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# General Insurance Actuarial Risk Assessment Overview

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**T**his article holistically places ratemaking into its proper context and connects the diverse operations that have impact on ratemaking as well. Broadly, the risk that a business line faces can be segregated into accident risk and expense risk.

## Accident Risk

- The likelihood of actual claims being higher than expected is a major risk to general insurance, which will be referred as “accident risk” in this article.
- Generally, the company price for taking on this risk by assuming a certain loss ratio with a margin for contingencies. If actual claims are lower than expected, the profit emerges.
- In order to mitigate this risk, proper underwriting as well as reinsurance arrangements is made.
- The fluctuation in actual loss ratio from year to year is a major risk which leads to fluctuations in shareholders’ return.

## Expense Risk

- This risk can be defined as the likelihood of actual expenses being higher than the expected. If the difference (expected vs. actual) is positive, the company makes money.

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## GENERAL ERRORS DURING RATEMAKING PROCESS

### Process Error

Process uncertainty originates from general claims uncertainty (including frequency, severity, timing, change in demand, and claims settlement process, etc.), internal sources of uncertainty (including planned or unplanned business mix changes, reserves booked other than recommended, expenses uncertainty, etc.). Uncertainty in economic, legal and operating environment and the stages of the insurance cycle are also contributing factors of process uncertainties in the results and recommendations.

### Parameter Error

Our results and conclusions are derived from the parameter estimates used in our actuarial and statistical models. These parameters inherit uncertainties relating to data quality, large and exceptional claims, change in reserving process and philosophy, assumptions including inflation, claim cost trend and others (including IBNR).

Our parameter estimates are deduced from past experience, our expectations of future and reasonable actuarial judgment. Since historical estimates contain distortions and random movements, past experience is not necessarily a reasonable guide to the future. Therefore, our results and recommendations inherit uncertainty due to parameters’ estimates used.

### Model Error

Our results and conclusions are derived from the adopted actuarial and statistical models. These statistical models are simplified versions of very complex (and unknown) underlying systems, processes and assumptions. This leads to inherent bias in our results and recommendations.

The choice of the model used can also contribute to the model uncertainty. For example, the triangulation methods used to estimate the incurred-but-not-reported claims can produce different results under a paid claims pattern as compared to incurred claims pattern.

## RISK MANAGEMENT IN RATEMAKING

Based on the pricing assumptions, the company’s management should understand the insurance business as the specificity of the insurance-related-reverse production cycle (collecting premiums first, paying out claims later and accumulating assets to cover future payouts) and the requirement to control and mitigate operational risks that are generated everywhere in the insurance value chain.

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For instance, different sub-products within motor line can have different features and claim trends. Regarding claim trends, bodily injury has no maximum liability limit and so can be a major source of potential loss. The company controls this risk by an excess of loss (XOL) reinsurance treaty without any limit for bodily injury cases. For comprehensive products, the sum insured are determined and known beforehand, and it is carefully monitored that changes in underwriting or depreciation policies do not unduly lead to decreases in sum insured as this will directly lead to decreases in premium being charged as premium on comprehensive is charged as percentage of sum insured.

Giving another example, different sub-products within medical insurance can have different features and claim trends. Regarding claim trends, grievous surgeries and chronic pre-existing conditions as well as critical illnesses can be a major source of potential loss. The company can control this risk by an XOL reinsurance treaties.

In order to calculate a final set of rates for an existing product, the company performs the following actions:

- Select an overall average premium target for the future policy period
- Finalize the structure of the rating algorithm
- Derive the base rate necessary to achieve the overall average premium target
- Select the final rate differentials for each of the rating variables based on the policy characteristics, coverage type and claim history
- Calculate proposed fixed & variable expenses
- Make projections based on the appropriate (or realistic) set of claims and expense assumptions

Proposed rates and rate changes should be viewed as a quantitative diagnostic tool for determining expected costs. If the company does not know its true rate needs, then it cannot know if the rates dictated by the market are sufficient to produce its planned or target returns. Once future expectations are determined, informed discussions can take place as to how to respond to those expectations. If the market dictated prices are too low, the company must know what other actions (e.g., changes in underwriting rules, marketing emphasis or claims handling) are necessary in order to produce the planned results. Implementing all or part of the rate changes is just one alternative for management to consider.

