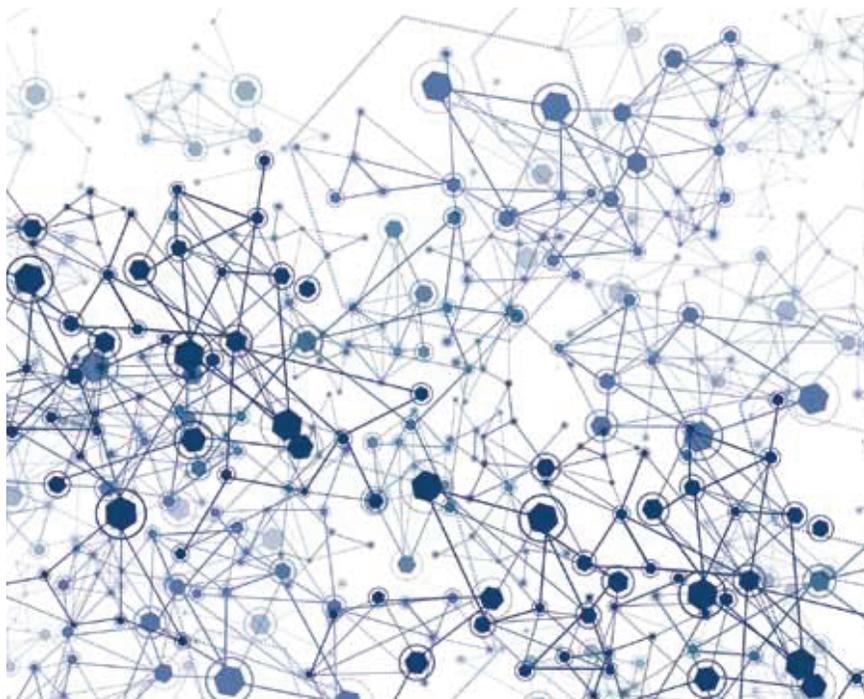


Actuaries, Algorithms and Drivewise

Submitted Anonymously



Unbeknown to many in the P&C business, a new rate making methodology has been slowly infiltrating the automobile insurance industry over the past two years. With so much information available via the web, and the accompanying explosion of companies scouring the web for this data, someone was bound to find a way to turn their collection of information into a “pot of gold.” That pot of gold has come to the insurance industry in the form of mathematical algorithms.

An interesting discussion appeared in the Letters to the Editor section of NAPAA’s *DirectExpress* after the weekly newsletter featured a succession of articles about Allstate’s *Drivewise* program. (See October 9, 2013, October 30, 2013 and November 6, 2013). In commenting on Allstate’s *Drivewise* device, one writer warned (to paraphrase) of the slippery slope that this

sort of information gathering device presented. This comment was likely referring to the fact that the extent of data collected is not truly known. Currently, when allowed by state insurance regulators, consumers are urged to use the telemetric devices in order to provide the insurance company certain data about the user’s driving habits. Such devices are pitched to the general public as a way to let their good driving habits “earn” extra discounts.

Another writer wrote a harsh response in rebuttal to the warning of a “slippery slope.” The rebuttal included a not-too-subtle assessment of the first writer’s knowledge of the insurance industry, claiming, in effect, that the device was not an “invasive method of data collection” nor was it designed to find the “sweet spot” via risk profiling. Well, it turns out that the second writer is the one who doesn’t understand in-

surers and the motives behind their thirst for data collection.

In late March 2014, the Consumer Federation of America (CFA) issued a letter to the National Association of Insurance Commissioners (NAIC). Various letters and analyses are available at <http://www.consumerfed.org/pdfs/CFA-Response-to-Earnix-March17-Presentation.pdf>.

Mr. J. Robert Hunter, Director of Insurance for the CFA and a Fellow of the Casualty Actuarial Society, has expressed his concerns with current automobile risk rating methodologies being adopted by many large insurers in the USA. In several of the documents highlighted on the CFA website, Mr. Hunter calls into question the mathematical rating algorithms used by insurance companies under the methodologies known as “Price Optimization.” One of the producers of these rating methodologies is a company called “Earnix.” Price Optimization, as designed for insurers, is a better mousetrap, and doubtless many of them are beating a path to Earnix’s door.

A key issue with the use of Price Optimization is that it appears to be at odds with the more widely accepted criteria established for rate making by the Casualty Actuarial Society. These criteria are generally acceptable to, and approved by, the department of insurance in most, if not all, states.

The basic concept of rate making for automobile insurance is relatively simple. However, recent technological advances are making inroads into rate calculations and the process has become more and more sophisticated. In spite of this, it is still quite likely there are some built-in biases by the rate maker (insurer) thrown in as well.

