

A Three-part series of articles on Allstate's Complimentary Group Rating

October 10, 2016, Published by Carrier Management (www.CarrierManagement.com)

Executive Summary

Opinion: Allstate's rating process made price optimization the biggest controversy in P/C insurance. But it might not be what it seems, according to James Lynch, chief actuary of the Insurance Information Institute.

In this three-part series of articles, Lynch explains what he calls the ultimate irony—that “the Allstate plan that kicked off the brouhaha might not even be price optimization.” In Part 1, he explains what price optimization is—value-based pricing—and how that differs from the cost-based pricing methods that actuaries use to estimate how much rates should change on an entire book of business. In Part 2, he explains classification plans that introduce individual surcharges and discounts to overall pricing indications for different groups of customers and how Allstate introduced an enhancement to this step—designed to solve “the reversal problem.” In Part 3, he explains that what is being maximized is retention, not price, as he brings together concepts explained in Part 1 and Part 2 of this article series.

Lynch was asked by Allstate officials to review and write about the plan, but he independently chose *Carrier Management* to publish his article. The article is based on his review of a report by another actuary, information from Allstate and knowledge he has gained from his study of price optimization over a two-year period.

[About Those Rates: Why Allstate's Rating Program May Not Be What It Seems](#)

October 10, 2016 by James Lynch, Part 1 of 3

Actuaries occupy a quiet, arcane world, their debates obscure: Loss development factors: weighted vs. straight? Premium impact: parallelogram vs. extension of exposures? Reserve methods: chain ladder vs. Bornhuetter-Ferguson. Part 1 of a three-part article series.

So Allstate's Complementary Group Rating process—CGR for short—is one for the books.

The early filings of the company's CGR plan launched the price optimization controversy in the public eye. The plan, according to its detractors, let Allstate gouge consumers on price, charging the maximum amount each customer would be willing to pay.

“This is a watershed moment in the history of insurance consumer protection,” said Robert Hunter [in a press release in late 2014](#). Hunter is director of insurance at the Consumer Federation of America (CFA), a consumer advocacy group that often finds fault with insurer practices.

“If regulators don't block this scheme immediately, American consumers will pay a huge price. While we are forced by law to buy these companies' insurance products in order to drive, there seems to be nothing stopping them from targeting millions of unsuspecting customers with unnecessary and unjustified price hikes.”

The media noticed, particularly after the CFA started calling the practice a “loyalty penalty.” NPR's headline said, “[Being a Loyal Auto Insurance Customer Can Cost You](#).” *Consumer Reports* called price optimization a “schmo tax,” as if to say you are a sucker if you don't shop for insurance and your insurer will jack up your rates unless you do.

Insurers, the reasoning seemed to be, had invented a money milking machine, one they hooked every customer to. The machine, precisely calibrated, could drain just as much money as any customer could possibly stand but not one cent more. Then, at the last possible moment, insurers could close the spigot, leaving each customer drained—not completely dry but given a perfect milking. Consumers wouldn't notice how much had been sucked from them. That way they would return, replenished and refreshed, at renewal, ready to be suckled again.

As we shall see, this was not the case, but the consumer advocates cried that Allstate's machine was not the only one. CFA cited surveys by the consulting firm Earnix, which found that 45 percent of large auto insurers owned one.

Editor's Note: Prior to 2014, *Carrier Management* published Hunter's objections to price optimization, although not specific to Allstate's CGR [here](#).

The truth, as is so often the case with insurance, is far more complex.

Still, [regulators heard](#) CFA's argument. In the following 18 months, 17 states and the District of Columbia announced they wanted to monitor, restrict or ban price optimization. The National Association of Insurance Commissioners adopted a white paper examining the practice.

The debate has been heated on occasion and confusing practically all of the time. For example, the NAIC tried to define the term “price optimization,” spent months researching the problem, then more or less abandoned the quest, even as they drew a template to monitor or restrict its practice.

The ultimate irony, perhaps: The Allstate plan that kicked off the brouhaha might not even be price optimization, at least if you follow the reasoning of one of the better known actuaries of the past half century.

Irene Bass is a former Casualty Actuarial Society president and a former member of the American Academy of Actuaries' board of directors. At Allstate's request, she thoroughly reviewed Allstate's CGR process and concluded that it is not price optimization. The plan, in her opinion, operates within the principles and standards of the actuarial profession. And it is a method of setting rates that uses computing power to correct an unfortunate problem that affects virtually all rating plans.

That is the story you will be reading. This article will look at what price optimization is. Then it will describe Allstate's rating process and the controversy over how it adjusts rates.

