

How People Act

AMONG THE MANY CHALLENGES actuaries face in estimating the effect of future contingent events, some of the most difficult involve the projection of human behavior. Not that predicting future interest rates, liability loss ratios, or mortality trends is easy. And of course, I don't include predicting the probability of a single event, such as whether your teenagers will start smoking next year even though you've done your best to steer them away from it. Rather, the estimates I refer to involve the behavior of a group of participants in a financial security program or group of insurance contracts who can choose to take advantage of the options available in that program or contract.

Actuaries often take advantage of the law of large numbers to produce reasonably predictable statistics for many types of events, but this should be done only if the occurrences are reasonably random, as with mortality. But because of information asymmetry, duration anti-selection, and the uncertainty of future trends, even mortality, a seemingly straightforward risk, can be difficult to estimate. In some cases, even if participants have choices, as long as conditions remain reasonably stable, past history can be used to judge similar future experience.

But changes in utilization rates or economic and personal conditions can turn previous experience into a poor indicator of future experience. Insurance products and employee benefit plans that actuaries deal with are packed full of choices. In some cases there are two-way options, for the company or plan can also have options, for instance, to terminate a plan or change rates or charges. For life insurance, policyholders can choose to voluntarily lapse the contract, annuitize, and take out a policy loan; for employee benefit plans, options include employee turnover, retirement, or annuitization; for health plans, they include rates of benefit utilization and at-issue self-selection.

In addition, the particular demographic profile of the group for which a projection is being conducted can significantly influence the choices made. Using the results of one demographic group in one economic situation to estimate experience of another group in uncertain future conditions has to be performed with caution and judgment.

Projecting future economic scenarios is difficult enough, but also reflecting how people will act in each scenario can be even more difficult. It's important to study experience in as many types of economic scenarios as available, but other aspects of the situation can change as well. To what extent will policyholders take advantage of their options, such as information asymmetry at insurance contract issuance? How

many will take early retirement? These are all tough but important questions.

Actuaries need to understand the situation, reflect the demographic population involved, assess other factors contributing to future economic conditions, and gauge reactions to them. They need to ask why, what would I do in this type of situation, what would motivate me to act or decide? In addition, because of asymmetrical effects, it's not always sufficient to just project the average, but to project the behavior

of clusters of people or probability distributions as well.

It's usually easy to project a trend statistically through such techniques as simple linear extrapolation or regression, exponential smoothing, or technical charting. Such simple projections are what the market usually uses. But in real life, trends change; to project (or not to project) a turning point is risky.

There will always be limits to our ability to predict how humans will act, but actuaries have to do it somehow. Some contend that it's impossible to predict turning points in the stock market. And it can be even more difficult to predict individual behavior, even if the individual's motivation is clear. Some contend that, due to the law of large numbers, it's easier to predict the actions of groups, even though it's only reliable when dealing with independent and identically distributed individual trials, which don't often happen in practice.

The earlier financial economist's theories such as Black, Scholes, and Merton assumed that all market participants act rationally in their own self-interest. But not everyone acts rationally and there aren't many perfect markets. The newly developing economic field of evaluating the effect of imperfect markets, in part due to the influence of behavioral economics, is little more than what actuaries have been doing and studying throughout the history of the profession.

The classic actuarial approach to this problem is to identify the risks involved; understand the demographic, economic, and competitive forces that might affect the future conditions; quantify a range of likely responses; and manage the resulting risks. The risk management techniques that should be used—such as dividends, non-guaranteed contract features, renewal options, hedging, or alternative funding plans—will depend in part on the degree of risk aversion involved. The actuary will increasingly rely on techniques such as sensitivity testing and stochastic analysis to study the effects of how people act, even if their assumptions and distributions are somewhat crude. ●

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