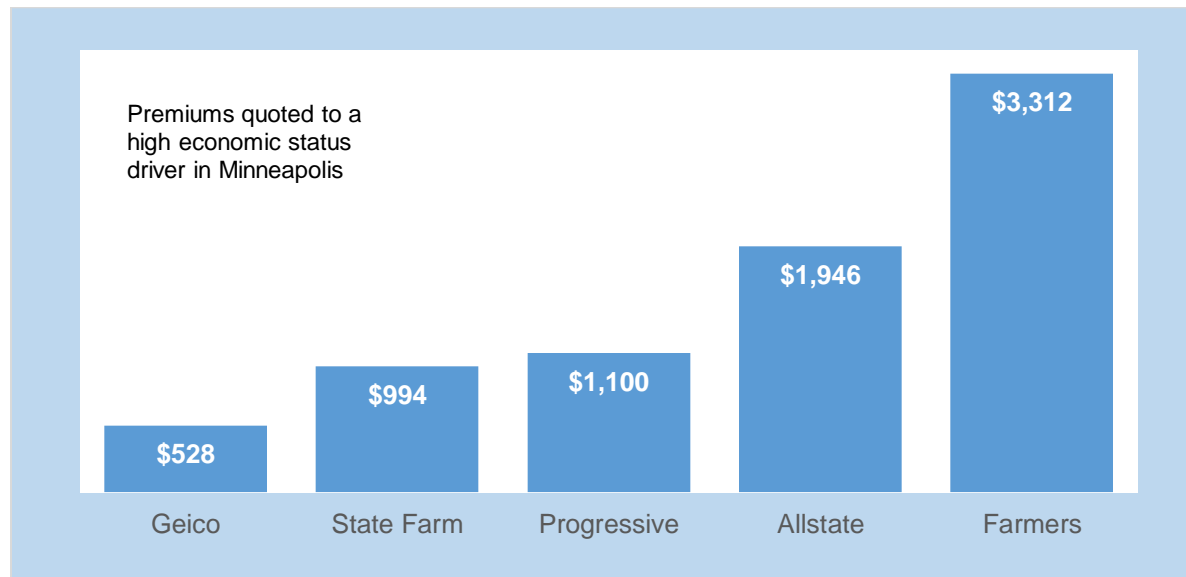
setting rates outside of the bounds of actuarial soundness. The evidence emerges when we consider whether it is possible that companies with large books of business in the same market can all be meeting the principles of actuarial soundness when their selected "estimate[s] of the expected value of all future costs associated with [the exact same] individual risk transfer" are starkly divergent.

In Appendix 1 we show the quotes supplied by the five leading writers of auto insurance in the nation (State Farm, GEICO, Allstate, Progressive and Farmers), whose groups write over half of the automobiles insured. These quotes are for the four hypothetical risks shown in Figure 1a (female high economic status, female low economic status, male high economic status and male low economic status) in 15 cities, yielding a total of 60 possible premium quotes from each of the five insurers and 300 possible quotes in all. As is shown in Appendix 1, there were 20 instances in which a company did not appear to operate in a state and 21 instances where an insurer would not provide an online quote for the lower economic status drivers.

The range of quotes among the five companies for each of the four profiles in each city is shown in the Appendix. For example, the premium for the high economic status female in Minneapolis ranges from \$528 to \$3,312, a \$2,784 or 527.3% increase in price depending on whether you applied to GEICO or Farmers. Can both of the premium quotes for an identical, excellent driving risk purchasing the same minimum limits policy that produce such an astonishing difference be actuarially sound? The other three insurers charge \$994, \$1,100, and \$1,946 as shown in Figure 2. Whether one, two, or even three of these premium quotes are actuarially sound estimates of the cost of risk transfer is less important than the high probability that at least one and probably two or

three of these rates are not actuarially sound.¹⁰

Figure 2. Can all five rates reflect actuarially sound estimates of expected losses for the exact same risk purchasing the exact same coverage?



Minneapolis is hardly the only city in which we found that the exact same driver faced premium quotes from these five insurers that diverged dramatically more than we would expect. The premium quotes to the same driver in a city differ by over 100% (double the rate) in more than two-thirds (41 of 60) of the customer profiles tested. They vary by more than 150% in 20 of 60 profiles, by over 200% (triple the rate) in 12 of 60 profiles and by more than 400% (quintuple the rate) in 5 of 60 tests. Such wide variations between estimates of the same transfer of risk raise serious questions about the actuarial soundness of these prices.

¹⁰ We understand that insurers have different underwriting expenses (including profit provisions) and different underwriting standards. A review of the differences in underwriting costs and profit (which represent only about one third of premiums for these insurers) and making even some extreme assumptions about the impact of underwriting standards do not come close to explaining many of the observed extreme differences in prices.

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Consider the case of the high economic status male driver in Queens, New York. GEICO charges him \$1,264, Progressive charges \$1,946, State Farm charges \$2,438, and Allstate charges \$3,350.¹¹ That is a 165% difference from the low to high price and none of the quotes are within 25% of each other, even though the companies are each offering this driver the same minimum limits coverage. The low economic status female driver faces a New York market in which the premium variation is 326% among the major companies offering quotes. Whether the company loss data of smaller, niche market carriers might lead to a wider pricing spread that is still actuarially sound is not an issue here, as the price differences here are from national companies with sufficient market penetration that their loss experience should not differ so dramatically. The question that must be asked, then, is whether these widely differing premium quotes from large insurers for the exact same customer buying the exact same coverage can make actuarial sense.

Across the data set the difference between low and high prices is over \$500 in 54 of the 60 readings; over \$1,000 in 27 of 60 readings; over \$1,500 in 18 of 60 readings; over \$2,000 in 12 of 60 readings; over \$2,500 in 8 of 60 readings and over \$3,000 in 6 of 60 readings. Price differences of such magnitude and frequency raise very serious questions about the actuarial soundness of the prices reviewed. Some companies, it certainly seems, must be getting it wrong.