I am chief actuary at the Insurance Information Institute, a nonprofit, nonlobbying organization that tries to describe how insurance operates. In this article I will be describing how this particular sliver of the insurance world operates.

Not every I.I.I. member favors the use of price optimization. Allstate is a member company, and officials there asked me to write about their plan. I have studied, spoken and written extensively about price optimization over the past two years. Allstate provided me a copy of Bass' report. I corresponded with both Allstate and Bass to understand the rating plan and her paper and attended a presentation of the Midwest Actuarial Forum in April at which she summarized her thinking.

I will try to relate Bass' point of view. I will also tell you what I think.

What Is Price Optimization?

The practice of price optimization so permeates the business world that it is hard to step back and think about it as an activity separate from the rest of the economy. It is the essence of the free market. It is the activity that in most of society allows supply and demand to meet. It eliminates supply gluts and prevents shortages. It is, if you will, the gentle guiding fingertips of the Invisible Hand.

There are so many examples it is hard to settle on the perfect one, so let's talk about beer.

At my liquor store I can buy a six pack of Samuel Adams for \$8.99, or about \$1.50 a bottle. I can buy a single bottle there for \$2. If I go to the restaurant, I will pay maybe \$4 a bottle. At the ballpark, \$10.

It's no mystery why the price varies. People will pay more per unit for the convenience of a single bottle, and a little more for the convenience of it being brought to their restaurant table, and a whole lot more if they can knock one back in Yankee Stadium.

The price in each case is what the buyer is willing to pay. It's the law of supply and demand, and it is an economic concept as old as Adam (Smith, that is).

But why is the ballpark price \$10 and not \$11 or \$9? What guru decided that profits are maximized with a \$10 ale? Who knew that sales would increase at \$9 but overall profits would fall?

Years ago, that was no guru. It was the seller's gut—pure instinct. A vendor would understand from talking with customers, from looking at sales figures, maybe even looking at economic trends. The vendor would know when it might be the right time to nudge prices a little higher and make some extra margin. Or it might be time to cut prices, hoping that volume would make up for lower margins.

Today we don't need the seller's gut. We have computers. They grab data and correlate variables. They do a much better job than the grizzled veteran. Computers try to determine how much specifically you (yeah, you, reader, or someone much like you) will pay, so they might give you a little discount and charge someone else a bit more.

It is not a new concept. Cereal makers distribute coupons on the theory that people who demand a lower price will self-select their way to a discount. They will clip the coupon. More price-tolerant customers will not.

The practice is called value-based pricing. The computer software that fine-tunes the practice is called price optimizing software.

That is what price optimization is, and we will see that insurers are using the software but doing something quite different.

You see value-based pricing everywhere, and though it is cause for the occasional grumble, consumers accept it as the best way to operate an economy. It seems perfectly natural that a single bottle of water costs more per ounce than a case, or that beer in a bar costs less than beer at the ballpark.

Once the idea is laid out, examples spill forth like bounty from a cornucopia: airline tickets, hotel rooms, bottled water, movie popcorn, gasoline, Froot Loops, dishwashers, pharmaceuticals.

But not auto insurance, at least not in the United States.

Thanks to the Casualty Actuarial Society's ratemaking principles, which have been codified in the insurance laws of every state, insurers have to build the rate from the ground up. The price isn't determined by supply and demand but by the underlying projected costs plus a reasonable profit.

I'm simplifying a whole lot here, but in essence actuaries estimate that losses will be X, expenses and taxes will be Y, profits need to be Z, so the rate charged will be $X + Y + Z$.

That's not value-based pricing; that is cost-based pricing.

In every state, insurance companies tell regulators what they will charge, starting with the cost and working their way up. They also document how they arrived at that number.

They show every permutation of their rates: the surcharges for male drivers, the credit for middle-aged drivers, and they have to show regulators how they arrived at those numbers. In order for those males to pay more, the actuaries have to prove they incur more losses than other folks. Those middle-aged drivers must have better experience than others to qualify for the discount. With cost-based pricing, that's the rule—er, the law.

Actuaries also follow a crazy quilt of restrictions. Oregon, for example, won't allow gender-based rates. California prohibits using credit information to price policies.)

Finally, in the U.S. rates change infrequently, usually once a year. More than twice a year is considered frequent.

We Americans are so used to the cost-based nature of insurance pricing that we don't always realize how unusual it is. Kellogg's doesn't tell regulators when it changes the price of Froot Loops. It raises the price and lowers the price weekly or even daily. It makes as much money on that cereal as it possibly can, and the competitive marketplace keeps prices reasonable.

Cost-based pricing is even an anomaly in the world of auto insurance. The U.S. practices it; other countries do not.

