A well-functioning financial system, including its legal and accounting components, is a key driver for realising the long-term growth and development potential of an economy. This conclusion emerges from a variety of studies, including cross-country comparisons, firm-level studies, time-series research and econometric investigations that use panel techniques. A number of economic historians have concluded that those regions – be they cities, states or countries – that developed relatively more sophisticated and well-functioning financial systems were the ones that were also the subsequent leaders in economic development of their times.

New financial product and market designs, improved computer and telecommunications technology and advances in the science of finance during the past 35 years have led to dramatic and rapid global changes in the structure of the financial system. The scientific breakthroughs in finance during this period both shaped and were shaped by the extraordinary flow of financial innovation, which coincided with those changes. The cumulative impact has significantly affected all of us – as users, producers or overseers of the financial system.

Finance science has informed practice across a wide spectrum, with powerful prescriptions for portfolio allocation, asset pricing, performance measurement, risk management and corporate financial decision-making. But surely the prime exemplifying case is the development, refinement and broad-based adoption of derivative securities such as futures, options, swaps and other contractual agreements. It is estimated that more than USD 500 trillion – half a quadrillion – of derivatives are outstanding today globally (in notional terms).

Practitioner innovations in these financial-contracting technologies have improved efficiency by expanding opportunities for risk sharing, lowering transaction costs and reducing information and agency costs. It was my great good fortune to be involved at the outset of this extraordinary period of development in finance science and the financial system. In 1973, when the late Fischer Black, Myron Scholes and I published the research on option pricing named by me and known as the Black-Scholes-Merton model – which was recognised a quarter century later in Stockholm – options and derivative securities generally were seen as an arcane and specialised area of finance. The modern financial derivatives markets were then in their infancy. The Chicago Board Options Exchange, the first options exchange, had just been launched; the first financial futures contracts were trading in the Midwest; and the first interest-rate swap contract was still eight years away into the future. Neither Eurex nor the International Securities Exchange (ISE) was yet in existence. At the time there was surely skepticism about the market’s potential and considerable doubt over whether the instruments then being developed would prove beneficial.

The methodology for valuing derivatives we had developed not only enabled listed, over-the-counter and executive stock options to be priced, but it also gave us insights into solving a wide range of other structurally equivalent valuation problems, such as a unified theory for pricing corporate liabilities; mortgage prepayment options; offshore oil drilling rights; real estate and movie right options; loan guarantees; deposit insurance; farm price supports; drug discovery phasing; shelf-space in supermarkets; modularity in production and multiple-fuel power plants; indeed even tenure contracts for professors. A whole world of possibilities had opened up.

Although we recognised in the early days that the approach we had developed had wide-ranging application, we could not have forecast the extraordinary speed, breadth and magnitude of the subsequent adoption and development of the derivative markets.

In addition to improving the means to price options, our analysis provided a means of measuring their risk exposure. The methodology also filled a need – with the creation of an options exchange, the pace and scale of trading were such that options traders and market makers could no longer operate based on simple heuristics and guesswork. The ‘theory’ enabled options traders to take much bigger positions because they could use the model to figure out how to hedge their exposures; they could...

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It was an enormous kick to see how this highly mathematical and abstract theory was put to mainstream practical use.