

## The New Actuary

**P**ROPERTY AND CASUALTY ACTUARIES' COMMUNICATION SKILLS are often the butt of jokes. The following paragraph might serve as a basis for these jokes (notwithstanding our pocket protectors and snazzy dress, of course):

*"Our analysis indicates that Company X's IBNR was determined using an optimistic expected loss ratio in the Bornhuetter-Ferguson method. In addition, the results of the incurred and paid loss development methods seemed to diverge due to case reserve strengthening implemented by the third-party administrator. The age-to-age factor selections relied heavily on the 3-year average excluding high/low, with a tail factor pulled from Sheshunoff. The handling of adjusting and other, formerly known as ULAE, needs to addressed."*

Oddly enough, many auditors and clients have come to expect this type of communication from their firm actuaries. In the process, these professionals have had to deepen their knowledge of the traditional actuarial functions and take part in "actuarial" communications.

We no longer get questions from auditors such as, "Does IBNR stand for Injured Badly, Not Recovered?" This is either a testament to the actuarial profession's success in raising awareness and quantifying the impact of certain important insurance related decisions—or they may have simply given up.

We believe the actuarial profession, as experts in the traditional areas of reserving and ratemaking, should continue to develop and enhance its services and communications skills. But in the changing world of financial services, we must also balance the importance of delivering traditional actuarial services with new and innovative ones. These new services, which typically focus on the integration of financial and strategic risks, will help our profession develop beyond the traditional roles our clients and auditors currently believe we're limited to.

A famous actuary once said: "Without uncertainty in life, there's no need for an actuary." The actuary's traditional role of pricing and reserving for insurance coverages is definitely focused on the uncertainty surrounding the insurance transaction. As we all know, the selling

of an insurance product is unique because the final cost of the insurance contract generally isn't known until many years after the price, or premium, is set.

Fortunately for the new actuary, uncertainty isn't restricted to insurance transactions. Uncertainty exists for the owner of a major sports franchise when setting season ticket prices for the upcoming year. Uncertainty exists for a major corporation looking to offer a point/rewards program to promote customer loyalty. Uncertainty exists for a pharmaceutical company looking to invest in a new drug. Uncertainty exists for a company performing due diligence on a potential acquisition candidate.

Uncertainty exists for every business. We've seen evidence that actuaries are becoming more involved in nontraditional roles at noninsurance companies. Actuaries have been using neural networks for advanced data mining of extremely large and detailed insurance company databases and discovering complex relationships. The power of neural networks is the ability

to handle multiple dimensions of risk factors simultaneously and to consider all the complex interactions between variables as well.

In the end, neural networks are providing underwriters and actuaries with precise and uniform risk assessments that can be used to increase the accuracy of product pricing. The skills actuaries are developing in this area are also being applied to noninsurance entities with robust databases.

Actuaries have also become more involved with financial transactions such as securitization (catastrophe bonds, swaps), "real options" analysis (option to defer investment, option to abandon investment, option for staged investment), and the use of stochastic modeling in analyzing unique investment opportunities. An example of this is our recent involvement in reviewing risk factors facing Low Income Housing Tax Credit (LIHTC) affordable-housing funds.

The LIHTC program was created by the Tax Reform Act of 1986 and was first used by the real estate development community in 1987. Under the LIHTC program, developers of rental housing must meet certain affordability



JOHN CONROY

STEPHEN R. DICENSO IS A SENIOR MANAGER AND KEVIN M. BINGHAM IS A MANAGER WITH DELOITTE & TOUCHE LLP IN HARTFORD, CONN.

tests under Sec. 42 of the Internal Revenue Code. If the tests are satisfied and state approval is granted in advance of the project after a rigorous financial examination by the state, investors receive a 10-year stream of federal tax credits they may use to offset their federal tax liability.

Our stochastic modeling focused on the risk factors that threaten the realization of the investor's yield, such as construction risk, lease-up risk, foreclosure risk, and tax-compliance risk.

For instance, if the developer fails to complete the construction according to plan or fails to lease the low-income units to schedule under the IRS code, the commencement of tax benefits will be delayed, resulting in a reduction in the yield achieved by the investor. By reviewing our client's historical data and other available industry sources, we were able to help the client establish parameters and develop models of affordable housing funds. This analysis provided valuable insights and confidence levels surrounding the profitability of these types of transactions.

Other examples of nontraditional actuarial applications include our involvement with stamp redemption and point/rewards programs. Though we were hired in a traditional role (establishing and reviewing outstanding liabilities), we leveraged our skill sets to offer additional value by stochastically modeling outcomes for future strategic program decisions. These decisions incorporated a number of critical assumptions—such as customer loyalty, residual points, and transferability—that affect the probability of redemption of points.

The above examples help to illustrate that actuaries are no longer just “looking out the back window of a car” and assisting clients in setting reserves for events that have already occurred. Many now view actuaries as trusted business advisers who can analyze and address the consequences of future strategic decisions for insurance and noninsurance entities.

As we stated before, uncertainty exists for every business, and the new actuary has the mathematical skills and modeling

ability to proactively address and assist entities with the quantification of uncertainty.

At the recent seminar on dynamic financial analysis in New York, keynote speaker Peter L. Bernstein, author of *Against the Gods: The Remarkable Story of Risk*, emphasized how important it is for a company to rigorously analyze the consequences of its strategic decisions. (See *Contingencies*, November/December 2000, cover story.) Uncertainty, whether defined as the probability of ruin, investment return volatility, percentage of tax credits lost, or points/rewards used, ultimately can be addressed using an actuary's mathematical skills and modeling ability to assess the consequences of an entity's strategic actions.

We believe that the actuary of the 21st century won't just be writing reports to auditors and clients about reserves using actuarial methods with unique names and complicated formulas that would make Pascal proud. If our predictions are correct, future reports may read more like this:

*“Our analysis and stochastic modeling indicate that Company X's selection of a double-trigger insurance program provides optimum protection from catastrophic insurance losses and large decreases in the market value of the company's investment portfolio. The investment portfolio mix has been optimized to deliver the highest return for the lowest amount of risk along the efficient frontier. The implementation of the Mars Frequent Shuttle Rewards (MFSR) program has a 90 percent probability of increasing customer loyalty by a minimum of 25 percent. We believe that Company X's return on equity to shareholders will exceed 15 percent 75 percent of the time and will only fall below 5 percent 10 percent of the time, assuming the MFSR program is implemented.”*

We can't guarantee that actuaries will communicate more clearly in the future by reducing references to long-winded formulas and oddly named distributions. But we're willing to bet that the actuary's traditional role will expand exponentially during the coming decades. It's our hope and belief that the actuarial profession will embrace the new actuary and take our profession to unprecedented heights. ●

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