Simply put, the basic rate making concept is a function of data relating to

incurred losses in a rating class, number of automobiles in that rating class, number of automobiles in a certain territory/region/state, expense factors in claims, commissions paid, taxes, and administration and other operating costs (including reinsurance costs). These historical costs are then trended forward and expressed as future expectations. In other words, the anticipated cost for claims and expenses going forward is established as a basis for the rate.

An acceptable profit margin is added to this. Expected investment results are often taken into account when establishing the profit margin. Any of these factors can be sliced and diced and costs can be attributed to certain types of coverages in accepted and approved ways. However, in the end, what one basically has is a cost-plus approach to determining insurance rates.

The standard measure of underwriting profit is the combined ratio, which is incurred losses plus expenses, divided by the earned premium. Combined ratios can be affected positively by reducing incurred claims and/or expenses, but can also be positively affected by a reduction in earned premium (negative growth). A combined ratio below 100% means there is an underwriting profit. Anything above 100% means there is an underwriting loss. When investment gains (or losses) are added to the combined ratio, the insurer's operating ratio is obtained.

I am not an actuary and do not profess to understand all the mathematics, rating factors, and actuarial categories involved. I do not want to make this article an "actuary-in-a-box" kind of outline. I am discussing the basic concept of rate making as I understand it. Hopefully, to help you digest, in a basic sense, what the rating controversy is about.

Pure loss, or loss cost for a class/category of items, is basically the incurred loss payout, divided by the number of insured items (in this case: automobiles). Let's say for example, the insurer has 1,000 automobiles in its book of business (all in force for a full 12 months – to keep it simple), all carrying collision coverage, and all driven by 16-year-old males. Also, assume the insurer paid out \$1,000,000 in collision damages for

these 1,000 cars. Thus, the insurer's "loss cost" last year for this class of driver, is \$1,000 per automobile for collision damage. BI/PD, comprehensive and other coverages can go through the same lost cost calculation.

However, if the insurer only charged each 16-year-old \$1000 per year in premium for collision coverage, then the insurer will most likely lose money. The insurer then has to consider future trends and past trends and incorporate price adjustments for each. Data relating to future trends are comprised of the anticipated increase in the number of vehicles on the road each year, potential change in accident rates among 16-year-old males, increased expenses associated with higher-priced cars, and higher repair expenses due to inflation or other market conditions.

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The insurer must then look at its past, or historical, trend. If, for example, the insurer incurred \$500,000 in losses five years ago, and experienced \$1,000,000 in claims during the past year, then the insurer's loss costs are increasing about 18% per year (roughly).

Next, the insurer must factor in the cost for running an insurance company; usually between 30% – 40%. The insurer then adds in the desired profit margin. If stock market returns are down, then fewer investment gains will mean that a higher profit margin will have to be applied to the rates to maintain desired profit levels, and vice versa.

In consideration of the factors described above, it is entirely possible that an insurer would determine that the hypothetical 16-year-old will have to pay an average of \$2,000 per year for collision coverage (Remember, I am really simplifying all of this).

A more sophisticated version would use a pre-determined base as its starting point. For example, an individual, age 30, married, driving a 5-year-old car with no accidents or convictions could start with a base of 1.0. From there, every factor that goes into a person's rating becomes a multiplier above or below the base. For example a 16-year-old male may start at the base of 4.0 and when combined with a collision premium of \$500, results in a base rated premium of \$2,000. A 19-year-old single male may be at a base of 3.0, but if he were married, the factor might be 2.5. If the process included the same 19-year-old but rated him as divorced, the base might be 3.75. The continuation of this process includes factors for credit score, geographical location and more. Any factor with a base different than 1.0 results in a corresponding higher or lower multiplied effect.

It is important to understand this concept for a couple of reasons. First of all, if you are told there is only an average of a 3% increase in base rates, you must remember that the multiplier effect can have startling consequences for those clients who are far removed from the base rates.

The finer the "slicing and dicing" that is done utilizing these mathematic algorithms, the more discriminatory the rating becomes, and therefore, the more it becomes unfair to more and more people. One could also argue that the finer the sampling in a class, the less meaningful the statistics. You cannot predict, with any reliability, the outcome of an election by talking to just 10 people. The larger the sampling, the more likely it will prove closer to the actual outcome. People a whole lot smarter, and more well-versed in statistics and actuarial science than me, have developed rate making practices that make "clinical" sense, but likely are changed when insurers get to apply their own biases.

The more information insurers have at their fingertips, the more they can parse

the data and apply the resulting assumptions to their rate making. This is why telemetrics compiled from devices like Allstate's *Driverwise* will become an indispensable tool in determining a "sweet spot" in the sea of prospective customers. The question then becomes: "What will happen to the insureds who fail to find a home in this new world of sweet spots?" The potential exists for some insurers to charge these less desirable clients outrageously high premiums, or to discard them altogether.

