Risk **milestones**

Anniversaries inevitably inspire an urge to reminisce. ***David Rowe*** *lists several important public milestones and one personal milestone in the development of financial risk management*

Financial risk management as we know it today has been shaped by a combination of diverse influences over more than 50 years. These include:

- theoretical breakthroughs
- technical advances
- shifts in the economic and regulatory environments.

A logical starting point for recounting these influences is the early work of Harry Markowitz on modern portfolio theory, which can be traced as far back as 1952. For all the controversy it engendered, the work of Markowitz and his co-Nobel prize winners William Sharpe and Merton Miller drove home one crucial idea: financial risk is inherently a portfolio concept, and the risk of any individual position is meaningless in the abstract without reference to its portfolio context.

My next important milestone is the introduction of mini-computers, exemplified by the DEC PDP-10 that first appeared in 1968. This brought computing power out of the exclusive control of corporate system engineering departments and into the hands of application specialists. By reducing the price of a stand-alone computer and enabling practical time-sharing, it made computing power available to individual departments and small organisations. It was this first wave of computing democratisation that allowed the practical application of modern portfolio theory to actual investment decisions.

The next major milestone came in spring 1973, when the original Black-Scholes and Merton articles on option pricing theory were published.[1] The central theoretical insight of these contributions was that, under specific stochastic assumptions, the payout of an option on an asset could be replicated by a continuously adjusted portfolio of positions in the underlying asset itself. The implication of this was that the fair value of an option is its expected payout. There is no special risk in writing such an option (given the assumed conditions) and hence no basis for some abnormal return to compensate for such risk.[2] The key practical insight was a very computationally efficient closed-form solution (the now famous Black-Scholes formula) for evaluating an option's expected payout.

Despite the insights of Black, Scholes and Merton, it took two more important milestone events to trigger an explosion in option markets. These were the introduction of the IBM personal computer in 1981 and the Lotus 1-2-3 spreadsheet program in 1983. This put both computing power and a simplified software development tool directly into the hands of end-users. When the concept of an interest rate swap was introduced at about this time, the great flexibility it provided for changing interest rate sensitivity quickly and cheaply proved irresistible. Theory and practice had converged to produce the beginning of a derivatives market whose dramatic growth continues to this day.

There were two significant milestones in 1995. In that year, JP Morgan introduced the first credit default swaps and collateralised debt obligations. Whereas interest rate and foreign exchange derivatives were based on underlying concepts with easily observable values, credit derivatives applied to something much more amorphous – namely, credit quality. This was a significant departure, and it opened up market thinking on how derivatives could be applied to an even wider range of uncertainties, such as weather, longevity, property damage and a host of other risks commonly considered the exclusive domain of the insurance industry.

Also in 1995, the Basel Committee on Banking Supervision agreed to allow banks to use their own internal market risk models for determining minimum regulatory capital. This was a radical departure from the long-established pattern of prescriptive regulation. An accompanying article in this issue of *Risk* discusses this innovation and its implications in more detail (see page 73).

Personal milestone

Finally, allow me to mention one personal milestone. Sometime in 1989, I began noticing copies of a magazine called *Risk* appearing on the desks of my colleagues. I remember thinking at the time that perhaps I should try to make a contact to see if I could get something published there. Needless to say, this is a classic example of 'be careful what you pray for, you might get it'.

The past 20 years have been a most interesting ride for all of us in this business. Let's hope the next 20 are equally successful. ■

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[1] *F Black and M Scholes, The pricing of options and corporate liabilities, Journal of Political Economy, May/June 1973; and R Merton, The theory of rational option pricing, The Bell Journal of Economics and Management Science, spring 1973*

[2] *Of course, the degree to which the underlying assumptions reflect real-world conditions continues to be hotly debated*