

# **A GENERAL DESCRIPTION OF COMMERCIAL AUTOMOBILE RATEMAKING METHODOLOGY**

**Act No. 262 of the 2019  
Regular Session of the Louisiana Legislature**



**Louisiana Department of Insurance  
Baton Rouge, Louisiana  
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# PURPOSE

## Act 262

This description of Commercial Automobile ratemaking methodology is hereby provided by the Louisiana Department of Insurance (LDI). It is required by Act No. 262 of the 2019 Regular Session of the Louisiana Legislature and enacted as La. Revised Statutes (R.S.) 22:1290.1 (Act 262).<sup>1</sup> Specifically, Act 262 requires the Commissioner to “post on the department’s website a general description of the ratemaking methodology that the Commissioner permits insurance companies to use in establishing automobile insurance rates for commercial motor vehicles.”

## Scope

Beginning on January 1, 2020, the provisions of Act 262 shall apply to all insurance companies (insurers) authorized to write automobile insurance in Louisiana. For purposes of Act 262, “Commercial Automobile insurance” means insurance for a commercial motor vehicle, which is defined as “a motor vehicle or combination of motor vehicles used in commerce to transport passengers or property if the motor vehicle meets one of the following requirements:

- (a) Has a gross combination weight rating of twenty-six thousand one or more pounds inclusive of a towed unit with a gross vehicle weight rating of more than ten thousand pounds.
- (b) Has a gross vehicle weight rating of twenty-six thousand one or more pounds.
- (c) Is designed to transport sixteen or more passengers, including the driver.
- (d) Is of any size and is used in the transportation of materials found to be hazardous under the provisions of the Hazardous Materials Transportation Act which requires the motor vehicle to bear a placard under the provision of the Hazardous Materials Regulations (CFR 49 Part 172, Subpart F). This shall not include hazardous materials used in agricultural movements as defined in this Chapter.”<sup>2</sup>

## Act 262 Data

Act 262 requires insurance companies writing automobile insurance to annually, on or before May first, submit to the LDI, by ZIP code and parish,

1. the total amount of direct paid losses less all deductibles on claims involving commercial motor vehicles,
2. the number of commercial motor vehicle policies written, and
3. the direct written premiums for insuring commercial motor vehicles.

Act 262 data is displayed on an aggregated basis on the LDI’s website for all companies reporting for the prior calendar year.<sup>3</sup>

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<sup>1</sup> For reference, see Act No. 262 of the 2019 Regular Session of the Louisiana Legislature or follow this link: <http://www.legis.la.gov/Legis/BillInfo.aspx?i=236428>.

<sup>2</sup> For reference, see La. R.S. 32.401(6).

<sup>3</sup> To access the data, visit the LDI website at <https://ldi.la.gov/industry/regulatory-forms/act-262>

Caution: Act 262 Data Not Sufficient for Ratemaking. Though the reported Act 262 data is of great informative value, it is not sufficient to determine the actuarial adequacy of rates charged in Louisiana or any sub-geographic part of Louisiana. It is important to be careful when drawing conclusions from the reported data. The following are important, though not all inclusive, considerations:

1. For the sake of simplicity, loss adjustment expenses, operating expenses, profit, risk load and reinsurance costs are not considered in the data presented.
2. Surplus lines insurers (approved non-authorized insurers that write hard-to-insure businesses) are not regulated by the LDI and are not subject to Act 262 data reporting requirements.
3. The data reported under Act 262 is as reported by the insurance companies. The LDI and the insurance companies have taken steps to ensure the reasonableness of the reported data. However, there may be undetected inconsistencies with regard to how premium and loss were assigned to vehicle location by zip code and parish. An example is one company may use geo-coding to assign the location of an insured vehicle while another company may use mailing address.

## TYPES OF INSURANCE

There are three main types of insurance available to individuals or businesses. They are life insurance, health insurance and property and casualty insurance (property/casualty). Property/casualty insurance represents insurance against loss to property or against loss for which an insured may be found liable. Property/casualty has two main segments: personal lines and commercial lines. Personal lines represents policies sold to individuals, or families and households, the most common being private passenger automobile and homeowners insurance. Commercial lines represents policies sold to businesses, such as commercial automobile, workers' compensation, general liability, and commercial property.

### Commercial Automobile

Automobile Liability coverage protects the insured against financial loss because of legal liability for motor vehicle-related injuries (bodily injury and medical payments) or damage to the property of others caused by accidents arising out of ownership, maintenance or use of a motor vehicle.

Automobile Physical Damage coverage (including collision, vandalism, fire and theft) insures against material damage to the insured's vehicle.

"Commercial" is defined as all motor vehicle policies that include vehicles that are used primarily in connection with business, commercial establishments, activity, employment, or activities carried on for gain or profit.<sup>4</sup>

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<sup>4</sup> 2018 NAIC Annual Statement Instructions for Property and Casualty Insurance.

# ACTUARIAL SCIENCE

Actuarial science is the quantification, analysis and management of future contingent risk and that risk's financial consequences. Ratemaking is the process of establishing rates used in insurance or other risk transfer mechanisms. The estimation of costs associated with the transfer of risk from the insured to the insurer encompasses costs such as claims, claim settlement expenses, operational and administrative expenses and the cost of capital.<sup>5</sup>

## Actuaries

An actuary is a business professional who deals with the measurement and management of risk and uncertainty. The name of the corresponding profession is actuarial science. The risks analyzed by actuaries can affect both sides of the balance sheet, and require asset management, liability management, and valuation skills. Actuaries provide assessments of financial security systems with a focus on their complexity, their mathematics, and their mechanisms.<sup>6</sup> Most actuaries work in the insurance field managing the risks underlying property/casualty insurance, life insurance, health insurance and pension systems.

