American Academy of Actuaries

Issue Brief

Consumer Cost of Automobile Insurance

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Key Points

- Actuaries are directly involved in the development and pricing of the automobile insurance product, which gives us a chance to share our unique perspective.
- Increased availability of data and technology has advanced pricing sophistication over the years, resulting in lower premiums paid by many consumers.
- Consumers can impact the price they pay for automobile insurance based on factors such as how safely they drive, deductibles they select, or types of automobiles they operate.

Automobile insurance is a necessity for the vast majority of consumers. However, it is also a product that can be confusing in terms of what it provides and how it is priced. Actuaries are directly involved in the development and pricing of the automobile insurance product, and as such, it gives us a chance to share our unique perspective.

This issue brief provides some of those insights:

- Concept of Insurance and Common Auto Rating Factors
- Ways Consumers Act to Control the Amount They Pay for Insurance
- Insurance Company Cost Drivers
- Impact of Predictive Modeling on Prices for Auto Insurance

Automobile insurance is a highly regulated industry, with state departments of insurance (DOIs) providing oversight of prices that insurance companies charge. The National Association of Insurance Commissioners (NAIC) website provides contact information to state DOIs, which consumers may also find useful.

Concept of Insurance and Common Auto Rating Factors

Background

The concept of insurance, in one form or another, dates back to ancient times. In its infancy, insurance was often used to protect the goods of merchants that were being transported across bodies of water. Insurance provides a level of certainty and predictability for individuals and businesses looking to mitigate some of the risks that they face. In its simplest form, this certainty is achieved by paying a fixed cost (or premium) to another party—an insurance company or similar risk-bearing entity—to take on the risk that the individual or business does not want to take on themselves.

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The insurance company is able to take on the risks from many individuals and businesses due to the concept of diversification. Insurance companies achieve diversification in their portfolios by underwriting, or targeting, risks that will not all suffer a loss at the same time. For instance, it would not be prudent for an insurer to write physical damage coverage on automobiles in just one city due to the risk of a single storm causing a loss on most of the insured vehicles. Rather, insurance companies will often fill their portfolios with policies from various, noncorrelated coverages and/or geographic territories.

The first automobile insurance policies were written around the turn of the 20th century. Auto insurance policies cover damage to one's own vehicle as well as bodily injury and property damage to another party caused while operating the vehicle. It can also cover the bodily injury of anyone in a vehicle, should this coverage be included in a policy. This type of coverage is often optional but is required by no-fault laws in certain jurisdictions where coverage is provided regardless of the party that was determined to be at fault in an accident.

Auto insurance rating has become increasingly sophisticated in recent years. This is largely resulting from an increase in computing power available to handle complex models and the vast amounts of data currently available that help identify the impacts and trends of various driver and vehicle characteristics, or rating factors, on auto insurance losses. While there is critical review by some of rating factors, this additional sophistication has generally been a benefit to many consumers as it has allowed insurance companies to better match price to risk, which has resulted in lower premiums paid for insurance by a large percentage of consumers.

Rating Factors

Automobile insurance policy pricing relies on rating factors to assess the exposure to loss associated with an insurance policy. These factors are used to separate the lower risk drivers and vehicles from the higher ones, and largely form the basis of what an individual is charged on an auto insurance policy. Common rating factors used to price automobile insurance policies include:

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- Driver age and/or years of driving experience
- Gender
- Marital status
- Driving record (tickets and accidents)
- Claims history
- Miles driven
- Vehicle make and model
- Location
- Credit-based insurance score
- Length of time with a company
- Multiple vehicles or multiple products insured
- Type and level of coverage insured

The factors are used within insurance company rating models to produce a policy premium. Rating factors that indicate a higher exposure to loss will generate a larger insurance premium (e.g., young driver with prior claims) while a lower exposure to loss will generate a lower insurance premium (e.g., experienced driver with no prior claims).

Ways Consumers Act to Control the Amount They Pay for Insurance

There is much variability in insurance pricing between insurance companies, and prudent consumers shop around to make sure they get the coverage and price that best suit them.

Consumers have the choice of selecting the types and amounts of coverage provided by their policy as long as they meet their state's minimum financial responsibility limits.[1] For example, they could select the limits they need for liability coverage. Additionally, customers can determine how much of a physical damage loss they are able to or want to absorb. If they have the option to select a higher deductible, that will generally lower their premium. If a consumer does not need physical damage insurance on an older vehicle for example, they could decide to not purchase physical damage coverage for that vehicle.

Consumers with good driving records generally have lower rates. Driving violations and at-fault accidents, particularly recent ones, typically increase premiums.

Additionally, consumers can get lower rates by responsibly handling their finances. Most automobile insurers use a credit-based insurance score in rating because this information is highly predictive of future claiming behavior.

1 Insurance Information Institute website.

Consumers with low mileage and safe driving habits may find that an insurance product that relies on telematics will result in a lower premium. With telematics, a device or an app will capture information about how the driver is performing. For example, is the driver frequently braking hard or accelerating quickly? Telematics may also detect whether the driver is using a cell phone while driving. Telematics rating plans often adjust the price paid based on mileage driven, similar to a "pay per mile" rating plan that some insurers have.

Premiums also depend on the vehicle a customer is insuring. Prudent consumers keep this in mind when shopping for a new or replacement vehicle. Some vehicles are less expensive to fix or replace. Some vehicles have safety features that help to prevent accidents.

Many companies offer a variety of discounts. Common discounts include multi-policy discounts (for those insuring both their home and their car) and good student discounts for youthful drivers. Prudent insurance consumers look into these discounts to make sure all discounts for which they are eligible are being applied.

