

## Managing Overconfidence

Overconfidence in p/c pricing is a serious problem. Actuaries and underwriters must have a realistic view of what they know and what they don't know. Can you pass our confidence quiz?

By Robert F. Conger and Stephen P. Lowe



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For years, behavioral scientists have talked about the need for businesses to manage overconfidence. J. Edward Russo and Paul J.H. Schoemaker have explored this issue in a number of publications, including *Sloan Management Review* (Winter 1992). There they stated, “Good decision making requires more than knowledge of facts, concepts and relationships. It also requires metaknowledge, an understanding of the limits of our knowledge.”

Nowhere is the issue of overconfidence more important than in the property/casualty insurance industry — particularly in pricing and underwriting. Actuaries and underwriters make critical assumptions, based on imperfect knowledge, about the future costs of business being written. To make sound decisions, they must have a realistic view of what they know and what they don't know. Overconfidence in making pricing assumptions, given the potential for adverse outcomes, can have a devastating impact on underwriting results.

Overconfidence can be measured and managed. (See *Box*.) The best way to *manage* overconfidence in p/c insurance pricing is to establish a formal control cycle around the process.

**Overconfidence in Pricing and Underwriting.** What are the implications for p/c insurers of overconfidence in pricing and underwriting? As a business, insurance is unusual in that the cost of the product is not known at the time it is sold. One has to wait for claims to emerge to know the ultimate costs of the coverage provided. Therefore, actuaries and underwriters must work together to estimate future claim costs and set prices on each insurance contract. Managing the overconfidence of actuaries and underwriters in the pricing process is critical to an insurer's success. Better management of overconfidence might even help to mitigate the underwriting cycle.

**Metaknowledge.** Metaknowledge is an understanding and appreciation of what we don't know. Individuals who have *good* metaknowledge understand the uncertainty in their estimates and can provide reasonable ranges around them. More important, behavioral scientists have found that better application of metaknowledge is associated with better application of an individual's primary knowledge. Those who “know what they don't know” are better at developing estimates, projections and forecasts.

In the context of p/c pricing, improving the metaknowledge of actuaries and underwriters should lead to better projections of future loss costs, improved pricing decisions and better (and perhaps more stable) underwriting results.

A few professions have established a superior track record in making accurate predictions, estimates and forecasts. Weather forecasters, by far, offer the best example. In a 1984 study, when U.S. weather forecasters predicted a 30% chance of rain (as they did 15,536 times), it rained almost exactly 30% of the time. This result is quite remarkable, especially when compared to forecasts in other industries. Two factors appear to be essential to their success:

■ **A Short Feedback Loop.** In weather forecasting, the feedback loop is almost immediate. Everyone, including the individual who made the forecast, knows the next day if the forecast was right. In addition, every element of the forecast (e.g., the temperature, the humidity and the amount of precipitation) can be compared to the actual result, permitting very precise *calibration* of the uncertainty in the forecast (i.e., the forecaster's metaknowledge is well calibrated).

■ **'Skin in the Game.'** Weather forecasters are held accountable for their predictions. The accuracy of their predictions usually directly

## How to Measure Overconfidence

Executives make business decisions based on the estimates, projections and forecasts of their staff (e.g., estimating savings from implementing a new software system, projecting the date a new production facility will go online and forecasting product sales revenue for the upcoming quarter).

Because executives can't be involved in every detail of the business, they must rely on their staff to make realistic assessments in their projections, estimates and forecasts. If the staff do not, the business risks the consequences of misinformed decisions.

**Testing for Overconfidence.** The evidence suggests that executives should be wary. Research conducted by behavioral scientists has consistently shown that people are almost always more confident in their estimates and predictions than the outcomes warrant. For example, in an oft-repeated test of this phenomenon, subjects are given ten quantitative questions and asked to respond to each with a numeric range, within which they are 90% sure the correct answer falls.

For example, one question might be, "How many German automobiles were sold in

Japan in 2001?" Obviously, one wouldn't expect a respondent to know the precise answer. The response, expressed as a range, would represent an educated guess based on general knowledge and reasoning.

Although one might assume that people could construct ranges so that they could, on average, get nine out of ten questions right, the reality is that most people fail miserably. Respondents typically get only three or four questions right. Such tests have repeatedly demonstrated that most people are *inherently overconfident* when making estimates, forecasts and predictions.