## Actuarial Societies

Property/casualty insurance (of which Commercial Automobile insurance is a part) has its own professional society, the Casualty Actuarial Society (CAS). For life, health and pension, the Society of Actuaries (SOA) is the counterpart of the CAS. The CAS and SOA represent the primary educational bodies of the actuarial profession. There is also the American Academy of Actuaries (AAA). The AAA is a professional association whose mission is to serve the public and the U.S. actuarial profession. Academy members include corporate executives and staff, regulators, consultants, academicians, and retired actuaries.

## Ratemaking vs. Reserving

**Ratemaking.** Ratemaking is one of two key activities performed by actuaries in property/casualty insurance. Ratemaking involves the estimation of the premium to be charged the policyholder to transfer risk from the policyholder to the insurer for a specified policy period. Ratemaking involves quantitative analysis of the numerous risk characteristics underlying an insurance program.

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<sup>5</sup> Casualty Actuarial Societe: State of Principles Regarding Property and Casualty Insurance Ratemaking.

<sup>6</sup> Trobridge, Charles L. (1989). "Fundamental Concepts of Actuarial Science" Revised Edition. Actuarial Education and Research Fund. Retrieved June 28, 2006.

The goal of ratemaking is to assure that the insurance transaction is appropriately balanced. In other words, the rates should be set so that the premium is expected to cover all costs and achieve the target underwriting profit. This is covered in the second principle of the CAS *Statement of Principles Regarding Property and Casualty Insurance Ratemaking*.<sup>7</sup> The Casualty Actuarial Society's Committee on Ratemaking Principles states "A rate provides for all costs associated with the transfer of risk."<sup>8</sup>

**Reserving.** Reserving involves the estimation of monies that need to be set aside, as liabilities on an insurer's balance sheet, to cover future claim payments arising from policies which have already been written. A claim reserve is a provision composed of five elements:

- Case reserve;
- Provision for future development on known claims;
- Reopened claims reserve;
- Provision for claims incurred but not reported; and
- Provision for claims in transit (incurred and reported but not recorded).

This document will not discuss the actuarial concepts and techniques used in setting claim reserves as the primary focus is ratemaking.

## RATES

An insurance product filed with the LDI contains three components: rates, rules and forms. The rates can be thought of as a matrix of prices for the various risk characteristics considered by the insurer. The rules are generally intertwined with the rates and disclose such things as discounts, surcharges, fees, premium calculation formulas, and cancellation procedures. The forms are the policy documents which define the coverages provided for the premium charged. Forms include the specific language of the basic policy and its endorsements.

### Rate Components

Fundamentally, the rates need to cover three items:

- Claims to be paid by the insurer (including claim adjustment expenses)
- Expenses of operating the insurance program
- A reasonable return on invested capital (profit)

When a rate reasonably reflects these components for a given risk, the rate is said to be actuarially justified.

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<sup>7</sup> Casualty Actuarial Society, adopted by the Board of Directors of the CAS May 1988;  
<http://www.casact.org/professionalism/standards/princip/sppcrate.pdf>.

<sup>8</sup> Basic Ratemaking, Geoff Werner, FCAS, MAAA and Claudine Modlin, FCAS, MAAA, VERSION 4, OCTOBER 2010, © Copyright Casualty Actuarial Society, 2010.

Insurance is a Business. It is important to keep in mind that insurance is a business. Like all businesses, an insurer must balance the dollars that flow into the company with the dollars that are expected to flow out of the company. In this context, part of the outflow is a reasonable profit. This profit is essential to attracting the capital needed to support the insurer's operations and provides a safety margin in the event that losses are higher than expected, such as in the event of catastrophe.

Dollars In = Dollars Out. The fundamental insurance equation that needs to be maintained is the equality of dollars in and dollars out of the insurance operation:



Fees collected can include billing installment fees, policy fees and other types of fees. Investment income is earned on the capital invested in the company as well as on the policy cash flows, e.g., the lag between the time premiums are collected and the time that claim costs and operating costs are paid.

When setting rates, the actuary generally tries to strike a delicate balance between the insurer's interests and the policyholder's interests. That is, the rates need to be high enough for the insurer to cover its costs, and yet low enough to be affordable to the policyholder.

Rates as Estimates. As stated in the CAS's *Statement of Principles Regarding Property and Casualty Insurance Ratemaking*, rates are estimates of future costs. In catastrophe-prone states such as Louisiana (which is subject to flood, hurricane, tornado, and hail), the estimation of future costs must contemplate catastrophic events. Catastrophe costs include the expected loss caused by the peril under consideration, reinsurance costs to protect the insurer and the cost of increased capital required to maintain solvency after a high-severity event.

# LOUISIANA REGULATION OF INSURANCE

In the U.S., property/casualty insurance is regulated by the respective state regulatory body (generally referred to as the “insurance department” of each state). The Louisiana Department of Insurance (LDI)<sup>9</sup> serves a variety of functions, including looking after the best interests of the public, regulating the insurance product, monitoring insurer solvency, and handling consumer complaints.

## Rating Laws

The various states have different rating laws in effect for property/casualty insurance rates. Some states, including Louisiana, have a “prior approval” rating law. Prior approval is the strictest of rating laws and means that an insurer must obtain approval from the insurance department prior to implementing the new rates. Some states have a “file and use” law, which means that the insurer can start using the new rates after filing them, but may have to make amends if the rates are subsequently disapproved. Other states have a “use and file” law, which is similar to file and use except that the insurer has a certain number of days (e.g., 30 days) to make a filing after implementing the new rates. A small number of states have a “no file” law, generally meaning that filing material need only be kept at the insurer’s offices and available for inspection by the insurance department upon request.