A friend described U.K. auto pricing to me as we sipped beers at a bustling happy hour. He shook his head and chuckled as he described the cacophony of British auto insurance. "It's like this, practically—this bar right here," he said.

He tapped two fingers from his right hand into his left bicep, then thrust them high—a frantic gesture that mimicked action in the old pits of the Chicago Board of Trade. You could almost hear the crescendo of screams, the staccato clang of the closing bell, the shredded order tickets tossed high then fluttering back to earth.

"It's the Wild West out there."

That's value-based pricing.

I've never met a U.S. actuary—or an underwriter or a CEO for that matter—who ever wanted American auto insurance priced that way. It's good they don't, because changing things would require changing laws in every state plus the District of Columbia. It won't happen soon.

But there is one time-honored break from the cost-based standard—so time-honored that actuaries like Bass consider it to be part of the cost-based standard. That is the deviation from the actuarial indication.

Allow me to explain.

Pricing models are just that, models. They use information from the recent past to predict how much premiums would have to rise or fall to hit a given profit level—up 2 percent or down 6 percent, for example. The estimate that pops out of a pricing model has different names, but I'm going to call it the actuarial indication, as in, "The model has an actuarial indication for a 5 percent increase." In some quarters this is considered the difference between the technical price (the model's figure) and the street price (what the customer pays).

But the models aren't perfect, as everyone acknowledges. The standard pricing model must predict settlement amounts on claims that have yet to settle; whether accident rates will rise or fall; whether inflation will soar or sink; and more. No crystal ball can see so much.

One notable shortcoming: The models don't anticipate how customers will react to rate changes.

Suppose the model predicts losses will skyrocket. Rates, it says, need to double. (I've used these models. It happens.) And suppose the insurer actually does start charging twice what it did in the past. How many policyholders would dutifully renew?

The standard actuarial model assumes the company will renew every risk, regardless of how much rates go up. Each policyholder will dutifully renew, whether rates go up 5 percent or 500 percent. The policyholder trudges inexorably to renewal, indifferent to whether they approach a tranquil rating spa or a bloody rating guillotine.

The model assumes a 100 percent retention rate. Remember that fact, as we'll use it down the road.

Everyone—regulators no less than anyone else—understands this is a flaw in the model. Everyone will go to the spa, and no one will go to the guillotine. But how do you get past this flaw?

In the past, insurers supplied a good dose of common sense.

It is common to charge something other than the actuarial indication, to charge lower rates than the indication demands. Companies do it, and regulators let them.

The figure below is from a rate filing I picked out more or less at random a couple of years ago but shows a situation common in rate filings. The model indicates rates should rise by 4.5 percent, but the company only wants to increase rates 3.0 percent. If everything else in the filing is in order, regulators usually approve this rate change, as happened in this case.

Disposition					
Disposition Date: 03/11/2015					
Effective Date (New): 05/01/2015					
Effective Date (Renewal): 05/01/2015					
Status: Approved					
Comment:					
Company Name:	Overall % Indicated Change:	Overall % Rate Impact:	Written Premium Change for this Program:	Number of Policy Holders Affected for this Program:	Written Premium for this Program:
	5.700%	2.600%	\$169,000	632	\$6,483,000
	17.400%	2.600%	\$898,000	3,649	\$34,492,000
	-3.800%	3.400%	\$1,859,000	15,942	\$54,331,000
	-6.300%	3.200%	\$170,000	1,071	\$5,284,000
	7.500%	2.700%	\$955,000	5,793	\$35,290,000
Overall Rate Information for Multiple Company Filings					
Overall Percentage Rate Indicated For This Filing					4.500%
Overall Percentage Rate Impact For This Filing					3.000%
Effect of Rate Filing-Written Premium Change For This Program					\$4,051,000
Effect of Rate Filing - Number of Policyholders Affected					27,087

The Allstate filing that kicked off the whole optimization controversy was the same way. The models said rates should rise 16.8 percent. Allstate asked for 2.4 percent.

Regulators generally become concerned if a company wants to charge more than the actuarial indication. If Allstate had requested its rates go up 20 percent, say, the company would have had a tougher time.

If the indication says rates should go up a certain amount, regulators reason, companies need to work hard to prove they should go up more. I've talked to regulators who have said they have never approved a request to raise rates by more than the actuarial indication.

To ask for less than the model calls for, however, is routine.

For actuaries, this judgment has a professional underpinning. In property/casualty insurance, pricing actuaries heed the Statement of Principles regarding ratemaking. Among its provisions, it allows actuaries to employ judgment in moving from the actuarial indication to the rate change they ask for. It also notes that actuaries use business judgment. They develop rates as part of a team, with underwriters, claims handlers, senior management and others providing their input.