Insurance Company Cost Drivers

Insurance, including automobile insurance, is unlike many typical consumer financial products because the final cost of the product to the company is unknown at the time it is sold to the consumer. Auto insurance prices are developed prospectively. That is, future costs are estimated using a variety of data and actuarial methods. As described in an earlier section of this brief, "Concept of Insurance and Common Auto Rating Factors," there are many rating factors that are considered when developing the price that an individual consumer pays for their auto insurance coverage. But, what about the overall cost components that also underlie that price? An actuary would consider several aspects to determine what the price paid should be.

Frequency of claims: The money that automobile insurance companies pay to policyholders from covered claims make up the vast majority of costs for an insurance company. This can be from events like car accidents, hail storms that damage vehicles, thefts of cars, and the like. One of the components of such costs is how often those events occur, or the frequency. Geographical areas or other customer segments that have more claims are said to have a higher frequency. If the frequency of claims increases—for example, due to increased traffic congestion, more cases of distracted driving, etc.—the cost to companies increases. And, therefore, this increased frequency translates into increased prices that the impacted consumer would pay for coverage. Deductible amounts selected by insureds (the amount of the claim the insured must cover) influence insurance company frequency as well.

Severity of claims: The other main component that makes up the total cost of claims is the average amount of the claim, or the severity. Different types of claims can have vastly different severities. For example, while slowly backing into a light pole in a parking lot may only result in a small-dollar claim, a serious accident with injuries can cost tens of thousands of dollars or more. Many economic factors can impact the severity of claims, such as cost inflation of repair parts, inflation related to health care, or greater numbers of lawsuits with increasingly large awards (often referred to as "social inflation"). Driving at higher rates of speed can also influence claim severity amounts. Also, as people buy more expensive vehicles, the cost to repair these vehicles impacts the severity of claims. As these average claims costs go up or down, that also directly impacts the prices that consumers pay for insurance.

Expenses: It is important to recognize that not all of the costs to auto insurers are due to claims. A portion of the cost is due to expenses unrelated to accidents such as the costs of running insurance companies themselves. These include things like salaries of employees and rents and mortgages on buildings. Other expenses include commissions paid to insurance agents or brokers for the sale of the product. These amounts vary by company, but approximately 20% of premium is these types of expenses on an industry-wide basis. Just as with consumers, as costs of goods change, the costs of expenses an insurance company incurs also change.

Investment income: Typically, an insurance company invests premium dollars collected when they are not being needed to cover costs from claims or expenses. This provides a way for companies to help keep prices down for consumers. When investment income changes, either up or down, the overall revenue that the company takes in changes, and can have a direct impact on the price of auto insurance.

Other cost drivers: There are also a variety of other cost drivers that impact the price that a consumer pays for automobile insurance. One of these is the presence of uninsured drivers on the road. The percentage of estimated uninsured drivers varies greatly by state, with some as high as 20% or more.[2] A reduction in this percentage can have a favorable impact on the price that insured drivers pay for coverage. Another cost driver is fraud. Some estimates place the cost of nonmedical insurance fraud in the United States at over $40 billion per year.[3] This translates to potentially an additional hundreds of dollars in premiums that households pay annually due to this problem. Insurance companies endeavor to detect and combat fraud. Success from these measures can have a direct, favorable impact on the price paid for coverage.

Impact of Predictive Modeling on Prices for Auto Insurance

A model can be defined as a simplified representation of real-world events using mathematical concepts. A model uses data to calculate an outcome that is then used to help arrive at a decision in a business context. Many insurance companies incorporate predictive models as part of their operations including for pricing, underwriting, claims handling, or marketing. Sometimes, models used for insurance are confused with use of credit scores, which typically measure a consumer's creditworthiness or ability to get loans from banks. While insurance company models may also use credit information, they are not typically the same thing. In particular, an insurance model that is used for auto pricing is measuring the likelihood of the consumer to have insurance claims and the costs of those claims. That is, because auto insurance pricing is prospective, models help an insurance company estimate the future cost for a customer. These types of models are very important for an insurance company in helping to set auto insurance prices.

Predictive models have been used by insurance companies as part of auto pricing for several decades. However, in more recent years—driven by advances in technology and data as well as the highly competitive nature of the automobile insurance industry—models have been increasingly used and have become more sophisticated. By themselves, models do not drive prices up or down. Instead, they facilitate insurers' differentiation of higher-risk versus lower-risk consumers. They are used to more accurately segment auto insurance customers to match the price that a consumer pays to their expected insurance cost. While this means that based on their risk, some consumers pay more than they would in the absence of modeling, it also means that many consumers pay less. An additional effect that use of models have had is greater availability of auto insurance overall, because companies can do a better job of estimating the costs that a consumer will have.

2 Insurance Information Institute.
3 FBI statistics.

While predictive models have been characterized by some as mysterious "black boxes," there are many controls in place to help ensure their quality and accuracy. Most states require auto insurance rates to be filed and either undergo regulatory review or be subject to regulatory approval. As part of this oversight, the models used to determine prices may also be reviewed. In addition, many states have laws regarding information that cannot be used in predictive models for insurance, such as certain types of claims or credit factors. Insurance companies will often have internal practices to ensure that the results of the models built are reasonable, correct, and have a strong relationship to projecting the costs of future claims. This allows models to differentiate the price that consumers pay in a way that is not unfairly discriminatory. Finally, professional standards exist that actuaries must follow as they build and use models, and do so with appropriate care and have the necessary expertise.

In summary, predictive models are important to the pricing of auto insurance to better match expected claims costs incurred by companies to the prices that consumers pay. While by themselves they do not increase or decrease prices in total, they help provide lower rates for many, leading to increases for others based on their risk of future claiming behavior. They also have had the impact of expanding availability of coverage for consumers.