The “Loss Ratio” approach is very useful when there is a lack of credible claim experience. This is because this methodology is based on the idea of observing the impact on underwriting

results by varying the claims cost, and the claims cost is estimated based on the available or current rates. Furthermore, when determining rates for writing new business, where no internal historical data exists, the actuary<sup>1</sup> can still determine the indicated rate by estimating the expected pure premium and expense provisions and selecting a target profit provision (possibly based on industry statistics).

The rate variation for different risk characteristics occurs by modifying the base rate. An insurer that fails to charge the right rate for individual risks (when other insurers are doing so), is subject to adverse selection (and thus, potentially deteriorating financial results). An insurer that differentiates risks using a valid risk characteristic (when others are not) may achieve favorable selection and gain a competitive advantage.

When a company identifies a characteristic that differentiates risk that other companies are not using, the company has two options for making use of this information:

1. Implement a new rating variable.
2. Use the characteristic for purpose outside of rate-making (e.g., for risk selection, marketing, agency management).

If the company implements a new rating variable and prices it appropriately:

- Its new rates will be more equitable.
- It may write a segment of risks that were previously considered uninsurable.
- It will attract more lower-risk insured at a profit.
- Some of the higher-risk insured will remain and will be written at a profit.

Over the long run, the company will be better positioned to profitably write a broader range of risks.

We need to take into account of the adequacy of risk factors that are considered for pricing purposes. The key objective is statistical parsimony here, as seeing too many risk factors in pricing tools means collinearity/multicollinearity problems, but too few risk considerations means that an optimum pricing structure has not been embarked upon.

What we often ignore is that market considerations play a larger role than risk considerations in setting of the prices of general insurance products. Pricing is inescapably linked with underwriting. We need to see different underwriting markets (soft is where prices are low and profits are low and hard is where prices are high and profits are higher). Another is underwriting itself. If we are underwriting high risks unduly then no amount

of good pricing will be adequate. For instance, having a third party insurance as the majority of the motor portfolio will mean higher loss ratios relative to a balanced portfolio no matter how high the prices are charged for third party insurance. Such situations demand increasing comprehensive motor into the portfolio rather than increasing prices for the third-party insurance.

Apart from underwriting strategy, pricing is linked with business and product strategy as well. Generally, if the objective is revenue enhancement of market share in a soft underwriting cycle, then pricing will tend to be low and underwriting less strict (higher GPW growth but higher loss ratios) and vice versa.

The company emphasizes data capturing and management as pricing requires holistic data and not segregated in silos. IT capturing is important, too, especially for risk parameters. Management Information System (MIS) platform is suited for this purpose.

One possible adjustment in deciding the “permissible loss ratio” is to offset it by the “investment return.” Investment gains sometimes, but not always, offset underwriting losses. And certain forces significantly affect the underwriting results—inflation, regulation, competition, and investment results. When the major components of loss costs are increasing rapidly because of inflation, rates tend to increase more slowly because of competition among insurers. Competition also affects underwriting results. During periods of seemingly favorable results, insurers might try to increase their premium volume, writing business at less-than-adequate rates. Sometimes, based on a belief, it is possible to write more commercial insurance at an underwriting loss, for which they can compensate with superior investment results. Although this practice can be effective in the short term when investment conditions are favorable, it can result in adverse operating losses.

That is why it is suggested that underwriting decisions should be kept independent and distinct from investment decisions by the company.

Feasibility analysis for critical distribution channels like agents, brokers and bancassurance should be undertaken by the company to see how adverse market conditions can likely change the quantity and quality of business brought by these distribution channels for premium revenue.

Innovations should be adopted but cautiously. Complex forms medical and motor insurance products and add-ons, complex derivatives and investment instruments should be generally avoided as it is difficult to realize their precise consequences until it is usually too late. Pricing should be continuously improved and enhanced but products should remain legible to all the stakeholders involved.

Lastly, I would like to highlight that insurance companies do not become insolvent due to having vulnerable balance sheets. As insurance is the business of risk taking, there are always vulnerabilities that have the potential to cascade and develop into a larger crisis. This vulnerability is kept in balance by risk management and market confidence. Ensuring that adequate premiums are charged for the commensurate risk is a part of this overall risk management. ■



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#### ENDNOTE

- 1 Or technical individuals involved.