The Balancing of Ratemaking Assumptions and Annual Financial Planning Assumptions

by Scott Anderson, FCAS

"THE BALANCING OF RATEMAKING ASSUMPTIONS AND ANNUAL FINANCIAL PLANNING ASSUMPTIONS."

Submitted by Scott Anderson, FCAS
with Prologue by Martha Winslow, FCAS

Abstract

When an elaborate operational and financial plan is prepared for the following year, including assumptions regarding prospective rate changes, goals are made with regard to premium levels and profitability. If certain assumptions such as catastrophe loads, loss trends and the effects of variability are not explicitly linked to the assumptions used for ratemaking on the product and state level, a built-in bias may be created for either rate inadequacy or rate redundancy that does not deliver the results as shown in a financial plan for a business segment. The goal of this paper is to show some of the pitfalls and provide basic ideas for balancing the ongoing ratemaking effort to the annual financial plan. This is particularly important in the current environment of changing catastrophe expectations and the increasing involvement of actuaries in financial planning.

Prologue

The premise of this paper is that for a given segment of business the assumptions that underlie the ratemaking calculations should be reconciled with the assumptions underlying the financial projections that are a part of the annual operational plan. As actuaries get more and more involved in the running of the business they need to become more than just purveyors of actuarial technique. They need to think like business people and understand the implications of their various work products and how they tie together.

A company's annual operational plan will consist of objectives for the year, initiatives designed to help the company achieve those objectives and a translation of all that into premium, loss and expense projections for the upcoming year. It is highly likely that the company actuary will be asked to do this translation. The work will consist of taking current experience and projecting it forward making various assumptions about rate and value changes, loss trend, cost of the operation, etc. Reflected in those assumptions will be the expected effect of the various initiatives on the specific actuarial assumptions.

At another time of the year the company actuary will be asked to calculate the indicated rate need for the business. Again, the actuary will use actuarial assumptions to project historical experience into the future. In this exercise the goal is to determine the rate level needed to attain the profit levels required by the company. Business executives will use these indications to make decisions about what rates to file for the product in the states that it is offered.

Using the loss trend as an example, how might the loss trend used to develop the operational plan and the loss trend used to develop the rate indications compare? Presumably since the two work products are done at different times in the year, would not the actuary want to reflect the very most recent information available for each? Would the actuary reflect all the same estimated effects of the planned initiatives in the rate indication even before there was enough experience to determine whether the action had the intended effect? How should the loss trend be handled if ratemaking is done at a finer level of detail than the financial plan? These and other questions would all have to be answered situationally by the actuary doing the work. The point here is not that the assumptions used in the financial plan and ratemaking need to be identical, but that the actuary needs to understand why the assumptions are either the same or different.

The operational plan and its attendant financial objectives are intended to be met each year. In order to make that happen business executives need to make decisions consistent with that plan. When the actuary promulgates an indicted rate need, the company executives need to understand how that rate indication relates back to the operational plan. It is with that understanding that they will be able to meet their financial goals. The actuary needs to understand this link. S/he can play a vital role in meeting the company's objectives by providing the analysis that allows the operational plan to be reconciled with the rate indications.

The key assumptions that need to be reconciled include the expected level of profitability, the loss trend, the load for catastrophes, any large losses that are smoothed, and expenses. These are all assumptions that will either change from one work product to another either because of the time period used or the analytical technique used.

The paper that follows walks through the specifics of how this reconciliation can be done for these key assumptions. Being cognizant of the need for the reconciliation is one thing and executing it is another. This paper addresses the execution of the premise described in this prologue.

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Introduction

This paper is based around a generic model for calculating a rate indication. The model selected uses the loss ratio method and is fairly standard among mid-sized

personal insurance carriers. All segments of the book are analyzed at the state/product/coverage level and certain elements are aggregated to similar levels as the financial plan. If done at the appropriate time of year, this allows for comparison to the annual financial plan as opposed to the typical state by state analysis done throughout the year. Excluded from this discussion are any specific comments regarding the calculation of the permissible loss ratio and any other issues not related to the development of expected losses and their effects. I will discuss some of the specific elements that we found to be at issue. Many elements such as Loss Development are not discussed but are assumed to be in agreement with financial planning assumptions. The specific elements would vary based on the type of products and the size of book that is analyzed. The products we are looking at are all considered personal lines therefore we can immediately exclude such issues as retro premiums and any analysis of actual premiums versus manual premium. Any issues concerning actual versus projected premiums are considered exposure equivalents and should not have an effect on the projected loss level, although premium plans do have an effect on expenses and profit projections. We are looking at as many as one million policies in a medium sized book, so the view that we are taking is high level and only as detailed as state/product/coverage group.

Following are the specific elements discussed in this paper: Selected Trends, Complement of Credibility, Catastrophe Loading and/or Excess Wind and Water Loads, Large Loss Loading and Indicated Rate Need. These elements are aggregated to match the same level of detail as used in the financial planning process to allow for comparison.