A larger data set shows these extreme price ranges to be common across the country

A review of 293,010 quotes from 64 preferred and standard affiliates of Allstate, Farmers, GEICO, Progressive and State Farm in 29,664 ZIP codes (representing 99.4 percent of the US population) reveals the same wide variation in the market price as was demonstrated in CFA's web quote tests.

¹¹ Farmers did not provide a quote for any of the profiles in Queens, NY.

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In order to ensure that the range of prices was not impacted by non-standard insurers, which tend to charge significantly higher premiums than standard carriers, we confirmed that the dataset acquired from QIS excluded any insurer identified as a non-standard insurer according to A. M. Best's list of predominantly non-standard auto insurers.

Looking at a subset of this data – premiums in the ZIP codes of the nation's 50 largest metropolitan areas, representing 53% of the US population – the average range of price variation within a ZIP code was \$965, with the highest price being, on average, 210% above (more than triple) the lowest price for the same coverage in the ZIP code. Of the 8,188 ZIP codes (and 80,725 premium quotes) in the top 50 metro areas, the difference between the low and high prices was at least 100% (double) in 6,581 ZIP codes. Premiums varied by more than 500% in 537 ZIP codes, with an average range of \$3,257 between the lowest and highest price for the same coverage in those markets, as shown in Figure 3.

Figure 3. Premium Variability in ZIP Codes of Top 50 Metro Areas

Level of Premium Variability	Number of ZIPs	% of All ZIPs	Average % Increase Low to High	Average \$ Difference Low to High
1 - Low (Less than 50%)	332	4.05%	47%	\$189
2 - Moderate (Between 50% and 100%)	1275	15.57%	77%	\$334
3 - High (Between 100% and 250%)	4364	53.30%	158%	\$648
4 - Very High (Between 250% and 500%)	1680	20.52%	347%	\$1,688
5 - Highest (More than 500%)	537	6.56%	620%	\$3,257
Grand Total	8188	100.00%	210%	\$965

As with CFA's website quotes, the larger national dataset also raises questions about the actuarial validity of companies' filed rates. While quality and marketing system (e.g. direct writers vs. captive agents) differences, the infrequency of purchase, and the complicated nature of the product may argue, as we discuss below, for a higher price dispersion than gasoline prices the expected risk

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associated with a single driver profile should not vary so dramatically among the standard books of the five largest insurers. That is, while the non-risk related expenses could explain some variation in prices, the vast majority of the insurance premium is the loss portion,¹² which is tied to an actuarial assessment that should not vary at extremely high levels among companies. The sheer number of ZIP codes where the price for the same coverage more than doubles among competitors – about 80% of ZIPs in the top 50 metro areas as shown in Figure 3 and 85% (25,153) of ZIP codes when including small metro and rural areas – reinforces our serious concern about the actuarial soundness of rates in many jurisdictions.

These data also point to a second crucial question: can a market with this level of price dispersion be competitive?

The question of price dispersion – herein referred to as "premium variability" – is a common one in the academic literature concerning the competitiveness of markets. When prices in the market for the same product are in a narrow range, the market is generally thought to be more competitive than when that range is wider for a given product or service. What constitutes narrow versus wide, however, depends on the product or service being evaluated. For example, gasoline – a product that is frequently purchased, substantially similar in quality across companies, and for which prices are easily compared – tends to have a price range of about 10 percent. For an item purchased less frequently, refrigerators, a price range of about 40 percent is considered a reasonable price dispersion in a competitive market.¹³ There is not extensive research on expected price dispersion

¹² According to ISO data reported by III at <http://www.iii.org/article/2015-year-end-results>, the 2016 Loss Portion of all auto insurance prices in the nation was 69.2%

¹³ Since the publication of Nobel-prize winning economist George Stigler's (1961) article on the economics of information hundreds of economists have analyzed price dispersion. Scheffler, et al (2015) provide a recent discussion of this literature citing nearly 300 scholarly articles, most of which assess price dispersion in markets for specific goods and services. For example, gasoline

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in the auto insurance marketplace, but it is unlikely that the average range of 210% among the top 50 metro areas would support a claim that auto insurance markets are competitive.

As is discussed below, the relatively narrow price range in California (62%) – a state also recognized as highly competitive according to the Herfindahl-Hirshman Index (HHI) (Hunter, et al., 2013) – provides a benchmark for price dispersion in competitive auto insurance markets. By this measure at least, most states seem to be host to noncompetitive auto insurance markets. This is important because many state insurance laws are premised on the assumption that rates cannot be excessive in a competitive market, diminishing the need for regulatory intervention. If a regulator determined that, by virtue of extreme price dispersion, a market was uncompetitive, the regulator would be obliged under state law to regulate rates with more vigor.

The extremely wide range found in many communities suggests that regulators ought to reconsider the common assumption that insurance markets - especially local markets - are competitive. In some respects, at least in retrospect, this might seem like an unsurprising, if still deeply troubling, finding. Pricing of auto insurance is very complicated from the perspective of consumers and hardly transparent. Consumers cannot compare prices in a supermarket's "insurance aisle"; instead they must subject themselves to a detailed inquiry about not only their driving record but, in many cases, their personal and professional life as well. As Honka (2014) demonstrates, the high cost of switching carriers creates another market inefficiency, and this might also contribute to the price disparities among companies

markets are studied by Chandra and Tappata (2011), and the refrigerator marketplace was treated by Saul Lach (2002). Only one article cited by Scheffler et. al. treats auto insurance prices: Dahlby and West (1986) point to a lack of price competition in auto insurance markets and explain this lack of competition mainly in terms of substantial consumer search costs. Since policies are individually priced, there is no quick way consumers can comparison shop. Company and lead generation websites now aid in this search, yet it takes time to undertake as the search requires the communication of much personal and potentially sensitive information, and the website quotes are not guaranteed.