How does the team decide? In the old days, they used their collective gut, just like the vendor pricing that ballpark brew. We *could* take 4.5 percent, the reasoning would go, but 3.0 percent just *feels* right.

This hasn't been controversial. I'm describing how I filed rates more than 20 years ago; back then regulators recognized the difference between the technical price and the street price. They still do.

Some people would say this collective gut-check is a deviation from cost-based pricing. Actuary Bass argues that the practice is a combination of actuarial and business judgment, thus provided for in the statement of principles. The practice is so tightly wound into cost-based pricing that it too is cost-based.

Either way, it is clear that asking to charge something other than the actuarial indication does not automatically break any laws, nor does it automatically violate any professional standard. The street price can differ from the technical price.

But the actuary's job has just begun.

[An Accident of the Rating Process: Allstate's Cure Explained](#)

October 10, 2016 by James Lynch, part 2 of 3

In Part 1 of this article series, I described cost-based pricing used by actuaries, which includes business judgment—introducing differences between the technical price indication for a book of business and final “street prices” filed with regulators.

Part 2 of a three-part article series.

But pricing actuaries do much more than estimate how much rates should change on an entire book of business. They must estimate the various discounts and surcharges that different groups of customers must pay.

A company might charge \$300 on average for collision coverage in a state. But hardly anyone would pay exactly that amount. Male drivers would pay more in most states. Middle-aged drivers would usually enjoy a discount.

All of those adjustments that take the \$300 average and turn it into the, say, \$278 that you would pay are called rating variables. The system that blends all the variables together—up for male drivers, down for the middle aged, down for those with excellent credit, up for those with a DUI conviction—is known as a classification plan, or class plan for short.

The first auto class plans go back at least six decades, according to a presentation actuary Jeff Kucera made at the Midwest Actuarial Forum in April. The first plans had a handful of variables, maybe a half-dozen.

Actuaries over time have found more and more variables that credibly predict how likely a customer is to file a claim. Today there are hundreds. Married people file claims less frequently than single people. Middle-aged people file less often than young people. Homeowners file less often than renters. (Not all insurers use every variable, and some variables are prohibited in some states.)

It is the actuary's model that teases out all these differences, and it is the actuary's job to prove to regulators that the size and direction of change is appropriate—that young drivers should pay a surcharge of, say, 40 percent, not 140 percent, or that persons with excellent driving records should get a credit of 10 percent, not 15 (all of those are numbers I just made up).

The mathematical models they use to calculate all this differ from company to company. But the discussion before regulators is routine and similar to the dance I just described. For every rating variable, the actuary shows the indication the model came up with (the technical price), then tempers it with reality (actuarial or business judgment) to come up with the street price. If regulators are OK with the difference between the two, they approve the filing, and that's the size of the surcharge (or credit).

The premium every policyholder pays is an amalgam of all those variables. There are so many variables that no two policies have exactly the same set of characteristics. If they did have the same characteristics, they would pay the same rate, something that is unaffected by Allstate's controversial rating plan.

It's amusing to come up with ways that two people might end up with exactly the same rate—identical twins who married identical twins, live across the street from each other, have the same job, the same credit rating and drive cars of the same make, model, year and option package. That would do it.

How likely is that?

If two policyholders pay the same premium, it is almost certainly a coincidence. They got to the same price through vastly different paths.

This tapestry of factors isn't perfect. It has one notable flaw. Bass calls it the reversal.

Reversals happen when all those factors collectively say a person's premium should go down but their premium actually rises. A driver for whom the actuarial indication is a decrease of, say, 4 percent, actually sees their premium rise.

Reversals are an accident of the rating process. They are rare, but they are almost inevitable.

Here is how they happen.

Rate filings have a lot of moving parts. The base rate is rising or falling and so are many—perhaps all—of the rating variables that tailor the rate to the individual risk. The way it generally works, each of those moving parts is subject to the human gut check I described before. All those tweaks can lead to an occasional unintended result: A person whose premium should fall actually sees it increase, or a person whose premium should increase actually sees it fall.

And this is where Allstate's Complementary Group Rating (CGR) model—the controversial one introduced in the first part of this article series—comes in. It promises to eliminate premium reversals.

How this happens is difficult to describe, but to understand the problem and Allstate's solution, it is worth the effort to learn. What follows is a really simple example.

Imagine a state with only two rating territories that we'll call East and West. And there are only two types of vehicles: cars and vans. And further suppose there is one van and one car in the East and one van and one car in the West. (In real life, no company would create separate rates for such a small state. The data set is too small to be useful.)