Selected Trends

The information includes: industry trends by coverage for state and countrywide, internal company trends by coverage and program for state and countrywide, selected trends by state and program.

The programs include: non-standard auto, standard auto, preferred auto, standard homeowners, preferred homeowners, packaged policies with all personal lines coverages offered.

All of the indications were trended to a common new business effective date, this allows the mathematics to be straight forward when comparing to a financial plan

on an annual basis. Additional trend will accrue on changes taken at later dates, this can be easily adjusted on a state by state basis.

TABLE 1

	Preferred		Standard		Industry
Coverage	Observed	Selected	Observed	Selected	Trends
BI	2.8%	2.3%	2.5%	2.3%	-1.9%
PD	8.0%	7.5%	8.5%	8.2%	7.5%
MED	3.2%	2.3%	2.9%	2.3%	see BI
UM	3.1%	2.3%	3.3%	2.3%	see BI
PIP	3.5%	2.3%	3.8%	2.3%	3.2%
LIABILITY	4.1%	3.3%	4.0%	3.5%	1.6%
COMP	5.1%	4.9%	4.8%	4.6%	4.1%
COLL	7.7%	7.5%	7.8%	7.4%	7.5%
PHY DAM	6.7%	6.5%	6.7%	6.4%	7.5%
TOTAL	4.8%	4.2%	4.7%	4.3%	3.2%

The SELECTED above in Table 1 is the weighted totals of the selected trends used in the calculation of the indications in each program, state and coverage. The OBSERVED above is the observed countrywide trend determined on an aggregate countrywide basis with the effects of large losses and catastrophes removed. The observed trend on aggregate data is often not the weighted average of trends that are determined at a more homogenous level.

A significant difference may exist between the indicated rate need as projected versus the financial "plan". The financial plan includes anticipated changes in

claims and underwriting processes, these changes are only included in the historic trend as those effects become part of the experience. For that reason, additional analysis is needed to adjust for planned and expected future changes to the loss trend. In order to explicitly separate these discretionary internal forces from the projection of profitability we calculated the indications such that the "pure" indication does not include anticipated internal effects. An adjustment is then needed that allows for these anticipated effects to be explicitly demonstrated to management. The prospective rate change decision can then be made intelligently as part of the entire product management process.

There is a significant level of uncertainty in calculating the effect of underwriting and claim actions. The needed effect is more often known, while the actions are created to meet those needed effects. Action plans usually include a significant amount of negotiation, management accountabilities should be set targeting the desired effects. The difference between projection and optimistic planning needs to be understood and facts need to be separated from wishful thinking during the estimation process.

To explicitly determine the adjustment to the indication for a prospective change in the trend, a minor modification to the model that allows for the selection of

separate historic and prospective trends was made. Sensitivity testing with time periods held constant, varying levels of loss and varying selected historic trends indicated that there is a very robust relationship between the change in the indication and the difference between the two selected trends. Given our specific policy terms and implementation lags, we found this relationship to be a 1 to 1.6 ratio. The following is an example using numbers:

The selected historic trend is 4%.

The resulting indication is +3%.

The selected prospective trend is +5.5%

The resulting change in the indication is: (5.5% - 4.0%) * 1.6 = +2.4%

The indication adjusted for this differing planned prospective trend is now 5.4%, 3% + 2.4%, due to the expectation of a higher trend in the future versus the empirical trend. These adjustments can be used to account for expected changes in the book of business, claims handling practices or industry aggregate information.

It should be noted that the ratio stated above, 1 to 1.6, is dependent on the permissible loss ratio and issues regarding fixed expense versus variable expense

as well as time lags and policy terms. The ratio for a particular product should be determined as explained above with varying inputs.

We found that the weighted averages of the selected trends were significantly lower than the aggregate trends. The aggregate trends were more stable, and were considered more applicable from a financial planning viewpoint. This indicated that our bias was toward assuming that there has been and would be an overall trend in the future that was less than actually projected. This is often due to a bias in the selection of a trend based on many different sources but rarely ever selecting from the high end of the range. It must be decided if the average of the selected trends is appropriate given our actual experience and the plan for the following years. If a difference is appropriate, documentation should support the reasons.

Complement of Credibility

Credibility weighted indications are used when, due to the amount of variability, the data analyzed will not give a significant answer. A credibility weighted indication will be an answer that falls between the actual indication and a

complement of credibility. How close this final answer is to the initial indication depends on the volume and variability of data used in the analysis.

A common practice of using the annual trend as the complement of credibility assumes that rates are currently adequate. This assumes that the current rate, increased by trend, would be a reasonable default if credibility was found to be zero. This may be faulty and is biased if rates were not adequate.

In our previous methodology, the selected annual trend was used for the complement of credibility. If the total indication is greater than the selected trends, the following holds true.
(Total before Credibility > Total after Credibility > Total of Trends)
Adjusting for this bias caused issues when discussing with non-actuaries. Many states with small business volume and low levels of actual loss activity received significant swings due to this change.