The results were not evenly distributed among the states. The widest ranges of prices for the exact same driver consistently occurred in New York, New Jersey, Virginia, Florida, and Michigan as shown in Figure 4. Of the 2,217 ZIP codes among the major metro areas with very high premium variation (above 250%), more than four-fifths occurred in these five states. On average the same person buying auto insurance in those very high variation ZIP codes saw price differences of over \$2,000 for the exact same coverage.

Figure 4. States with Most "Very High" and "Highest" Variation ZIP Codes

State	# of ZIPs with Very High/Highest Variation	% of all Very High/Highest Variation ZIPs Countrywide
New York	496	22%
New Jersey	477	22%
Virginia	333	15%
Florida	332	15%
Michigan	182	8%
All Other States	397	18%

On the other hand, there is California. Of the 332 ZIP Codes in the top 50 metro areas that exhibited low premium variability (a range of less than 50 percent), all but one are in California. Using the expanded dataset that includes smaller metro and rural areas, 472 of the 473 low variability ZIPs are in California. In fact, of all 1,593 California ZIP codes in the expanded data set, the highest premium is less than double the lowest premium in 97 percent of California ZIPs, with only three percent having a range wider than 100 percent. In the next best performing state, Arizona, the premiums double from low to high in more than a third of ZIP Codes. Figure 5 lists the average percentage and dollar range for ZIP Codes in each state (including major metro, smaller metro and rural areas).

Figure 5. Average Premium Variation Within a ZIP Code by State

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State	Average Range (%Increase from Low to High Premium)	Average \$ Difference Between High and Low Premiums
CA	62%	\$238
AZ	96%	\$326
IN	98%	\$330
IL	100%	\$315
KY	101%	\$648
MO	103%	\$336
OR	112%	\$468
NM	115%	\$436
OK	121%	\$508
WV	121%	\$535
AL	126%	\$459
AR	127%	\$459
WA	129%	\$541
ME	133%	\$348
SD	134%	\$283
NE	134%	\$324
MT	135%	\$423
ND	136%	\$377
CO	136%	\$539
NH	137%	\$355
ID	139%	\$327
NV	141%	\$649
WI	147%	\$369
TX	150%	\$548
OH	152%	\$392
KS	154%	\$419

State	Average Range (%Increase from Low to High Premium)	Average \$ Difference Between High and Low Premiums
IA	157%	\$320
VT	159%	\$432
UT	162%	\$470
MD	163%	\$965
TN	167%	\$477
LA	171%	\$885
CT	174%	\$860
MS	179%	\$733
DE	180%	\$734
GA	185%	\$629
NC	186%	\$447
AK	187%	\$794
WY	190%	\$354
MN	198%	\$795
HI	205%	\$536
PA	222%	\$615
SC	228%	\$905
DC	239%	\$988
MI	265%	\$1,889
FL	297%	\$1,807
NY	302%	\$1,331
MA	337%	\$804
RI	339%	\$1,469
VA	344%	\$644
NJ	536%	\$2,306

This illustrates the competitive benefits of California's rigorous regulatory structure, and the premium variation in that state is much more in line with what an actuary would expect of premiums generated by the nation's five largest writers for the same driver living at the same address and purchasing the same coverage. The question that arises, then, is why do consumers in other states see such widely varied pricing for this single risk purchasing the same coverage from

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large standard market insurers? Have the actuaries of state insurance departments done any sort of actuarial review of the prices being charged among the different insurers in their state to see if disparities such as we see in these data mean that some of the rates now in effect are not actuarially sound? We know of no such study. Moreover, it is not a study that can be conducted outside of the state insurance departments in a meaningful way, because, outside of the transparency rules of California and a few other states, insurers guard everything but their bottom-line loss data from public research and analysis. That is to say, we are not the forum for such an evaluation; instead, our findings provide guideposts for regulators, upon whom it rests to gain access to the relevant raw data and burrow into it. The findings discussed above should elicit serious reflection and investigation by regulators. We believe they point to several questions that are well within the purview of state insurance regulators: Are companies charging actuarially sound rates? Are the markets in which it is assumed that a rate cannot be excessive because competition is found to exist *actually competitive*? If not, what are the implications for regulation and how will states address potentially noncompetitive markets?

PART 2 – ARE CLASS DIFFERENTIALS ACTUARIALLY SOUND?

Another question brought to the fore by CFA's website quote research is whether or not the class differentials used by many insurers are actuarially sound. This is a more precise question than the somewhat more public debate around rating factors and equitable pricing, which, as Podgers' (1981) reporting reveals, has been going on for decades. That debate, straddling the actuarial and public policy realms, is a worthy one, and one that will be better informed by this paper and follow-on research. However, to have a fully informed discussion of the public policy concerning rating

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factors, there needs to be a more thorough and transparent analysis of the pricing methodologies and the companies' arguments that the data speak for themselves (Bjorhus, 2016).

When shopping for auto insurance most consumers find that companies request a range of personal information that is unrelated to their driving history or the car they wish to insure. It is unlikely, however, that many of these shoppers are aware of the extent to which their answers to these questions impact the price they will pay for auto insurance. There are five common personal questions asked by auto insurers that are not driving-related *and* tend to be good indicators of a customer's economic status:

1. *Are you married?* Unmarried people have lower incomes than married people.¹⁴
2. *What is your occupation?* Blue collar and hourly workers have lower incomes than white collar and salaried workers.
3. *What is your highest level of education?* Lower levels of education are associated with lower income.¹⁵
4. *Do you currently have auto insurance?* Whether because a driver did not own a car for a period of time, a car was non-operational, or because their coverage lapsed, drivers without current insurance tend to have lower incomes. (In the data collected as part of this study, the lower economic status drivers did not have a car for the past 6 months.)¹⁶
5. *Do you own or rent your home?* The median income of renters is less than half that of homeowners.¹⁷

¹⁴ In December, 2015, for example, Pew Research Center published the infographic "Married adults are more likely to be upper income than unmarried adults," retrieved on December 16, 2016 from http://www.pewsocialtrends.org/2015/12/09/the-american-middle-class-is-losing-ground/st_2015-12-09_middle-class-13/download/

¹⁵ See, for example, Bureau of Labor Statistics "Earnings and unemployment rates by educational attainment," retrieved from http://www.bls.gov/emp/ep_chart_001.htm

¹⁶ In reviewing CFA's data, we considered whether the lack of current insurance rating factor stood out as different in some way from the other socioeconomic factors. As a lapse in coverage is not, in our view, a reflection of driver safety or otherwise an inherent risk factor, but far more typically a reflection of an individual's economic situation, we regard this as an appropriate factor for consideration in this argument. This is supported by the fact that the nation's largest auto insurer, State Farm, does not appear to consider prior insurance coverage in most states.