A traditional rating plan would have two variables: one for territory (East vs. West) and one for vehicle type (car vs. van). In this particular state, let's pretend drivers in the West have a little worse loss experience than drivers in the East. Western drivers should pay 5 percent more than eastern drivers. And van owners have a little better experience than cars. They should pay 5 percent less than car owners. The rating plan needs to reflect all of that.

The total premium each risk pays varies by the different risk profiles. The final premium is:

Base rate x Territory Factor x Vehicle Factor

The chart below shows the base rate, a 5 percent surcharge for the drivers in the West and a 5 percent credit for van owners.

Base Rate: \$100
East—1.00
West—1.05
Car—1.00
Van—0.95

So, a car in the East is assessed $\$100 \times 1.00 \times 1.00 = \100 . That's \$100 times 1.00 for being in the East and times another 1.00 for being a car. A car in the West pays $\$100 \times 1.05 \times 1.00 = \105 . That's \$100 times 1.05 for being in the West and 1.00 for being a car. The western car pays more because in our example western territories have worse loss experience. We can rate the entire four-car portfolio quickly. The result are shown below:

Eastern Car: \$100
Western Car: \$105
Eastern Van: \$95
Western Van: \$99.75
Total for State: \$399.75

The insurance company collects \$399.75 to protect the four risks it writes. The van in the East pays the least, reflecting the fact that it presents the least risk. The car in the West presents the most risk, and its premium reflects that fact.

But suppose the company's actuaries analyze the risks again and find:

- There is no need to change premiums overall. The company collected \$399.75 before. It should collect the same amount now.
- Western drivers got a little bit worse. Eastern drivers got better.
- Car drivers got better. Van drivers got worse.

The actuarial review quantified all those improvements and deteriorations. It recommended a new base rate—\$88.54, much lower than \$100. Western drivers would pay a surcharge of 15 percent, and van owners would pay an extra 10 percent.

The company doesn't fully embrace the actuarial analysis, but it incorporates the analysis into its decisions on how to change the book. It moves all of its rating factors in the direction the analysis suggests. It decides to decrease its base rate to \$96.34—not as much as the actuarial analysis suggested.

The company also decides to surcharge western drivers, but not as much as the analysis calls for. Van drivers will pay a higher penalty, but not as steep as the actuarial analysis recommended. The chart below summarizes the analysis, the rates and the rating factors the company proposes.

	Current	Indicated	Proposed
Base Rate	\$100.00	\$88.54	\$96.34
East	1.000	1.000	1.000
West	1.050	1.150	1.100
Car	1.000	1.000	1.000
Van	0.950	1.100	0.976

There is no premium change overall. The next chart shows what every risk will be charged and that the company will collect \$399.75. And, though I don't presume to know how regulators will handle any filing, it seems likely they would be satisfied with one like this.

	Current	Indicated	Proposed
Eastern Car	\$100.00	\$88.54	\$96.34
Western Car	105.00	101.82	105.97
Eastern Van	95.00	97.39	94.02
Western Van	99.75	112.00	103.42
Total	399.75	399.75	399.75

Yet this plan mistreats half the risks. The western car pays \$105.97, which is more than it currently pays (\$105) and more than what the actuarial analysis called for (\$101.82). In fact, its premium rose when the actuaries said its rates should fall.

The eastern van has the reverse situation. Its premium should rise slightly, according to the actuaries, but the premium actually fell.

The two vehicles have suffered a premium reversal. Their premiums are going the opposite direction of what the actuarial model called for.

With just two variables that can each have only two values, this is not a complex rating plan. A typical classification plan filing can have dozens of variables that can each have several values. Probably every class plan change filed in America has at least one reversal and perhaps far, far more.

Reversals had been an unintentional, unavoidable consequence of the rating system. In our example, it's easy to find the aggrieved risks because we are only looking at two rating variables and four policies. A large company in a large state has dozens of rating variables and, perhaps, millions of policies. There are undoubtedly reversals, but for decades the industry lacked the computing power to find them.

We also lacked the computer power to fix them. They are the unfortunate result of a detailed process.

Probably every class plan change filed in America has at least one reversal and perhaps far, far more.

One way insurers handle unusual situations is to cap premium changes. To prevent rate shock, a company would file a premium cap of, say, 25 percent. If some confluence of rating factors hiked premium by, say, 75 percent, the increase would be capped at 25 percent.

That is fairly easy to program. The company loads its new rating factors into its systems. The computer compares the new premium with the old. If the premium rises too much, a cap settles in.

It's a crude response, but it sledgehammers away some of the imperfections of the old system.