One would guess that all of this would result in insurers achieving the ultimate and utopian goal of lots of premium dollars pouring in, negligible claims (but enough to keep the demand for insurance high), and the need for very little staff. But, not so fast. Consumers aren't too keen on subjecting themselves to the vagaries of insurance companies, let alone to submitting themselves to what some see as electronic eavesdropping. When it comes to insurance rates, most consumers benchmark themselves against a standard that includes among other things: marital status, age, homeownership, education, and driving record. Just imagine if you will, each and every person in the USA having an individual and unique driving rate profile. Imagine two people the same age, same driving experience, living on the same street, driving the same make and model vehicle - in short, same everything - having vastly different insurance premiums. Is this fair? The one paying lower premiums will likely argue it is fair, but that is not what the concept of insurance is about.

Enter Earnix and their methodologies (sophisticates like to say algorithms). The company has developed a rating model that moves away from what is often termed the "cost-plus" basis of insurance rate making. Instead, Earnix utilizes a process (and this is my very simplistic take on their concept) using all the information available about people to see what type of consumer will accept the highest premium increase (and what that threshold is) and still remain loyal to the company. Insurers know, or will know, what type of people shop for new insurance and at what tolerance level. This is called "demand elasticity."

The March 27, 2014 letter by the CFA to the NAIC states:

"Notably, Earnix did acknowledge that price optimization is a tool to move rate and rating factors away from the actuarially determined cost-based price levels. As the company's consulting actuary Mike Miller put it, price optimization "is not an actuarial tool at all...It provides no input regarding expected costs; it provides nothing actuarial in nature in terms of projected losses and expenses."

Insurers who adopt this type of rating approach will not only be calculating rates based on the "cost-plus" basis, but they will then refine rating further by applying "demand elasticity" factors. Insurers will then know to whom they should market and attract to their books of business, and what types of rate increases they can apply to their customers upon renewal and still have them remain loyal. It is also a bonus if they are determined to be the least likely to have claims. It appears that under Earnix's philosophy, insurers will set a price that appeals to, and attracts, a client base that will be least likely to leave for anything less than a 20% premium increase.

These "ideal customers" will see premium increases based on many factors that are not even public information. This is because the mathematical algorithms that are used under this type of rating approach have not been filed or approved. Is this great or what? You think you have difficulty now trying to explain rate increases to your clients, well, be prepared; it is going to get worse, very quickly. We are on the cusp of insurance utopia! Rates will increase and no one will be able to explain why!

As CFA also points out in their March 27, 2014 letter to the NAIC:

"Who Will Get Hurt By Price Optimization?"

Though Earnix refused to discuss its methodology during the call (and, similarly, said it would not file its "black box" with regulators), it has been very clear in its marketing material that price optimization is an elasticity model that predicts how much of an increase different consumer classes will tolerate

before non-renewing or not purchasing a company's policy. Groups who tend to have fewer marketplace options for reasons of geography, time available, financial literacy or, more generally, tend to shop less than average are vulnerable to having premiums raised unfairly by price optimization."

When I read about EAs and FSLs extolling the virtues of *Driverwise*, I think about George Orwell's predictions in his book 1984 (only the year was wrong in my opinion). Every time you visit a shopping site, buy something online, or visit any of the thousands of other types of websites, you are likely being "watched." The gnomes of the data collection world are compiling scads of data about you. Earnix is just perhaps only the first of many to figure out a way to turn all this free information into a pot of gold by building a better mouse trap.

Some EAs, I am sure, are already past the point of being able to succinctly answer questions about premium increases experienced by their clients. Allstate, one might think, has been working hard to get EAs to the point where it is becoming virtually impossible - or far too time-consuming - for them to easily figure out why their clients' premiums have increased.

Apparently, in recent Allstate Town Hall meetings, the new rating algorithms were discussed and agents were warned that "those algorithms" are far too difficult to comprehend or explain to clients. Management indicated that there is now myriad rating classifications and showed a terrific video that basically says: "Blame premium increases on inflation - costs keep going up."

I would like to believe even the most unsophisticated consumer would have trouble believing a 25% premium increase on their auto insurance renewal is the result of "inflation." Oh, and about those rating caps. We have already heard of several exceptions. There's a surprise!

Is it possible that Allstate's recent push for growth is tied to the discovery of their own "Optimized Price?" Or should it be called "Optimized Profit?" As far as being able to explain that next double-digit increase...forget it! "It is what it is!" I, for one, hope they remove the question from the ACES survey that asks if you answered your client's question satisfactorily. **Ef**