¹⁷ According to the Federal Reserve Board (2014), the median income of homeowners in 2013 was \$63,400 and the median income of renters was \$27,800.

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Another typical question – *what is your social security number?* – provides insurers with the information they need to incorporate drivers' credit scores into premiums, with the same inverse relationship in which premiums go up as credit scores (another indicator of economic status) go down. Though this factor was not tested in CFA's study, *Consumer Reports* (2015) has detailed the significant impact of low credit scores on premiums, as did Brobeck et al (2013).

As noted above, the test conducted by CFA is binary in nature. Either the driver answered the five questions listed above with characteristics that tend to indicate higher economic status (Female A and Male A profiles of Figure 1a) or with characteristics that tend to indicate lower economic status (Female B and Male B profiles of Figure 1a). The question, then, that is being assessed here can be formulated as: *Do lower economic status drivers pay the same, less, or more than higher economic status drivers, all other things being equal, and, if they pay more, is the economic status surcharge being applied to their rate actuarially sound?*

The American Academy of Actuaries "Actuarial Standards of Practice – Risk Classification" (ASOP 12) provides the following guidance:

3.3.4 Reasonableness of Results: "When establishing risk classes, the actuary should consider the reasonableness of the results that proceed from the intended use of the risk classes (for example, the consistency of the patterns of rates, values or factors among risk classes.)"

In looking at the cumulative effect of the five socioeconomic factors we studied, the pattern of impact of these factors is very inconsistent, indeed. Appendix 1 shows the difference in prices for high status females, low status females, high status males, and low status males in 15 cities across America.

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For GEICO, as an example, the percentage surcharge that a low status female faced compared with a high-status female with the same clean driving record ranged from an increase of 18.1% in Chicago to an increase of 308.7% in Minneapolis. Of the 15 cities studied, GEICO imposed a socioeconomic surcharge for female low economic status drivers of more than 200% in one city, one in the 151% to 200% range, five in the 51% to 100% range, and five in the 0-50% range.

The five insurers charged cumulative price increases (i.e., for the five socioeconomic factors studied) to low economic status females over what they charged high economic status females in the ranges shown below in Figure 6.

Figure 6. Range of socioeconomic surcharges for female drivers in 15 cities

Increase	Progressive	Allstate	State Farm	Farmers	GEICO	All
No change	0	0	2	1	0	3
<50%	2	5	8	4	5	24
51%-100%	9	1	2	2	5	19
101%-150%	1	0	0	3	3	7
151%-200%	2	1	0	0	1	4
>200%	1	0	0	0	1	2
Negative	0	2	0	0	0	2
Total	15	9	12	10	15	61

* Note: not all carriers offered quotes to lower economic status drivers in all cities

While GEICO exhibited some of the largest socioeconomic surcharges, all insurers reviewed imposed a surcharge greater than 50% in some cities. The highest increase in price for low economic status females over high economic status females used by Farmers was 128.6% in Houston; the lowest was 0% in Los Angeles (where socioeconomic rating factor use is substantially restricted by the state's consumer protection laws) and the next lowest was 38.4% in Chicago.¹⁸ For State Farm, the highest was 66.4% in Queens, NY; the lowest were 0% in both Los Angeles and

¹⁸ We include the second lowest premium change for those companies in which Los Angeles had the smallest differential, because the Los Angeles quotes are impacted by California's unique consumer protection statute and regulations.

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Minneapolis. For Allstate, the highest was 183.8% in Jersey City; the lowest was *minus* 18.9% in Chicago (that is the lower economic status driver paid less). For Progressive, the highest was 206.7% in Queens, NY; the lowest was 23.2% in Los Angeles and the next lowest was 45.7% in Phoenix.

State Farm is quite consistent in its factor application. All eight of the increases in the 0-50% range were between 3% and 4%, which, along with the two cities with no change, means that the company's premiums were within about four percentage points of each other in 83% of the cities.

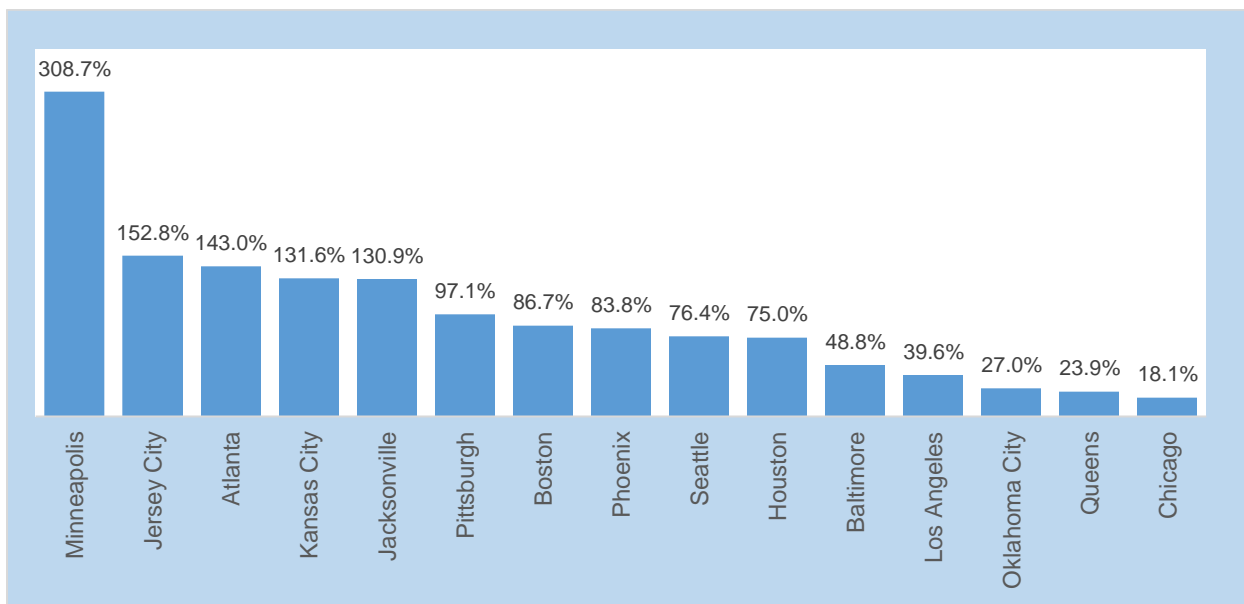
As the data in the Appendix reveal, the prices charged to low economic status male drivers compared with high economic status male drivers were in ranges similar to (though not precisely the same as) those faced by female drivers.