It is much harder to find and correct reversals. Not only do you need the old rating factors and the new rating factors; the latest actuarial analysis has to be poured into the computer as well.

This is where Allstate's CGR plan comes in. It checks for premium reversals as part of the actuarial analysis and sets up a way to eliminate them. It is an additional factor that knocks the indicated rate into place, to be consistent with the actuarial analysis. The charts below show how it might work.

	Current	Indicated	Proposed
Base Rate	\$100.00	\$88.54	\$96.34
East	1.000	1.000	1.000
West	1.050	1.150	1.100
Car	1.000	1.000	1.000
Van	0.950	1.100	0.976

	Current	Indicated	Proposed	CGR Factor	Post CGR Rate
Eastern Car	\$100.00	\$88.54	\$96.34	1.000	\$96.34
Western Car	105.00	101.82	105.97	0.988	104.67
Eastern Van	95.00	97.39	94.02	1.015	95.43
Western Van	99.75	112.00	103.42	0.999	103.32
Total	399.75	399.75	399.75		399.75

The final premium is the proposed premium times the CGR factor. For the western car, for example, that would be \$105.97 times 0.988, or \$104.67.

At the bottom righthand corner of the chart, you can see the company generates the premium it thinks it needs: \$399.75. And the proposed rate for each risk falls in between the current rate and the actuarial indication.

There are no reversals.

Now, I solved this simple, make-believe problem using Excel and its Goal Seek tool, which lets you work your way backward from the solution you want to the variables that will get you there. (The tricky part was getting the rate for the eastern van in between \$95 and \$97.39.)

In the real world you would check every possible combination of premiums where each risk is charged an amount in between the current premium and the actuarial indication. Then you'd pick out the combinations that satisfied the other parts of your rate change—the rating factors would fall in the range established by the actuarial analysis (between 0.950 and 1.100 for vans, for example), and the plan would hit management's premium goal (\$399.75).

It's a complex problem even in my little example. You are fitting three sets of constraints:

1. The individual premiums have to fit their ranges. The western car has to fall between \$99.75 and \$112.00, for example.
2. The rating factors have to fit their ranges. The western factor must be between 1.050 and 1.150.
3. And the sum of the individual premiums has to hit management's premium goal: \$399.75.

The possibilities grow with the complexity of the rating system. Irene Bass, a former Casualty Actuarial Society president and a former member of the American Academy of Actuaries' board of directors, looked at a plan only slightly more complex than I've portrayed here (at Allstate's request)—three territories and three rating factors—and came up with one octillion possibilities (10^{27} to the mathematically inclined).

That's a big number. Since the Big Bang, light has traveled about half that far, in feet.

A real-life rating plan would generate an even more stupefying number—one of those numbers so large that if it measured time, monkeys could rewrite Shakespeare at leisure.

But even in my simple plan, there is more than one solution. Witness the alternative below. (You don't have to look much at the chart. It's only here to show there is more than one solution.)

	Current	Indicated	Proposed	CGR Factor	Post CGR Rate
Eastern Car	\$100.00	\$88.54	\$96.34	1.000	\$96.34
Western Car	105.00	101.82	105.97	0.973	103.08
Eastern Van	95.00	97.39	94.02	1.014	95.29
Western Van	99.75	112.00	103.42	1.016	105.04
Total	399.75	399.75	399.75		399.75

Neither of the two solutions is better than the other. Each would generate the total premium the company wants. In each plan, every risk would pay an actuarially sound rate—something between the current rate and the result of the actuarial analysis. No one would suffer a premium reversal—paying more when the data suggest they should pay less.

These plans are tied.

If I just slogged through the spreadsheet, I could probably assemble a dozen plans that would tie these two. That would give me a 14-way tie. A complex plan covering, say, a good chunk of Allstate's Wisconsin business, might have thousands—a veritable logjam of plans, all equally valid.

A computer could find them easily enough. It wouldn't actually look at every combination. It would be programmed to use the results of one iteration to select a new combination using an (here comes that word) *optimization* routine.

It would end up with several sets of rating plans, all of which are actuarially sound and all of which contain rates that for every consumer would never be excessive, inadequate or unfairly discriminatory.

From an actuary's point of view, all of those plans would be tied. And with no reversals, all of those plans would be better than a traditional rating plan.

But a company can only file one out of thousands of possibilities. How should the company break the tie?

Well, no one would assemble the product management team to sift through the portfolio risk by risk. It would take too long—way too long—*comically* way too long.

Allstate's approach: Give the computer a rule to follow and let it break the tie.

Allstate's rule: Use the set of rates that maximize retention for the overall book. Take the rates that keep as many customers as possible.