## Rate Standards

Most states, including Louisiana, have called for actuarially justified rates by legislating statutes requiring that rates be “not excessive, inadequate or unfairly discriminatory.” Rates meeting this standard are said to be “actuarially justified,” i.e., aligning closely with the costs associated with the transfer of the risk under consideration.

**Excessive Rates.** The public does not want excessive rates because that means the insurer will make too much profit at the expense of the consumer and the insurance coverage may be unaffordable. In a competitive market, an insurer with excessive rates will not attract consumers because the consumer will tend to shop and find lower-priced insurance with a different insurer.

**Inadequate Rates.** The public does not benefit from inadequate rates, i.e., rates below those that are actuarially justified. Inadequate rates can undermine the competitiveness of the market, can result in insufficient premium being collected and may lead to insurer insolvency. Insolvency means the insurer will not have the cash to pay claimants or to return any unearned premiums due the policyholders. In addition, inadequate rates reduce the incentive for insurers to want to write business in a given state as the insurer would lose money with each policy written.

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<sup>9</sup> The LDI’s web site is <http://www.lidi.la.gov>.

**Unfairly Discriminatory Rates.** Insurance premiums charged are designed to recognize differences in risk, i.e., loss potential. One of the state’s primary regulatory purposes is to ensure that consumers with similar risk characteristics are charged a similar rate. There are a few risk characteristics that are banned from use in ratemaking by statute; these include race, religion and national origin. Unfair discrimination is when either statutorily banned characteristics are used in insurance ratemaking or when similar risks are not charged a similar premium.

## Review of Insurance Programs

When an insurer is new to the insurance market of a given state, the company will generally have no loss experience of its own on which to base the rates. Nevertheless, the insurer will need to make a filing of initial rates, rules and forms with the LDI. The filing material may be based on a few sources: a similar program of the company’s in other states (if applicable), the approved loss costs and rating factors of a rating bureau, e.g., ISO (Insurance Services Office, Inc.), or competitors’ programs already filed in the state under consideration. These latter programs will provide important information on rate levels appropriate for the new state and the various rating territories within that state. (Rating territories for Commercial Automobile and other lines of business can be defined by county/parish, city, zip code or combinations thereof.)

When a new program has been submitted to the LDI for review, the LDI will review the rates, rules and rating plans for statutory compliance and reasonableness. The review will often consist of comparing the proposed rates for the new insurer to those of established insurers. If the rates and coverage are similar to those of the established insurers, the submission will generally be approvable.

**Regulatory Review Period.** The LDI has 45 days to review and to act on the rates, rules and forms submitted by the insurer. Final action will normally take the form of approval, disapproval or approval with amendments.

**Content of Filings.** A rate filing or rate/rule filing is expected to contain sufficient information and appropriate actuarial support for all proposed rates and rules. The LDI may request additional information from the insurer, in which case, the review period (45 days) is reset.

**Review Process.** Rates and rules, whether filed for the first time or as a change to existing rates and rules, are reviewed by the LDI’s compliance examiners and actuaries. The compliance examiner verifies compliance with state statutes and completeness of the filing<sup>10</sup>. The actuary looks for adequate support for the proposed rates and ensures that the support is compliant with actuarial principles<sup>11</sup> and standards<sup>12</sup>. When the LDI has completed its review, the filing is either approved or disapproved. Sometimes, before the review is completed, the filing is withdrawn. When this happens, the review process is halted without approval or disapproval.

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<sup>10</sup> In Louisiana, see La. R.S. 22:1464(A)(2)

<sup>11</sup> Casualty Actuarial Society, Statement of Principles Regarding Property and Casualty Insurance Ratemaking, adopted May 1988; <http://www.casact.org/professionalism/standards/princip/sppcrate.pdf>.

<sup>12</sup> The Actuarial Standards Board adopts many standards that impact property and casualty ratemaking. See <http://actuarialstandardsboard.org/index.asp> for those standards.

## Filing Guidance

The LDI's website ([www.lidi.la.gov](http://www.lidi.la.gov)) provides a wealth of filing guidance for insurers to follow in making property/casualty rate and rule filings as well as form filings. The LDI's *Rate and Rule Filing Handbook*<sup>13</sup> as published by the LDI's Office of Property and Casualty is a particularly good source of information.

## LOUISIANA STATUTES

The LDI receives its authority to review property and casualty rates from the Louisiana legislature. Louisiana Revised Statutes Title 22 requires Commercial Automobile and other property/casualty insurance rates, rules and policy forms<sup>14</sup> to be filed with the LDI. Specifically, rates shall not be inadequate, excessive, or unfairly discriminatory. Statutes for rates and rules include (in part):

### § 1451. Systems for ratemaking

- A. As used in this Subpart, the term "commissioner" shall mean the commissioner of insurance.
- B. The commissioner shall have the exclusive authority to accept, review, and approve any application for insurance rates or rate changes for all lines of property and casualty insurance. The commissioner shall exercise his authority in accordance with the provisions of this Section.
- C. ...
- D. ...
- E. ...
- F. No provision of this Section shall prohibit the commissioner from conducting market conduct exams to ensure the rates being charged by insurers are not inadequate, excessive, or unfairly discriminatory.

### § 1452. Purpose of rate regulation; construction; definitions

- A. The purpose of this Subpart is to promote the public welfare by regulating insurance rates to the end that they shall not be excessive, inadequate, or unfairly discriminatory and to authorize and regulate cooperative action among insurers in ratemaking and in other matters within the scope of this Subpart. Nothing in this Subpart is intended:
  - (1) To prohibit or discourage reasonable competition.
  - (2) To prohibit or encourage, except to the extent necessary to accomplish the aforementioned purpose, uniformity in insurance rates, rating systems, rating plans, or practices.
- B. This Subpart shall be liberally interpreted to carry into effect the provisions of this Section.
- C. ...