Russo and Schoemaker, among others who have studied this phenomenon, have found it widespread across a variety of industries, from advertising to data processing to security analysis. In each industry, the overconfidence problem relates to the need for estimates, forecasts and projections. For example, Russo and Schoemaker discussed the importance of managing the overconfidence of geologists who must estimate the likelihood of finding oil and gas in a particular area. Such estimates are critical to the success of energy companies. **E**



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affects career success and remuneration. Those who build better models that produce superior forecasts are rewarded; those with poor track records are not. Also, weather forecasters on television or radio often have to "face the music" after a blown forecast, adding emotional, as well as financial, incentives to get it right.

Better feedback and greater accountability can improve metaknowledge. To be effective, feedback must be accurate, timely and precise. But feedback alone is insufficient. It must be coupled with accountability to ensure that one is motivated to act on the feedback and adjust one's perceptions and opinions accordingly.

**Actuaries and Underwriters.** How do these factors relate to actuaries and underwriters involved in pricing p/c insurance products? These insurance professionals make numerous assumptions about future claim costs when setting prices on the business they are writing. Actuaries and underwriters have:

■ **A Very Long Feedback Loop.** Unlike weather forecasters, they do not find out if they are right or wrong the next day. It takes at least several years before actual claim experience emerges sufficiently to permit feedback. Consequently, executives may question the value of after-the-fact comparisons of actual experience to assumptions because at that point there isn't anything that can be done.

■ **'No Skin in the Game.'** Actuaries and underwriters are not often held directly accountable for the results achieved on business underwritten based on their assumptions and projections. Although their compensation may have a performance component, their incentive plans usually relate to the overall results of their company or division.

In p/c insurance, the short feedback loop and direct accountability required for well-calibrated metaknowledge do not exist naturally. Insurers must create them. In the actuarial

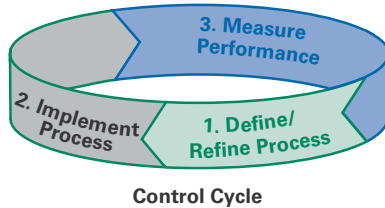
## Exhibit 1 Control Cycle: Retrospective Test of Pricing/Underwriting

### 1. Pricing and Underwriting Process Elements

- Data Required
- Actuarial Methods Employed
- Underwriting Policies & Rules
- Decision Authorities & Reporting
- Quality Assurance

### 3. Formal Retrospective Performance Testing

- Data Accurate and Adequate?
- Pricing Methods Sufficiently Robust?
- Policies and Rules Effective?
- Decision Authorities Appropriate?
- *Variances Between Projected and Actual Experience Within Tolerances?*



community, this feedback loop is referred to as “the control cycle.”

**The Control Cycle.** The best way to manage overconfidence in the p/c insurance industry is to implement a control cycle. Generically, a control cycle consists of a series of steps to manage any business process. The control cycle provides staff with needed feedback.

A control cycle for p/c pricing and underwriting entails identifying, testing and validating all of the assumptions that underlie the projection of future loss costs used to price and underwrite the business. Actuaries and underwriters make a number of assumptions in support of the pricing and underwriting process. For example, they make assumptions about the ultimate frequency and severity of claims on recent past business, the trends that affect claim frequency and severity over time, the impact of newly implemented coverage changes and the effects of new underwriting policies.

### Take the P/C Confidence Quiz

Are you overconfident when making business decisions? The authors have created a “confidence quiz” — related specifically to the p/c insurance industry — to test your confidence level. To take the quiz, visit [www.tillinghast.com](http://www.tillinghast.com). Answers will be available immediately after submission. An analysis of results will be provided in a future issue of *Emphasis*. **E**

Pricing and underwriting decisions are based on these assumptions. What is often missing is a subsequent review to determine the accuracy of each of the original assumptions, feedback to the actuaries and underwriters and behavior modification reflecting this feedback.

The control cycle may be applied to the pricing and underwriting process to improve feedback and, thereby, reduce overconfidence. (See *Exhibit 1*.) The control cycle consists of three main steps:

■ **Defining or Refining the Process.** The pricing and underwriting process must be defined in detail. This includes specifying the data required, the actuarial methods to be employed and the underwriting policies and rules to be followed. In addition, management must spell out decision authorities and reporting guidelines. Finally, quality assurance guidelines should be established, including, perhaps most critically, acceptable tolerances for variations between projected and actual experience.