Actuarially, the range of surcharges for lower income Americans over persons of higher economic status with exactly the same driving characteristics (as well as the same address) within each insurer is astonishingly wide. If GEICO charges a high-status woman in Minneapolis \$528, can it really be actuarially sound to charge the exact same woman except with lower economic status characteristics (same age, same perfect driving record, same address, same miles driven, same car) \$2,158?

Given that, as ASOP 12 (section 3.3.4) establishes, "the actuary should consider the reasonableness of the results that proceed from the intended use of the risk classes (for example, the consistency of the patterns of rates, values or factors among risk classes)," it seems that the reasonableness standard will not be met with the quadrupling of the lower economic status woman's premium. GEICO's selection of an 18% increase for the same profile comparison in Chicago and a 131%

increase in Jacksonville does not comport with the expectation of "consistency of the patterns of rates." Figure 8 presents a graph of GEICO's premium differentials deriving from these five socioeconomic differences in the 15 cities tested and illustrates the wildly inconsistent impact of precisely the same factors.

Figure 8. GEICO premium differentials for same factor set in 15 cities



The variability of pricing for the same changes to purported risk factors is not exclusive to GEICO. Allstate, for example, charges a low status female 12.8% *less* based on these socioeconomic characteristics in Chicago but 183.8% *more* for the same combined factors in Jersey City. The implication is that a lower economic status results in someone who is less risky of a driver in Chicago, but three times riskier in Jersey City, than a higher economic status driver.

The premium differences Progressive imposes on drivers in Phoenix and Atlanta illustrate the actuarial problem. Progressive's minimum limits premium for a high economic status female driver

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with a perfect driving record is \$766 in Phoenix and \$764 in Atlanta. In other words, Progressive charges a good driver (with higher income characteristics) virtually the same premium to meet the respective states' minimum liability limits in Phoenix and Atlanta.¹⁹ In Phoenix, Progressive raises the premium for a lower economic status female driver by \$350, or 45.7%, to \$1,116 annually for the same minimum limits coverage. However, this lower economic status driver, with an unblemished driving record, faces a \$1,236, or 161.8% increase in Atlanta when she purchases that state's minimum limits coverage, leaving her with a \$2,000 annual premium from the company. Since the impact of geography is shown to be virtually nil – basic limits premiums are actually lower for the high-status driver in the Atlanta than in Phoenix – we should expect, if factors have a meaningful relationship to risk of loss, that the non-driving related factors should have approximately the same impact in response to the ZIP code change, but that is far from the case. Instead, Progressive's pricing, if we were to assume that it is actuarially derived, must be built on the claim that the purported auto insurance risk associated with being a low-income driver jumps nearly four-fold when moving from Phoenix to Atlanta *after* accounting for territorial differences.²⁰ It is not, at the very least, *consistent* for Progressive to have increases of 45.7% in Phoenix but a whopping 161.8% in Atlanta for the very same five factors.

The public availability of complete data (or lack thereof) means that a review such as ours can only surface the question of actuarial soundness. As with the concerns that arise from the intercompany comparisons discussed above, finding the answer to this question lies squarely with insurance departments and particularly with the actuaries of those departments.

¹⁹ That Arizona and Georgia have different financial responsibility limits does not matter here, as this is a relative impact comparison and what matters is that the low and high economic status drivers face the same minimum limits in their respective state.

²⁰ As we note above (see footnote 10), profit and underwriting expense differences cannot alone explain the wide premium differences among large insurers; in this case – an analysis of one insurer's classification practices in two states – profit and underwriting expense differences are unlikely to explain any of the premium differences.

The discussion above just notes inconsistent application of the factors within each insurer. Comparing the impact of these non-driving factors among different companies also reveals odd actuarial results. The city with the highest purported risk adjustment necessitated by the socio-economic factors was Minneapolis for GEICO for both females and males. But that city has the lowest premium changes based on those factors for State Farm (both sexes) and Farmers (males - outside of the 0% change in Los Angeles). Stated differently, the actuarial analysis of risk in Minneapolis suggests that *the city's lower-income good drivers are either among the riskiest in the nation or the least risky, depending upon which companies' actuaries are looking at the data.* If the data used by each company are credible and current, such extreme differences are impossible for precisely the same risk. At the very least, state insurance department actuaries should look at these patterns and demand further explanation of the results.

Notwithstanding the evaluation of actuarial soundness discussed above and focused on the likelihood that the selections are not actuarially defensible, the use of these particular factors necessitates additional, and equally important, reflection: do current rating factors comport with other actuarial standards? We see two other elements of those standards that deserve particular consideration by actuaries with respect to these socioeconomic factors: the actuarial standard of public acceptability and the requirement that factors have, at least, a plausible relationship to risk.