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<sup>13</sup> The handbook can be found at: [https://ldi.la.gov/docs/default-source/documents/propertycasualty/rating/rate-and-rule-filing-handbook.pdf?sfvrsn=feaf7c52\\_12](https://ldi.la.gov/docs/default-source/documents/propertycasualty/rating/rate-and-rule-filing-handbook.pdf?sfvrsn=feaf7c52_12)

<sup>14</sup> Forms are filed with the LDI pursuant to La. R.S. 22:1261 et seq., 22:1281 et seq., 22:1311 et seq. and 22:1331 et seq.

## § 1454. Rating standards and methods

A. Rates shall not be inadequate or unfairly discriminatory in a competitive market. Rates shall not be excessive, inadequate, or unfairly discriminatory in a noncompetitive market. Risks may be classified using any criteria except that no risk shall be classified on the basis of race, color, creed, or national origin.

B. In determining whether rates are excessive, inadequate, or unfairly discriminatory, consideration may be given to the following items:

(1) Basic rate factors. Due consideration shall be given to past and prospective loss and expense experience within and outside the state, catastrophe hazards and contingencies, events, or trends within and outside the state, dividends or savings to policyholders, members, or subscribers, and all other relevant factors and judgments. Fines and penalties against an insurer, whether levied by a court or regulatory body, shall not be used by the insurer or considered in any manner in the loss or expense experience for the purpose of setting rates or making rate filings.

(2) Classification. Risks may be grouped by classification for the establishment of rates and minimum premiums. Classification rates may be modified for individual risks in accordance with rating plans or schedules which establish standards for measuring probable variations in hazards or expenses, or both.

(3) Expenses. The expense provisions shall reflect the operating methods of the insurer, the past expense experience of the insurer, and anticipated future expenses.

(4) Contingencies and profits. The rates shall contain a provision for contingencies and a provision for a reasonable underwriting profit and shall reflect investment income directly attributable to unearned premium and loss reserves.

(5) Other relevant factors. Any other factors available at the time of the rate filing.

C. Except as provided by this Subpart, the commissioner shall not approve or otherwise regulate rates.

## RATEMAKING PRINCIPLES

According to the Casualty Actuarial Society's *Statement of Principles Regarding Property and Casualty Insurance Ratemaking*:

**Principle 1: A rate is an estimate of the expected value of future costs.**

Ratemaking is prospective because the property and casualty insurance rate must be developed prior to the transfer of risk.

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

Ratemaking should provide for all costs so that the insurance system is financially sound.

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

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 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.**

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.

Ratemaking is prospective and the indicated rate level is the rate level that achieves a balance between the expected premium income and the expected losses and expenses (including a profit provision that considers investment income) for a future policy period. In addition to complying with the principles set forth above, the results of actuarial ratemaking must comply with Louisiana’s statutory requirement that rates not be excessive, inadequate or unfairly discriminatory (La. R.S. 22:1452).

## STATEWIDE RATE LEVEL INDICATIONS

Most usually, ratemaking is performed on an “accident year” basis. In other words, the loss dollars are assigned to the year in which the accident took place, regardless of when the claim was reported or paid. The premium dollars are assigned to the year in which the premium was earned, regardless of when the premium was collected. By using “earned” premium, premiums are matched up with the losses which those premiums funded. For Commercial Automobile insurance, the most common ratemaking methodology entails reviewing the latest five accident years of premium and loss experience. In addition, for expense experience, the latest three years of experience are normally used. Once the premiums and losses have been tabulated for the past five accident years, various adjustments (especially inflation) are made to place the premiums and losses at the level that can be reasonably anticipated for the future policy period for which rates are being made.

### Ratemaking Example 1

To provide insight into the ratemaking process, let’s work with a simple hypothetical example. This example will show that a rate is in essence a claims costs provision which is “grossed up” for expense provisions. This “grossing up” process is seen in many non-insurance endeavors, such as when a price is grossed up for a tax rate.

Suppose the actuary determines that the expected losses (including loss adjustment expenses or LAE) for a policy are \$1,200. (This expected or long-term average claims cost is called the “pure premium”).

|               |         |
|---------------|---------|
| Pure premium: | \$1,200 |
|---------------|---------|

Further, suppose the actuary estimates that the makeup of the premium dollar should be as follows:

|                             |           |
|-----------------------------|-----------|
| Claims cost (including LAE) | 60%       |
| Agent commissions           | 12%       |
| Other expenses              | 22%       |
| Profit                      | <u>6%</u> |
| Total                       | 100%      |

So, claims costs are assumed to represent 60% of the premium, and expenses and profit are assumed to represent the other 40% of the premium. Given these assumptions, the rate that would need to be charged is \$2,000 (= \$1,200 / 0.60). This is the amount that will allow 40% or \$800 to be available for expenses and profit, and still leave \$1,200 available to fund the expected claims cost.

As can be seen in this example, the claims cost of \$1,200 is being “grossed up” for a 40% expense and profit ratio. The result is \$2,000, which represents the quotient of \$1,200 and the complement of (e.g., 1.00 minus) 0.40.

## Ratemaking Example 2

This example will demonstrate the “loss ratio approach” to ratemaking. Specifically, when the actuary makes a projection of the loss ratio (ratio of losses to premiums) for the projected policy period, the relativity (or ratio or quotient) of that loss ratio to the targeted loss ratio reveals the indicated rate change.