And how do you teach a rule to a computer? You give it some variables to examine. Allstate's tiebreaker is a retention score, a set of retention rules that combine a host of policy characteristics. All of the information is from the company's own data. None of it is big data, that is, sourced outside the company. There can even be risk-based variables in the score. For example, the retention score could be based on a driver's age or gender, where the law allows.

And there is the controversy. Instead of gathering the product team to add that late dose of common sense to the actuarial model, it has introduced cold, mathematical logic. It has created a rule, and that rule takes the form of a variable, and that variable helps set the rate. That variable is not necessarily tied to risk.

And organizations like the Consumer Federation of America and the Center for Economic Justice saw Allstate's actions as price optimization. By using a variable unrelated to cost—even to break a tie and in Allstate's eyes to improve how rates are made—the consumer advocates said the insurer was hooking customers up to a money-milking machine. Allstate was going to surreptitiously drain their wallets. It was going to price-gouge.

"The purpose of price optimization is to extract as much profit as possible from policyholders, who are often required to purchase insurance policies," according to a [February 2015 press release](#) from the Consumer Federation of America.

Is that what Allstate is doing?

In Part 3, Lynch brings all the concepts together to conclude that Allstate's CGR is not price optimization.

[Not All 'Optimization' Is Price Optimization; Allstate's CGR Proves It](#)

October 11, 2016 by James Lynch, part 3 of 3

"The purpose of price optimization is to extract as much profit as possible from policyholders, who are often required to purchase insurance policies," according to a [February 2015 press release](#) from the Consumer Federation of America.

Part 3 of a three-part article series.

Is that what Allstate is doing with its Complementary Group Rating?

We've spent more than 4,000 words in Part 1 and Part 2 of this article series learning how Allstate's plan operates. We followed the reasoning of actuary Irene Bass, a former Casualty Actuarial Society president and a former member of the American Academy of Actuaries' board of directors. Let's put that effort to good use.

First, the CGR plan does not maximize profits. It maximizes *retention*. Remember all those paragraphs ago (in Part 1) when I asked you to remember that the standard actuarial model assumes that all risks renew no matter how much their rates go up? And if all risks renewed, the model indicated that the company would achieve a certain profit level. And that profit level was the return on equity approved by the regulator.

Allstate's rating method does something more sophisticated. It understands that some risks will not renew after a rate change. It looks at several sets of rating plans, all of which promulgate fair rates. It tries to figure out which set will give the highest level of retention. In other words, it determines which plan is most like the 100 percent retention assumed by the actuarial model.

The overall profit that results is disclosed in the rate filing. If that profit is too high, the regulator will reject the filing. The only way the insurer can make excessive profits is if the regulator approves the filing. Saying that insurers are maximizing profits or price-gouging, in this case, is akin to saying regulators aren't doing their jobs. There is no evidence that is happening.

Second, the plan doesn't price-gouge individuals. If the actuarial models say a policyholder requires a 10 percent increase for the insurer to make a reasonable profit, then that policyholder will see an increase of, at most, 10 percent. That just isn't price-gouging.

When the model calls for an increase, the premium the policyholder pays is never more than what the actuarial model says that customer should pay. It is hard to price-gouge someone when they are being charged less than what the actuarial model suggests they should pay. (A person for whom the model calls for a decrease sees the opposite situation.)

Allstate's plan actually seems to improve on the standard ratemaking methods, which can inadvertently result in reversals. Remember in the standard methods, a customer who should see lower rates might see them rise, an inevitable consequence of what has been the state of the actuarial art.

Third, it doesn't charge each customer the most he or she is willing to pay. It charges a rate that maximizes the retention across the entire portfolio. One individual might be willing to pay more than Allstate wants to charge, but that rate would be part of an overall plan that resulted in fewer customers. So that customer is actually charged less than what he or she might tolerate.

Actuary Bass summed up the argument, writing that Allstate's plan "reflects business judgments that have always been a part of accepted, sound actuarial ratemaking; but...does [them] better by making sure there are no rate reversals that result from judgmental adjustments to the rating factors."

Bass' main point, I think, is that there should be no professional or regulatory qualms about letting a computer replace the old "gut-feel" ratemaking adjustment with a sophisticated, quantitative technique—particularly when the latter results in fairer rates for everyone.

More formally, she concludes that Allstate's plan:

- Is cost-based, not value-based, which makes it consistent with actuarial ratemaking principles.
- Complies with applicable requirements of regulators and the actuarial profession.
- Is not consistent with the key principles of price optimization, because it doesn't maximize prices or profits.