1. Do socioeconomic rating factors meet the actuarial standard of public acceptability?

American Academy of Actuaries: "Risk Classification Statement of Principles:"

"The system should be acceptable to the public."

"Any risk classification system must recognize the values of the society in which it is to operate...they should not differentiate unfairly among risks; they should be based on clearly relevant data...they should be structured so that the risks tend to identify naturally with their classification."

As we demonstrate below, the public clearly does not accept the five socioeconomic factors we studied, nor are the factors structured so that customers (the "risks" in American Academy of Actuaries parlance) identify naturally with their classification.

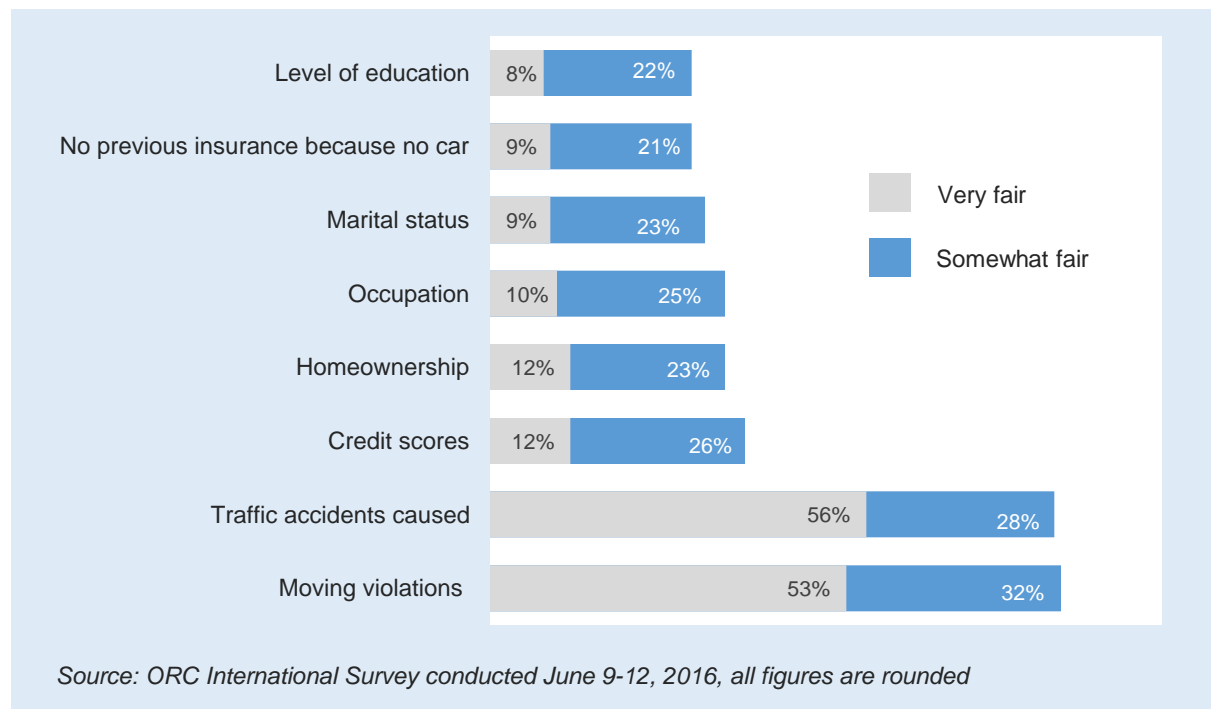
In June 2016, Consumer Federation commissioned ORC International to conduct a representative survey of 1,000 Americans to ascertain the public's view of the use of various rating factors in the setting of auto insurance premiums and published its findings (Heller and Styczynski, 2016). The survey found that 83 percent of the public found it very fair or somewhat fair for auto insurers to use traffic accidents caused when setting premiums and 84 percent found it very or somewhat fair to use moving violations such as speeding tickets. The near opposite was true for the non-driving related factors that reflect drivers' economic status, as shown in Figure 2. The survey had a margin of error of +/- 3.09 percent at the 95 percent confidence level.

Respondents were asked the following question for each of eight rating factors tested:

As you probably know, auto insurers use many factors to decide how much each driver is charged for their insurance coverage. How fair do you think it is for insurers to use each of the following factors in deciding on an auto insurance price for a driver? Would you say each is very fair, somewhat fair, somewhat unfair or very unfair?

For the survey, the order in which the different factors were presented was randomized.

Figure 9. Percentage of Americans who find each rating factor very fair or somewhat fair



Only about one in 10 Americans think the use of these non-driving factors is "very fair." Conversely, over six in ten Americans consider it somewhat or very *unfair* to use these non-driving factors associated with economic status.

Clearly, serious questions exist about the public acceptability of the five socioeconomic factors we studied (homeownership, coverage lapse, education, occupation and marital status). The public also rejects credit score use, but CFA did not test its effect in the research reviewed in its paper.²¹

²¹ Research published by CFA in 2013 (available at http://www.consumerfed.org/pdfs/useofcreditscoresbyautoinsurers_dec2013_cfa.pdf) revealed premiums for good drivers in Baltimore with poor credit scores were \$1,399 and \$2,788 from Allstate and State Farm, respectively. This is a \$1,389 or 99% difference between companies for the same risk. Good drivers with excellent scores were charged \$1,001 and \$1,030 in Baltimore by State Farm and Allstate, revealing a much narrower variation of \$29, or 3%. For Allstate and State Farm customers, a poor credit score raised premiums for good drivers by 40% and 171%, respectively. More research must be done on the purported actuarial soundness of credit scores in insurance.

The question for regulators, then, is whether or not the use of these factors meets the principle that requires a classification system to be acceptable to the public.