Suppose the actuary is making rates in 2019 for policies to be written in 2020. Suppose the targeted expense and profit ratio (relative to premium) is 40% (as in Ratemaking Example 1 above), so that the permissible or targeted loss ratio is 60% (= 100% - 40%). Suppose the actuary tabulates loss ratios as shown in Table 1 below. (The premiums and losses, and thereby the loss ratios, are “adjusted” for inflation and other factors to be later discussed in detail).

Table 1:  
Statewide Ratemaking Analysis  
(Amounts in \$000's)

| Accident Year                 | Adjusted Earned Premium | Adjusted Incurred Losses | Loss Ratio  |
|-------------------------------|-------------------------|--------------------------|-------------|
| 2014                          | \$1,500                 | \$1,200                  | 80%         |
| 2015                          | \$1,600                 | \$1,100                  | 69%         |
| 2016                          | \$1,800                 | \$1,420                  | 79%         |
| 2017                          | \$1,950                 | \$970                    | 50%         |
| 2018                          | \$2,125                 | \$1,380                  | 65%         |
| <b>Total</b>                  | <b>\$8,975</b>          | <b>\$6,070</b>           | <b>68%</b>  |
| <b>Selected Loss Ratio:</b>   |                         |                          | <b>66%</b>  |
| <b>Target Loss Ratio:</b>     |                         |                          | <b>60%</b>  |
| <b>Indicated Rate Change:</b> |                         |                          | <b>+10%</b> |

As shown, the actuary's analysis suggests an adjusted loss ratio (ratio of adjusted losses to adjusted premiums) of 66%. Then the indicated rate change would be +10% (= 66% / 60% - 1). In other words, if the past premiums had been 10% higher than they actually were, then the adjusted loss ratio would have been 60% and the rates would appear just adequate today. But the past premiums were not 10% higher in the past, so they need to be increased by 10% today, at least on an indicated basis.

## ADJUSTMENTS TO HISTORICAL PREMIUMS

The historical premiums collected by the company need to be adjusted so as to represent the future policy period for which rates are being made. A few adjustments that require consideration include:

- Rate on-leveling
- Premium trend
- Market events

### Rate On-Leveling

Rate on-leveling adjustments are intended to adjust the historical premiums for rate changes that have already taken place since the time of the historical year under consideration. If this adjustment were not made, then the rate indication that results from the ratemaking analysis would include rate changes that have already been implemented. This would represent a double-counting. By restating historical premiums at today's rates, the ratemaking analysis will indicate what rate change needs to be taken relative to the current set of rates, not some past set of rates. There are two common approaches to on-leveling the historical rates: policy rerating and parallelogram. These are described below.

**Policy Rerating Approach.** In this approach, the insurer computes the rate on all policies in a past experience period based on the rating plan and rates currently in use. Some insurers have sophisticated computer systems that can rerate all policies from a past data period at today's rates so as to make this adjustment. This method is the most accurate way to place historical premiums at current rate level.

**Parallelogram Approach.** Not all insurers have the ability to use computer systems to rerate all policies on current rate plans and at current rate levels. For these insurers, a standard mathematical approximation formula known as the parallelogram approach is used to make an appropriate premium adjustment.

## **Premium Trend**

For Commercial Automobile insurance, premium trend is driven by costs of new vehicles and applies to Physical Damage coverage.

## **Market Events**

Premiums may need to be adjusted for significant market events. For example, the legislature may pass a statute that makes a change to the minimum limits of Commercial Automobile insurance at a point in time.

Market events may occur on a one-time or a continuous basis. As such, the historical premium used in ratemaking may need adjustment in just one year, or in all of the years. The impact of these events may or may not be picked up by premium trend adjustments. It is incumbent upon the actuary to carefully consider the overlap of all premium adjustments in the actuarial ratemaking analysis.

# **ADJUSTMENTS TO HISTORICAL LOSSES**

## **Loss Development**

Insurance represents the sale of coverage for financial loss due to future unfortunate events. As such, the final costs relating to the sale of a block of insurance policies will not be known until after such policies have been sold, policy periods have expired and all, or virtually all, related claims have been fully paid. Depending upon the type of insurance, this can take many years. This situation stands in contrast to manufacturing industries, where costs are incurred first and product is sold later.

As described above, loss data is normally organized by accident year, meaning that losses are assigned to the year in which the accident occurred, regardless of when the claim was reported or paid. As such, the loss dollar evaluation of a given accident year will change even after the end of the accident year.

**Estimation Techniques.** Reported incurred losses are paid losses plus reserves for expected future loss payments on claims already reported to the insurer. Reported incurred losses for each of the historical years used in the ratemaking exercise may be immature. In other words, some claims are still not fully settled and reserves set aside for future payments are estimates made by claims adjusters (usually understated but sometimes overstated). Actuarial techniques used include loss development triangles, the Bornhuetter-Ferguson method, the chain-ladder method and the Cape-Cod method, to name a few.

Past patterns of loss development are analyzed and used to project the amount of development from immature loss values to estimated ultimate loss values.

For Commercial Automobile insurance, Physical Damage losses are generally paid out soon after the accident occurs. Therefore, loss development is not very significant, and the adjustment factors that are needed are close to unity (1.000). This is in contrast to Liability losses, where claims may involve injuries or lawsuits, and loss development will generally be significant. This occurs as injuries are found to be more serious than originally thought, and the dollar evaluation of such claims will normally develop upward.

**Maturities.** The maturity or evaluation of an accident year is the amount of time elapsed since the inception of that year. As an example, consider accident year 2018. The first evaluation of this accident year will often be at December 31, 2018, or 12 months of maturity. The second evaluation would then be at December 31, 2019, or 24 months of maturity. The third evaluation would be at December 31, 2020, or 36 months of maturity. And so on.

