What Are The Chances?

Let's turn our attention now to "real world" risks. In real life, adversity manifests itself with a variety of probabilities. These probabilities run the spectrum from disturbingly high to very low. Exhibit II.F.2 shows the probabilities for a variety of events, culled from a variety of official and unofficial sources. We can view these probabilities as the expected number of years between events, or as the number of occurrences expected per year in a sample of given size (as in our ball drawing experiments). For example, a probability of 1/10 (.1 in decimal notation) for automobile collision means that we can expect one such event every 10 years for a single auto, or one event per year for every 10 autos. Events that affect individuals, businesses, and whole societies are included for comparison.

In order to fit the vast scale of probabilities into a single chart, a logarithmic scale is used. Logarithmic scales are often used in risk assessments, to show both probabilities and losses. When used to show probabilities, the logarithmic scale partitions the scale into even segments representing decrements in the probability by factors of ten (1, 1/10, 1/100, 1/1,000 and so on). Logarithms of fractions have the effect of expanding the scale. In this way we can compare the probability of relatively "frequent" events, such as auto collisions, with rare events, such as catastrophic hurricanes. The logarithmic scale for losses works in the opposite direction, compressing large loss amounts to accommodate a reasonable scale.

Note also that the probabilities given for these events constitute a single number or best guess. Data on rare events is, naturally, scarce. Uncertainty leading to nuclear reactor core meltdowns, for example, suggests a range of probability values form 1/1,000,000 to 1/100,000 per reactor year. Pegging an exact value somewhere in between these endpoints seems a reasonable compromise. In actual decision making situations we would want to be more explicit about this uncertainty.

The chart (below) clearly indicates that the probabilities for truly disastrous events are usually very low. For perspective, the probability of a penny landing "heads" 10 times in a row is 1/1,000. Most of the catastrophic events on the chart have probabilities much lower than this. Their rarity, however, is counterbalanced by their severity. All distinctly "possible" scenarios constitute genuine danger. And as our experience has shown, danger is something that must be carefully reckoned with. Probabilities that we might safely ignore when making relatively trivial decisions become troublesome in the realm of disaster. While being "99 percent sure" it will not rain tomorrow (implying a 1/100 chance it will) is certainly enough to convince me to leave my umbrella at home, it is less assuring in regard to a catastrophe.

Probabilities that seem inconceivably small become comprehensible when viewed from the standpoint of the collective. In a group of 1,000 firms, each facing an annual probability of financial ruin of say 1/ 10,000, or .0001, we are virtually guaranteed that one of these firms will go out of business within the next 10 years. The question becomes: Are you willing to take a chance that it is your firm? The answer is probably "no." No exact threshold for acceptability of risks can be drawn. When the stakes are high, numbers like 1/100,000 or the proverbial "one in a million" are more likely to represent an acceptable comfort level.

What are the chances my organization will suffer a serious loss within the next year? This is the question we will try to answer by applying modern methods of risk assessment.

EXHIBIT II.F.2

WHAT ARE THE CHANCES?

Probability	Event
1.0	
1/10 (.01)	Automobile collision (property damage only)
	Offshore oil rig accident
1/100 (.01)	Major (8+) earthquake, Southern California
	Mine disaster
1/1,000 (.001)	Bridge collapse
	Catastrophic hurricane ($50B damage), Eastern U. S.
1/10,000 (.0001)	Dam failure (major installation)
	Major fire, large industrial facility
1/100,000 (.00001)	Major earthquake, Eastern U. S.
	Nuclear reactor core melt
1/1,000,000 (.000001)	Fatal lightning strike
1/10,000,000 (.0000001)	Catastrophic meteor strike

Courtesy of www.IRMI-Online.com