2. Do current socioeconomic rating factors have a plausible relationship to risk or are they obscure and irrelevant?

AAA's "Risk Classification Statement of Principles:"

Causality: "If a cause and effect relationship can be established, this tends to boost confidence...Thus classification characteristics may be more acceptable to the public if there is a demonstrable cause and effect relationship between the risk characteristic and expected costs. However, in insurance it is often impossible to prove statistically any postulated cause and effect relationship. Causality cannot, therefore, be made a requirement for risk classification systems. Often causality is not used in the rigorous sense of cause and effect but in a general sense, implying the existence of a plausible relationship...Risk classification characteristics should be neither obscure nor irrelevant to the insurance provided, but they need not always exhibit a cause and effect relationship." (emphasis added)

While causality is not an actuarial requirement, it is at least encouraged. But what is required is a plausible relationship: the classification should not be "irrelevant to the insurance provided." The classes discussed in this article have no plausible relationship, and not only do not show a cause and effect relationship, they are obscure and irrelevant.

Merriam-Webster defines relevant as "having significant and demonstrable bearing on the matter at hand."

Does homeownership, having a short break in coverage while not owning a car, occupation, education, and marital status each have a significant and demonstrable bearing on private passenger auto liability risk of loss? As we discussed above, the public does not think so. Aside from the public acceptability requirement, can it be shown that these factors in and of themselves

constitute legitimate risk distinctions that, when combined, really have impact sufficient to double, triple, or quadruple the price? Where is the evidence to demonstrate that? Further, if there is an underlying risk being captured in any of these, what evidence is there that it is not the same risk being captured by each - perhaps one already captured in other factors as well? If, for example, the risk that coincides with one's level of education is the same that coincides with one's home ownership status, then the application of both would have the effect of erroneously amplifying the impact of the underlying risk characteristic (whatever that may actually be). We believe the patterns of prices shown above is sufficient to show that these factors, obscure as to their risk-relatedness and rejected by the public, are being applied in ways that likely produce actuarially unsound results.

It should be of serious concern to actuaries and regulators alike that the five factors we study herein are obscure and irrelevant to the insurance provided and, we surmise, cannot be shown to have significant bearing on driving behavior. Unless the state actuaries can show that the cumulative impacts – we stress that we are talking about cumulative impacts – shown above can be confirmed as legitimate, non-duplicative measurements of risk of loss by insurance department actuaries, these factors should be eliminated from pricing models as not being actuarially sound.

RECOMMENDATIONS

It is doubtful that the actuaries from insurance companies have the desire to determine if the rates they are charging are actuarially sound based on a review of other carrier pricing or a deep dive into their own rating factor relativities. But actuaries at state insurance departments have a duty to do so. Based on the findings discussed above, we offer a set of recommendations to state insurance department actuaries and, ultimately, to their commissioners.

PART 1

Price differences of such astonishing magnitude and frequency for precisely the same risk raise very serious questions about the actuarial soundness of at least some of the prices reviewed. The actuaries of the nation's insurance departments should undertake an actuarial review of the prices being charged among the different insurers in their state to see if disparities such as we see in these data are prevalent in their states. We strongly suspect, based simply on the price dispersion in evidence, that some of the major carriers' rates now in effect are not actuarially sound. State insurance departments should look carefully at the actuarial principle that a reasonable and not excessive rate "is an actuarially sound estimate of the expected value of all future costs associated with an individual risk transfer" to see if these widely disparate rate patterns mean that at least some companies' estimates of at least some of their prices are not actuarially sound. Further, departments subject to statutes that limit regulation where a market is deemed competitive should consider the divergent pricing for the same risk as an indication that the insurance market is not competitive and, thereby, in need of more substantial rate regulation.

PART 2

State insurance department actuaries should consider the reasonableness of the results that proceed from the use of the risk classes in light of, the actuarial standard pertaining to the "consistency of the patterns of rates, values or factors among risk classes."

Regulators must answer the question: Are actuarial standards met when insurers charge hundreds or thousands of dollars more for the identical clean risk except for the five socioeconomic factors? In our experience, insurance department actuaries only study individual factor data and do not

review the cumulative impact of multiple factors on the final rate being proposed by an insurer. The unstudied question we raise is: are the combined charges of the multiple factors reasonable when, for example, an insurer charges a low economic status female *less* for these factors in one market while it charges almost 200% *more* for the same combined factors in another market? Is it consistent for some insurers in one ZIP code to impose surcharges of well over 100% attributable to these socioeconomic factors while other companies impose no or only small increases in the same ZIP code for the very same five factors for the exact same risk?

Insurance departments must also consider if it is actuarially sound to charge significantly more for state required auto insurance using five socioeconomic factors rejected overwhelmingly by the public when actuarial standards call for public acceptability of rating factors.

Finally, state insurance department actuaries should study the patterns of prices shown above to determine if these socioeconomic factors, obscure as to their risk-relatedness and rejected by the public, are being applied in ways that produce actuarially unsound results. States should undertake an analysis of these five socioeconomic factors to determine if, in combination, they can be shown to have as significant a bearing on driving behavior as the startling differentials shown above indicate. Although it was beyond the scope of this paper, we would suggest that a sixth factor, credit score, also be included in departments' evaluations. If the cumulative impacts shown above cannot be demonstrated by insurance department actuaries, these factors should be eliminated from pricing models as not being actuarially sound.

CONCLUSION

A review of two sets of auto insurance premium data shed an important light on different ways in which premiums in state auto insurance markets may violate principles and standards of actuarial

practice. The wide dispersion of prices among large insurers for precisely the same insurance coverage raises questions about both the actuarial soundness of individual companies' rates and claims that auto insurance markets are sufficiently competitive to make rate regulation unnecessary or limited in a state. The evidence presented in this paper also raises important questions about the actuarial soundness of the use of socioeconomic rating factors by insurance companies.

The data detailed in this study are substantial but more study is needed using the above information as well as data on claims and losses that are not available to the public. Such research is clearly the responsibility of state insurance departments, which are compelled by state law to ensure actuarial soundness and prohibit excessive and unfairly discriminatory pricing in their state's auto insurance market. This is particularly vital in state-required auto insurance, since the state mandates its purchase and penalizes (with fines, penalties and even jail time in some states) any citizen who fails to have the insurance even if that person clearly cannot afford it. The disparity in prices also raise serious question as to the competitiveness of auto insurance markets across the country, with the possible exception of California.