I've presented my thoughts on this topic a number of times over the past two years. There are, I think, three questions to consider:

First question: Is there something wrong with charging something other than the actuarial indication? I think most consumers believe the rate they pay appears fully formed out of a complex model. That was never the case, but that mistaken belief has driven much of the discussion, I believe. Consumers thought the traditional actuarial model—at least how they understood it—might be complex, but it resulted in a fair rate. They fear that introducing a subjective element, an adjustment not based on risk, will be unfair.

It was this point that the Consumer Federation of America pushed. CFA representatives said insurers were using price optimization "to increase premiums on certain customers despite no increase in risk associated with those policyholders" and that the practice "invariably and unquestionably leads to unfair discrimination and illegal rates."

CFA's concern, as given, appears to object to everything up to and including the normal tweaking that insurers have done for decades.

The earliest regulators to consider the issue expressed the same sorts of concerns. In May 2015, as the controversy broiled, Florida called out any modification to a rate that would "maximize insurer retention, profitability, written premium, market share or any combination of these." On a cursory reading, that seems to be precisely what companies have always done.

The actual case, at least regarding Allstate's plan, appears to be the opposite of what advocates fear. Gut-feel adjustments to the actuarial rate can create reversals, which are inadvertently unfair. Allstate's plan promises to eliminate them.

It seems ironic, but the plan that consumer groups find unfair could actually be more fair than the tactics the consumer groups are defending.

Second question: Is there something wrong with a computer taking on a task that humans used to perform? Once the question is asked, the answer seems obvious. We've spent much of the past half-century handing jobs to computers. I wrote this story on a computer. You are likely reading it on a computer.

The introduction of the PC and the spreadsheet has moved computers to the center of ratemaking. It seems odd to suggest this one step should remain arbitrary and imprecise.

Allstate's plan hands the gut-feel adjustment to a computer and gives the machine a rule to follow. The machine operates efficiently and fairly. It finds solutions that don't have reversals and finds the option that the company believes will keep the most customers.

Finally: Is there an issue with the variables that insurers use to make the final adjustment?

Regulators have always had to ensure that insurers don't use variables that shock the sensibilities. States differ in what rating variables they allow. Pennsylvania, for example, prohibits gender-based rates. They would presumably prohibit using them at the tie-breaking stage as well.

In some ways, this examination of rating plans like Allstate's is a new regulatory reach. Regulators had the right to question the step a company took from the actuarial indication to the final rate, but they didn't exercise it often. Remember that the step was amorphous, the result of a confab of actuaries, underwriters and the rest of the product management team. It would have been onerous and likely pointless to delve too deeply into what went into that step.

Now the adjustment is backed by mathematical rigor, and it is not surprising that regulators want to know what gives the calculation its backbone.

It's the variables that have fueled the price optimization firestorm and sucked Allstate's plan along.

Ohio regulators, in their bulletin restricting price optimization, listed variables they objected to, though they did not mention what company used any of them:

- Whether a customer has complained about a policy.
- The size of prior rate changes in auto policies.
- The size of prior rate changes in homeowners policies.

Pretty clearly the variables had the potential to shock the senses of some consumers.

Though every state has its own approach to regulating any issue, there are some signs that regulators' stance has softened as understanding of the practice has grown. Contrast what Florida proscribed—seemingly any adjustment to an indicated rate—with Missouri's action eight months later. Missouri's bulletin seems more measured. It said optimizing techniques could "potentially" violate insurance laws. It decried adjustments based on the "propensity to shop for insurance...ask questions or file complaints."

It said insurers should review the state's rating laws and reminded them they are "responsible for any model or program they utilize" and that rates should not be excessive, inadequate or unfairly discriminatory.

Illinois saw even less to worry about. In January 2016 it decided no action was necessary.

"Illinois has a highly competitive auto and homeowners insurance market," acting Insurance Director Anne Melissa Dowling said in a statement to A.M. Best's News Service. "I would be delighted to host any members of the consumer organizations to visit with me, in person, to share the data they cite as it is inconsistent with what I have reviewed." (Best's News Service, Jan. 7, 2016, "Illinois Insurance Regulators Decline to Take Action on Price Optimization, Draw Fire From Consumer Groups.")

It is impossible to say what the other 30-plus states will do, but there seems to be less urgency as time passes.

Nonetheless, it seems unfortunate that the price optimization debate focused on a matter settled long ago—adjusting actuarial indications into the real world—and scorning what appears to be an improvement on the standard method.

The lesson here seems to be that everyone—consumer advocates, regulators, the news media—should avoid a headlong rush to judge such a complex and delicate process as insurance rating. The public would seem to be best served when all parties proceed judiciously, taking time to understand a process thoroughly and isolating what parts might be objectionable and why, before condemning the whole.