This entire book of products analyzed over five years is considered well above the standard of credibility. Therefore, the total indication after credibility standards are applied should not be less than the total indication before credibility standards are applied. (Total before Credibility ≥ Total after Credibility)

For this reason, the complement of credibility selected is the countrywide indication for that program and coverage. If the countrywide indication is still not considered credible, the total across all programs for that coverage is used. If that total is still not considered credible, the total of all coverages is used. In any case, a credibility complement is available that allows the total indication for the book of products to remain the same.

This choice of the complement of credibility was not used in the past due to the lack of availability of the countrywide totals with consistent loss periods and effective dates. We believe this new choice removes the bias inherent in other choices of the credibility complement.

Catastrophe Loading and/or Excess Wind and Water Loads

The following detail is offered to explain the difference in indications and the financial plan that is due to the varied methods of smoothing and handling weather related losses. An explicit number should be developed that compares the net difference of using the two different loading procedures.

TABLE 2

Process	Losses Selected	Detail
Financial Plan	Excess Wind and Water	State Specific
Rate Indications	Defined by Catastrophe #	Countrywide

Our indication model uses the ISO Excess Wind and Water methodology. Our financial plan separates losses using the presence or absence of a Catastrophe number on the claim record. We had decided that due to the changing dollar threshold on the assignment of a Catastrophe number, we would plan catastrophe along with certain weather related causes of loss. While these two methodologies are not in perfect synchronization, we can attempt to balance the two and determine if the two different smoothing methodologies are both setting equivalent smoothed loads.

The financial plan for catastrophe and weather related losses is determined on a countrywide basis. This high level of detail created issues when reviewing a state with a higher probability of this type of loss. In the current indication analysis, the ISO Excess Wind and Water Loads by state are used. This differentiates between the different loss potential in the different states and product lines. The ISO loads used are as published in the appropriate Circular.

The effect of smoothing will either have a net effect of removing loss dollars from the analysis or adding loss dollars to the analysis. To define the differences between the two methodologies, the net effects of each of the two smoothing methods were calculated. Loss dollars used for this calculation are undeveloped losses valued at 12/31/96. The calculation was done separately for coverages and products.

The catastrophe loading, or smoothing, should not significantly change the level of loss on a sizable book of business when looked at in total over time. Any bias should be understood and adjusted.

Large Loss Loading

The large loss loading, or smoothing, should not significantly change the level of loss on a sizable book of business when looked at in total. Given the size of our book, we wanted to determine if the large loss load actually balanced with the total of our large losses for the previous years. Then we needed to determine if this level of loss is what would be expected in the coming years that are shown in the financial plan.

The Large Loss Loads in the past were calculated countrywide. This high level of detail created issues when reviewing a state with a possibility of large loss less than countrywide. In the current analysis, regional loads are determined separately for each program. This analysis differentiates between the different large loss potential in the different regions of the country and product lines.

TABLE 3

Region	Standard	Preferred	Package
Great Lakes	1.07	1.09	1.18
South	1.02	1.04	1.16
Coastal	1.04	1.08	1.14
North	1.02	1.04	1.12

The Large Loss Loads are equivalent to our actual large losses over the five year period. This ensures integrity with our financial plan and our view that our total large losses are considered credible over a five year period.

Indicated Rate Need

The financial plan includes a planned rate and value change over each of the following years. Both the written and the earned effects of the rate changes are explicit in the plan. These rate change plans are based on the countrywide line of

business data used in the financial planning process. We need to know if the rate making model is now giving us different rate indications when determined at the program/state/coverage level.

The rate changes are totaled and compared to the plan. If we have done the exercises above and know that we have removed any biases from our methodologies, the more detailed view should be providing us with the more credible answers. If we then compare these new indicated rate actions with our financial plan we should be able to tie together rate actions, claim actions, underwriting actions and expected profitability.

Summary of Findings

As we went through this process for the first time, we found significant differences between the definitions and applications of our assumptions. Of significant note were the catastrophe smoothing, loss trend and the complement of credibility.

The differing methods of handling catastrophes are based on the different uses of data. One view is to explain past experience and the expected future effects on the

following year's finances. The other view is the expected values used in the pricing models for the existing book and mix of business. Both views need to be used, but an understanding and method of translating must be determined.

The trend is critical in the calculation of the indication, it is all too easy to insert expectations into the selection process. Any planned expectations different from projections should be documented and the underlying actions understood. None of us want to project a large trend that is not realized as well as vice versa. Selected trends were adjusted in the final output to reflect the overall trend level, this was done to remove bias.

The complement of credibility was determinable after all of these indications were completed. Other choices are definitely available, but the financial plan must link to the final selection.

A note to data integrity, many small data issues can leverage themselves into significant issues. Determining certain ratios without ALAE and then using those numbers against losses including ALAE can have a noticeable effect on the final indication. Care must be taken to think through, test and document assumptions to determine if material differences could arise.

The gains from this exercise were significant:

- We have a better understanding of our trend and factor selection methods.

- We are able to show specific opportunities for attainment of the financial plan.

- We are much more prepared to explain the differences as viewed by underwriting professionals and financial professionals.

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