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Appendix: Annual Premium by City, Customer Profile, and Company

Minneapolis, MN	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$528	\$1,100	\$1,946	\$994	\$3,312
<i>Low Status Female</i>	\$2,158	\$1,798	\$3,342	\$994	\$4,674
High Status Male	\$528	\$1,056	\$1,946	\$994	\$2,982
<i>Low Status Male</i>	\$1,840	\$1,448	\$3,070	\$994	\$3,626
Houston, TX	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$944	\$686	\$1,124	\$1,286	\$1,408
<i>Low Status Female</i>	\$1,652	\$1,374	\$1,396	\$1,326	\$3,218
High Status Male	\$732	\$688	\$1,100	\$1,286	\$1,380
<i>Low Status Male</i>	\$1,552	\$1,310	\$1,456	\$1,326	\$3,390
Jacksonville, FL	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$868	\$882	\$2,860	\$956	N/A
<i>Low Status Female</i>	\$2,004	\$2,224	N/Q	\$1,470	N/A
High Status Male	\$868	\$918	\$2,860	\$956	N/A
<i>Low Status Male</i>	\$1,032	\$1,752	N/Q	\$1,470	N/A
Chicago, IL	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$474	\$328	\$582	\$434	\$744
<i>Low Status Female</i>	\$560	\$504	\$472	\$448	\$1,030
High Status Male	\$690	\$596	\$750	\$876	\$1,674
<i>Low Status Male</i>	\$778	\$1,084	\$1,398	N/Q	\$2,054

Private Passenger Auto Premiums and Rating Factors – Are They Actuarially Sound?

Atlanta, GA	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$790	\$764	\$1,298	\$1,446	N/A
<i>Low Status Female</i>	\$1,920	\$2,000	\$1,442	N/Q	N/A
High Status Male	\$790	\$752	\$1,234	\$1,514	N/A
<i>Low Status Male</i>	\$2,082	\$1,896	\$1,460	N/Q	N/A

Boston, MA	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$722	\$1,402	\$2,536	N/A	N/A
<i>Low Status Female</i>	\$1,348	\$2,254	N/Q	N/A	N/A
High Status Male	\$722	\$1,402	\$2,536	N/A	N/A
<i>Low Status Male</i>	\$1,348	\$2,254	N/Q	N/A	N/A

Appendix (con't): Annual Premium by City, Customer Profile, and Company

Kansas City, MO	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$424	\$656	\$786	\$928	\$916
<i>Low Status Female</i>	\$982	\$1,280	N/Q	N/Q	\$1,570
High Status Male	\$424	\$638	\$786	\$928	\$916
<i>Low Status Male</i>	\$976	\$1,184	N/Q	N/Q	\$1,454

Seattle, WA	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$730	\$972	\$1,806	\$1,084	\$836
<i>Low Status Female</i>	\$1,288	\$1,780	N/Q	\$1,120	\$1,736
High Status Male	\$680	\$686	\$1,806	\$1,084	\$756
<i>Low Status Male</i>	\$846	\$1,082	N/Q	\$1,120	\$1,502

Private Passenger Auto Premiums and Rating Factors – Are They Actuarially Sound?

Phoenix, AZ	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$594	\$766	\$1,278	\$746	\$1,358
<i>Low Status Female</i>	\$1,092	\$1,116	N/Q	\$772	\$2,000
High Status Male	\$594	\$736	\$1,278	\$746	\$1,282
<i>Low Status Male</i>	\$1,126	\$998	N/Q	\$772	\$2,232

Pittsburgh, PA	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$544	\$522	\$1,244	\$584	\$1,044
<i>Low Status Female</i>	\$1,072	\$904	\$1,378	\$606	N/Q
High Status Male	\$544	\$522	\$1,244	\$584	\$1,044
<i>Low Status Male</i>	\$858	\$904	\$1,378	\$606	N/Q

Oklahoma City, OK	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$666	\$698	\$1,252	\$976	\$692
<i>Low Status Female</i>	\$846	\$1,194	\$1,204	\$1,010	\$1,394
High Status Male	\$666	\$684	\$1,252	\$1,010	\$692
<i>Low Status Male</i>	\$1,108	\$1,140	\$1,204	\$1,046	\$1,404

Jersey City, NJ	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$618	\$1,546	\$3,138	\$2,696	\$3,830
<i>Low Status Female</i>	\$1,562	\$2,440	\$8,906	\$2,792	\$5,968
High Status Male	\$618	\$1,206	\$3,150	\$2,696	\$3,830
<i>Low Status Male</i>	\$1,388	\$1,916	\$8,358	\$2,792	\$5,354

Appendix (con't): Annual Premium by City, Customer Profile, and Company

Baltimore, MD	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$828	\$1,534	\$1,614	\$1,434	\$2,300
<i>Low Status Female</i>	\$1,232	\$2,544	\$1,770	\$1,484	\$3,404
High Status Male	\$1,004	\$1,582	\$1,556	\$2,858	\$2,726
<i>Low Status Male</i>	\$2,400	\$2,380	N/Q	\$2,960	N/Q

Queens, NY	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$1,264	\$2,174	\$3,350	\$2,388	N/A
<i>Low Status Female</i>	\$1,566	\$6,668	N/Q	\$3,974	N/A
High Status Male	\$1,264	\$1,946	\$3,350	\$2,438	N/A
<i>Low Status Male</i>	\$1,526	\$4,734	N/Q	\$4,144	N/A

Los Angeles, CA	GEICO	Progressive	Allstate	State Farm	Farmers
High Status Female	\$546	\$646	\$970	\$1,124	\$976
<i>Low Status Female</i>	\$762	\$796	\$1,078	\$1,124	\$976
High Status Male	\$546	\$716	\$970	\$1,124	\$976
<i>Low Status Male</i>	\$732	\$760	\$1,064	\$1,124	\$976