**Loss Development Triangle.** Let’s say the paid-to-date claim dollars (in \$000’s) are tabulated as shown below as of December 31, 2018. The array shown is called a “loss development triangle.” The shape is triangular because the earlier years have more historical evaluations available as of a given point in time, as compared with later years.

| Table 2<br>Typical Loss Development Triangle |           |           |           |           |
|--|-----------|-----------|-----------|-----------|
| Accident Year                                | Maturity  |           |           |           |
|  | 12 Months | 24 Months | 36 Months | 48 Months |
| 2015   | 1,000     | 1,110     | 1,110     | 1,110     |
| 2016   | 1,200     | 1,320     | 1,320     |           |
| 2017   | 1,400     | 1,540     |           |           |
| 2018   | 1,500     |           |           |           |

Based upon the above loss development triangle, the actuary may discern that after 24 months of development, a given accident year is basically fully developed. However, between 12 and 24 months of maturity, the cumulative losses develop upward between 10% and 11%, and the actuary may select 10% for 12-24 month loss development. He would then apply a factor of 1.10 to the 12-month evaluation of \$1,500,000, to estimate the ultimate amount of loss incurred at \$1,650,000 for accident year 2018.

## Loss Trend

Fundamentally, loss trend can be thought of as inflationary adjustments to losses. Losses are subject to continuous change from economic forces such as inflation. In the calculation of the indicated rate level change, the actuary recognizes the continuous change in the frequency and severity of claims when projecting a future loss level.<sup>15</sup>

The trend rate from one year to the next can be influenced by medical or repair costs. Adjustments are needed to bring historical losses to the dollar level projected for the future period for which rates are being made. As an example, it may have cost \$2,000 to repair a car's transmission in 2018, but that same transmission would have cost \$2,205 to repair two years later in 2020. The average annual inflation rate over the years, in this example, is 5% per annum, i.e.,  $\$2,205 = \$2,000 \times 1.05 \times 1.05$ .

There are various methods used by insurers to adjust losses to the expected cost level underlying the projected future time period.

**Data Elements.** With respect to the data elements which are analyzed for loss trend purposes, there are normally two approaches. The first approach is to analyze pure premium, which is total loss dollars per unit exposure (or vehicle). The second approach is to analyze the two components of pure premium, which are frequency and severity. Frequency is the claim count divided by the exposure; and severity is loss dollars divided by claim count. Note that pure premium equals frequency multiplied by severity.

**Time Series Data.** To calculate an appropriate loss trend adjustment, the insurer will generally analyze historical time series data for pure premium, frequency and/or severity for the given line of insurance and state. The time series data will typically be for the latest 16 calendar quarters. A statistical curve is typically fit to the time series data to calculate the average annual percentage change in the pure premium, frequency or severity time series under study. The most commonly used statistical curve in trend analysis is the exponential curve, also known as "compound growth."

**Calendar Year Paid Data.** Loss trend analysis is usually based upon calendar year paid data. That is, the loss dollars paid and number of claims closed in a given calendar year are related to the exposures earned in that calendar year. The use of calendar year paid data eliminates the need for loss development factors, since calendar year paid data does not develop after the end of the calendar year.

**Countrywide vs. State Data.** If the insurer does not write much business for the given line and state, the trend data will generally not be statistically reliable. In these cases, the insurer will often supplement the loss trend analysis with state-specific industry data and/or insurer's countrywide data. State-specific industry data is available through industry organizations that provide statistical services, such as the

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<sup>15</sup> Jones, Burt D., "An Introduction to Premium Trend," February, 2002, [www.casact.org/library/studynotes/jones5.pdf](http://www.casact.org/library/studynotes/jones5.pdf) is a good actuarial reference on the subject of premium trend.

Insurance Services Office, Inc. (ISO). A common source of statewide and countrywide pure premium, frequency and severity data for supplemental loss trend analysis is ISO's *Fast Track Report*. The analysis of such data would proceed along the same lines as described above, with fitting of statistical curves to the assembled time series data.

## Application of Trend Factor

The loss trend factor is applied to each historical accident year of loss data used in the ratemaking experience period. The loss trend factor applied to a given historical accident year must reflect the time between the average loss date underlying that historical accident year and the average loss date expected in the future year for which the actuary is developing rates.

Let's say the actuary is making rates in 2019 for annual policies to be written uniformly throughout 2020. The average policy writing date will be midway through 2020 (i.e., July 1, 2020), and the average accident date will be six months after the average policy writing date, or January 1, 2021. Let's say the actuary is using historical accident years 2014 through 2018 to make his projections. The average accident date in accident year 2014 is July 1, 2014. Therefore, the losses for accident year 2014 must be increased by 6.5 years of loss trend to put those losses on a January 1, 2021 level. Assuming a 3.0% annual trend rate has been selected, the loss trend factor applicable to 2014 would be 1.212 ( $= 1.030^{6.5}$ , where " $\wedge$ " denotes exponentiation). Similarly, the loss trend factor for accident year 2015 would be 1.177 ( $= 1.030^{5.5}$ ), and so on.

## CATEGORIES OF LOSSES

In Commercial Automobile ratemaking, the actuary typically separates losses into two key categories: Liability (such as bodily injury, property damage, medical payments, and uninsured/underinsured motorist) and Physical Damage (such as collision and comprehensive).

### Liability Losses in Ratemaking

Losses are usually analyzed using five years of historical data. Two adjustments must be made to these losses: (1) loss development, to project reported losses to their ultimate, settled value, and (2) loss trend (i.e. the impact of inflation). Large losses are treated separately from other losses to avoid excessive impacts on the rate needs of the entire book of business.