■ **Implementing the Process.** The second step involves implementing the process defined in the first step.

■ **Measuring Performance.** The final step entails measuring performance against objectives. Key questions in this respect include:

- Are the data accurate and adequate?
- Are pricing methods sufficiently robust?
- Are underwriting policies and rules effective?
- Are decision authorities appropriate and in line with responsibilities?
- Are the variances between projected and actual experience within tolerances?

The answers to these questions should then feed back into the first step of the control cycle and be used to refine the process.

The control cycle provides timely feedback on the methods and assumptions used in the pricing and underwriting process, enabling actuaries and underwriters to improve decision-making and, ultimately, reduce the level of overconfidence.

*Exhibit 2* shows what pricing and underwriting might look like in a world where overconfidence is actively managed. In this illustration, a p/c insurer has implemented the early stages of

a control cycle, requiring actuaries and underwriters to take direct responsibility for every “loss pick” developed in the pricing and underwriting of each piece of business written. (This is accomplished using an account-level database that is part of the company’s underwriting workstation.) The company has expanded the assumptions to include each of the elements shown, so that the sources of pricing errors (and responsibilities) become explicit.

Of course, recording assumptions isn’t enough. To be effective, each element of the control cycle process must be *tested* retrospectively as part of an ongoing constructive postmortem. Especially when things go wrong, the individuals involved must take responsibility for figuring out why and for adjusting the process accordingly. And to get “skin in the game,” individual performance must be highlighted and tied to rewards in some way.

Given the long feedback loop for p/c business, testing should include examining a well-defined set of interim results (e.g., reported claims during the first year of a program) against projected values, based on the initial pricing assumptions. Feedback and corrective action can then be applied more promptly.

### Training Through Case Simulation.

Implementing a p/c pricing and underwriting control cycle is obviously a long-term initiative. Benefits come only as the feedback begins to flow. For many companies, this is too long to wait. Fortunately, training can accelerate the process. The long time line to the feedback loop is not unique to p/c insurance. Other industries with similarly long time lines (e.g., oil and gas exploration) have found that training can speed up the calibration.

The most effective training involves the use of case studies, constructed around past business, where the results are already known. Junior staff can gain quick, practical experience by working these case studies for pricing and underwriting and getting immediate feedback.

**Breaking the Cycle.** Historically, p/c insurers have lacked the discipline to fully implement the control cycle and manage their business by it. As a result, the p/c insurance business is notoriously cyclical, alternating between hard and soft markets. Periods of overcapacity and rampant price cutting are followed by withdrawal of capacity and opportunistic pricing.

## Exhibit 2 Managing Overconfidence in Pricing and Underwriting

Pricing Element	Best Estimate (\$)	Standard Deviation (%)	90% Confidence Interval		Ownership of Assumptions	
			Low	High	Primary	Manager
<b>Historical Experience</b>						
1. Not Fully Credible	957	5.0	597	1020		
2. Not Fully Mature (Loss Development)	191	20.0	146	242		
<b>Subtotal:</b>	<b>1,149</b>	<b>6.7</b>	<b>1,052</b>	<b>1,249</b>		
<b>Historical Costs</b>						
<b>Trends</b>						
3. Frequency/Severity Changes	138	50.0	67	226		
4. Exposure Changes	10	200.0	.88	23		
<b>Subtotal</b>	<b>1,297</b>	<b>12.0</b>	<b>1,105</b>	<b>15,009</b>		
<b>Future Costs</b>						
5. Non-Attritional Loss Elements	610	33.0	383	874		
<b>Total</b>	<b>1,906</b>	<b>17.3</b>	<b>1,508</b>	<b>2,340</b>		
<b>Variance From Best Estimate</b>			<b>20.9%</b>	<b>22.7%</b>		

Note: All Estimates Expressed as Pure Premium or On-Level Loss Ratio.

To break the cycle, p/c insurers need to be more explicit about pricing and underwriting assumptions and provide more immediate and precise feedback on results. Companies that adopt this approach, based on specifying and emphasizing profitability targets and foregoing the temptation to chase business volume when the market is soft, can achieve a steadier pattern of profitability. If this discipline is adopted widely, only then will the industry be able to manage overconfidence, improve decision-making and restore rationality. **E**

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