### Physical Damage Losses in Ratemaking

Losses are also usually analyzed using five years of historical data with the same two adjustment as to Liability losses. Large Physical Damage losses are rare as losses are limited to the value of individual vehicles. Catastrophes such as flooding or hail, however, may result in significant losses under Comprehensive coverage. These catastrophic losses should be treated separately from other losses to avoid excessive impacts on the rate needs of the entire book of business.

# EXPENSES

In the ratemaking exercise, at least three historical years of expenses are normally reviewed. These expense monies are needed to support the insurer's business operation, including acquiring and servicing policies. These expenses are often referred to as underwriting expenses (or operational and administrative expenses).

In ratemaking, expenses are categorized into variable or fixed expense and are treated differently in the actuarial ratemaking formula.

## Variable expenses

Variable expenses are expenses which are calculated as a percentage of premium. Commission paid to salespeople based on the premium of the insurance product sold is good example of variable expense. Other variable expenses considered in ratemaking include taxes and some overhead to run the insurance company.

## Fixed expenses

Fixed expenses include costs that a business is obligated to pay and cannot decrease over the short run without significant changes to human resources or physical facilities of the business. Fixed expenses are the costs of doing business that, for all practical purposes, cannot be changed easily over the short term. Fixed expenses do not react to changes in the sales level. If an insurer wants to decrease fixed expenses significantly, it needs to downsize the business (lay off workers, sell off property, and so on). A business should be careful not to overreact to a temporary downturn in sales by making drastic reductions in its fixed costs, which it may regret later if sales pick up again.

## Expense Categories

Key categories for expenses analyzed in Commercial Automobile insurance ratemaking are:

- Loss adjustment expenses
- Commissions and brokerage expenses
- Other acquisition expenses
- General operating expenses
- Taxes, licenses and fees
- Cost of reinsurance
- Dividends

In the actuarial ratemaking exercise, the expenses that are expected to arise in the future policy period must be estimated and considered in the future rates. Moreover, Louisiana Revised Statute 22:1454 (B)(3) provides that “[t]he expense provisions shall reflect the operating methods of the insurer, the past expense experience of the insurer, and anticipated future expenses.”<sup>16</sup>

The following discussion provides detail for each key expense category<sup>17</sup>:

**Loss Adjustment Expenses.** Loss adjustment expenses are expenses incurred by the insurer in adjusting the claims. They are usually broken down in one of two ways: ALAE vs. ULAE, or DCC vs. AO. These acronyms are defined as follows:

**ALAE – Allocated Loss Adjustment Expenses.** These are adjustment expenses which can be directly allocated to a given claim and typically include legal costs, investigatory expense, independent adjuster expenses, etc.

**ULAE – Unallocated Loss Adjustment Expenses.** These are adjustment expenses which cannot be directly associated with a given claim and typically include claims department overhead, in-house claims adjuster’s salaries, etc.

**DCC – Defense and Cost Containment Expenses.** These usually represent all legal costs and investigatory expenses associated with adjusting claims.

**AO – All Other Adjustment Expenses.** These usually include claims adjustment expenses (whether the adjuster is in-house or an independent adjuster), claims department overhead, etc.

When the actuary uses the ALAE vs. ULAE approach for analysis, ALAE is normally tracked in the loss data with the losses to which these loss adjustment expenses are allocated. ULAE is projected separately, by analyzing the historical relationship of paid ULAE to paid loss and ALAE, or the relationship of paid ULAE to earned premium.

When the actuary uses the DCC vs. AO approach for analysis, DCC is normally tracked in the loss data just like ALAE, since these loss adjustment expenses can most usually be allocated to specific claims. AO is projected separately, much like ULAE in the ALAE vs. ULAE approach.

**Commissions and Brokerage Expenses.** Commissions and brokerage fees represent amounts paid to agents or brokers as compensation for generating business. Typically, these amounts are paid as a percentage of premium written. Commission rates may vary between new and renewal business. In addition, contingent commissions vary the commission based on the quality (e.g., resulting loss ratio) or amount of business written (e.g., predetermined volume goals).

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<sup>16</sup> La. R.S. 22:1454(B)(3)

<sup>17</sup> Casualty Actuarial Society’s text Basic Ratemaking by Geoff Werner and Claudine Modlin, Fourth Edition, October 2010, Chapter 7. Basic Ratemaking is an excellent source for ratemaking practices that are commonly used in Louisiana.

Commissions and brokerage fees are intended to compensate the agent or broker for the many costs which they incur. These costs include those of obtaining the business for the insurer and servicing the policy on behalf of the insurer. Such servicing costs include those of writing the policy, answering policyholder questions and assisting with claims during the policy's contractual term.

**Other Acquisition Expenses.** Other acquisition costs are expenses that are paid to acquire business other than commissions and brokerage expenses. Costs associated with media advertisements, mailings to prospective insureds and salaries of sales employees who do not work on a commission basis are included in this category.

**General Expenses.** General expenses include the remaining expenses associated with insurance operations and any other miscellaneous costs, excluding investment income expenses (these expenses are typically reflected as an offset to investment income). For example, the general expense category includes overhead associated with the insurer's home office (e.g., supplies, rent, building maintenance) and salaries of certain employees (e.g., actuaries).

Often, a portion of general expense is viewed as fixed as opposed to variable. (By contrast, commissions and premium taxes are almost always variable expense, since they will vary proportionally with the premium regardless of the magnitude of the premium for the book of business under consideration.)

**Taxes, Licenses and Fees.** Taxes, licenses and fees include premium taxes and other taxes, assessments and fees payable by the insurer to the state. These amounts do not include federal income taxes (FIT). Actuaries normally factor FIT into their calculations of needed underwriting profit.

**Cost of Reinsurance.** The cost of reinsurance can be a necessary expense consideration for an insurer writing Physical Damage coverage in catastrophe-prone areas such as Louisiana. For insurers with significant reinsurance protection, it is appropriate to reflect the cost of reinsurance in the rate.

The actuary reflects the reinsurance cost in the projected rates as "net cost of reinsurance." This is the premium paid to the reinsurer ("gross cost of reinsurance") less the expected recoveries from the reinsurer. Essentially, the net cost of reinsurance represents the reinsurer's long-term expense and profit needs.

**Dividends.** Policy dividends are a return of premium when an insurer has had a good year financially. Dividends are most often paid by mutual insurance companies (however, not all mutual companies pay dividends). In ratemaking, when dividends are expected to be paid, premiums are adjusted to include the expected dividend.

## CREDIBILITY

Credibility refers to the statistical reliability of a given data set. The larger the data set, the more statistically reliable. The credibility of any rate level indication needs to be assessed by the actuary. To the extent that the indication is not fully credible, the indication needs to be adjusted so as to make it more reliable.

As an example, if the loss experience for a given book of business has little or no credibility, the actuary may deem it appropriate to adjust the rates by one year's inflation. In other words, with no information afforded by the non-credible loss experience, the actuary nevertheless knows with a high degree of certainty that inflation exists, and will use that inflation to complement the available loss experience.

## PROFIT

### Profit Provision

Similar to all businesses, insurance is a business and insurance companies must earn a profit to stay in business. Underwriting profit is defined as the difference between the premiums earned and the losses and expenses incurred in a given calendar year. This is in contrast to operating profit, which is underwriting profit plus investment income. Insurance rates should include a reasonable profit provision commensurate with the amount of risk transferred from the insured to the insurer.

Profit is important in several ways:

- (1) Attraction of capital. Without a profit, the investment capital that supports the insurance operation will move to another investment opportunity and there will be fewer insurance companies willing to do business in a given state. The fewer insurance companies actively doing business in the state, the fewer choices consumers will have when looking for an insurer to protect their property.
- (2) Building of surplus. The accumulation of profit allows an insurer to build capital or surplus. Such accumulation allows the company to be able to write an increased number of policies over time, which benefits the public by making insurance more available.
- (3) Ability to stay solvent. An insurer must collect and hold sufficient funds so that it can comfortably pay all future claims, even in the event of a large loss or a large catastrophe, without becoming insolvent.

### Investment Income

Investment income to the insurer is earned on funds from several sources:

- Surplus invested in the entity to guard against higher-than-expected losses
- Funds held between the time of premium collection and claim submission
- Funds held between the time of claim submission and final settlement/adjudication

It is appropriate for the investment income to be reflected in the rates. It is normally reflected as an offset to the needed profit provision. For example, if 8% of premium is needed for underwriting profit before investment income consideration, and investment income is worth 2%, then the underwriting profit provision will be 6% of premium.

With respect to federal income tax (FIT), actuaries normally make calculations of needed underwriting profit by factoring in FIT.

## OVERALL STATEWIDE RATE INDICATION

Generally, an insurance department will not permit an insurer to select a rate change which would represent more movement than the indication suggests. In other words, if a rate increase is indicated, the proposed or selected rate increase should be no higher than the indication. Conversely, if a rate decrease is indicated, the proposed or selected rate decrease should be no lower than (i.e., no more of a decrease than) the indication.

## TERRITORIAL RATEMAKING

Company territories do not change with every filed rate request. Territory changes can include a change to a territory's rating factor or to the territory's geographic definition, e.g., set of parishes or zip codes. When an insurer files for a statewide rate change, the insurer may file to adjust the overall rate level only, or the overall rate level plus the territorial (and possibly other) rating plan relationships. To justify the territorial rate changes, insurers need to include in the rate filing actuarial support for the requested changes. The ratemaking by territory generally proceeds using the same steps as the ratemaking at the statewide level. As a final step, the average territory change is generally balanced to zero so that the intended overall statewide rate change is still achieved.

## RATING VARIABLES

Commercial Automobile insurance is usually rated using a number of key rating variables. These must be supported by sound actuarial analysis. Such variables have generally included, but are not limited to, the following:

- Rating territory (geographic location)
- Insurance limits
- Industry
- Type of vehicles
- Coverage
- Number of traffic violation
- Number of claims
- Deductibles
- Credit score

## DEDUCTIBLES

Policyholders can select, according to their needs, the desired deductibles for Physical Damage coverage. Deductibles are a means of keeping insurance premiums more affordable. A deductible represents monies the policyholder pays out-of-pocket before the insurer pays anything toward a claim for loss or damage. For example, given a deductible of \$500, and repair costs of \$1,800, the policyholder would be responsible for paying the first \$500 and the insurer would pay the remaining \$1,300. Because of deductibles, insurance premiums are cheaper than otherwise; also, the higher the deductible, the lower the premium.

Like any other rating factor, deductible discounts must be filed with the LDI. The LDI reviews deductible discounts for reasonableness.

## CONCLUSION

Commercial Automobile rates are determined, maintained and filed by insurance company actuaries. Filed Commercial Automobile rates are reviewed by insurance department actuaries to ensure that they are actuarially sound, reasonable and appropriate for the coverage afforded. These processes are well-established in Louisiana and other states. The Louisiana Department of Insurance remains committed to maintaining a financially sound, efficient, and fair market for Commercial Automobile insurance in Louisiana.

Should you have any questions, contact us at: c/o

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