



Evolving Techniques in Investment Management

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Executive Summary

Introduction

An explosion in the variety and power of innovative techniques and instruments has been a dominant feature of investment management in the second half of this century, particularly in the 1970s and 1980s. Several ingredients have combined to bring this about. Improvement in the quality and availability of information early in the post-war period was vital to the process. The shift in the status of insider dealing has been an excellent barometer. Previously, failing better facilities, insider dealing was the accepted route to investment research. It is now a criminal offence in most countries. Advances in computer power was another essential factor, allowing the data to be stored, processed and analysed. The burst of brilliant academic thought in the third-quarter of this century was the spark which set it all off.

Another stimulus to the proliferation of techniques comes from the growth of international investing. Under the combined influences of globalisation and deregulation, and with the help of technology, cross-border investors already accounted for more than 8 percent of global equities by 1993. The figure is expected

to increase substantially. The enlargement of investor choices has catalysed the enhancement of management techniques to cope with the growth in complexity.

The mainstream of the investment management industry has not rushed to exploit the new investment technology. Derivatives are still under-used, in spite of the widespread recognition of their potency in risk control, and quantitative techniques are not yet to be accepted by many fund managers. Eventually, they may have little choice. Fast-growing specialist firms are dedicated to the new techniques sprouting up. These and some of the more forward-thinking established firms are aiming at market share through product innovation. Differentiation by products and techniques looks likely to become a key weapon in the intensifying competition for global investment business.

The Process

On the face of it, the basic investment management process has not changed. Identifying client needs, picking suitable investments and putting together the portfolio remains the core of the process. The variety of techniques relates to the way in which these tasks are carried out.

Risk

The subject of risk is one of the great controversies of investment management. It is a concept readily understood in all walks of life and is central to the developing science of fund management. What is controversial is the definition of risk as short-term volatility of security prices. This definition has enabled and inspired massive advances in mathematical techniques but sharply conflicts with some intuitive notions.

MPT and Efficient Markets

Modern portfolio theory (MPT), the quantitative discipline founded by Markowitz in 1952, rests on the controversial notion of short-term volatility. Another controversy arose from further developments in MPT. The 1960s gave birth to the random walk theory, the efficient market hypothesis and the capital asset pricing model (CAPM). All of these carried the common message that, after allowing for risk, stock markets could not be beaten, as they were efficient. The parameter "beta" measured the risk of a stock relative to the market. The capital asset pricing model asserts that the return from a stock relative to the market could be almost explained by this parameter. The arbitrage pricing theory of the 1970s was more hopeful in that it prescribed how the market could be beaten by correctly forecasting changes in certain economic variables.

There is now a deep schism on the subject of market efficiency. Previously almost monolithic in their support for market efficiency, academics are now split on this issue. In the main, three different types of argument are being brought to bear on

the case for discrediting the efficient market hypothesis. These are the existence of anomalous effects, the occurrence of bubbles and the prevalence of non-linear relationships. Some MPT exponents such as Markowitz himself and Barr Rosenberg are now busy using quantitative techniques to spot under-valued stocks. Any consistent success of the quantitative techniques used by them and others will be evidence against the theory. The fashionable mathematics of chaos is another line of attack, but as yet it has no convincing success.

A practical consequence of support for the efficient market hypothesis is the growth of indexed funds. If the hypothesis is sustained over the years, this trend could continue. By 1993, these funds were estimated to account for about 20 percent of equity investment in US pension funds.

Analysis and Valuation

The valuation process for bonds reduced estimating the discount rates applicable to future cashflows. Ideally, the zero-coupon bonds need to be used if available. In practice, the yield to maturity (YTM) though theoretically flawed, is a widely used measure and value. Credit ratings by organisations such as Moody's and Standard and Poor's are of help in the valuation of bonds with default risk.

The two key measures of risk – duration and convexity – together explain most of the variation of bond prices with interest rates. The yield curve – the graphical version of the term structure – is another commonly used tool. A three-dimensional yield surface is theoretically better but is impractical in most markets.

The analysis and valuation of equities requires various types of information, both current and historic, relating to economic industry and company-specific data. Accounting data poses special problems. There is much subjectivity that goes into accounts for both creditable and deplorable reasons. In different countries the motivation for published accounts varies. In the UK and the US, influencing shareholder perceptions is a matter of high priority whereas in some countries, tax minimisation is the target.

The investor needs to make a subjective assessment of the validity of the earning figures. Sometimes, their unreliability represents an opportunity for detecting features others have missed. Because of the shakiness of the published earnings estimate, frequently other measures of comparing companies are used, cashflow being one.

International Diversification

International diversification is a growing trend. Its advantages of risk reduction and the provision of enhanced opportunities are now widely recognised. The controversial capital asset pricing model or its international counterpart also support the case. There are issues such as client comfort that militate against diversification, some of which should recede in importance over time.

International diversification introduces two new dimensions – market selection and currency exposure. The latter gives rise to one of the major debates in international investment, which relates to the appropriate degree of hedging currency risk. There is a body of research on this subject, much of it historical. Given considerable structural change in global exchange rate systems, past history needs to be treated with circumspection. A fund manager should take into account a number of different factors in looking to the future.

Derivatives

Derivatives have been around for a long time. They were traded in Amsterdam as far back as in the early 1600s. They took on a new life after 1973 following the seminal paper on options pricing by Black and Scholes, and the opening of the Chicago traded options exchange.

Black and Scholes' model, as is common with all mathematical models, made simplifying assumptions. Subsequently, variants and alternatives were devised dispensing with some of the simplifications. One of the more important alternative methodologies consists of the binomial model. This technique is often useful in situations when the Black and Scholes assumptions do not apply. Different models have been derived for the different asset types. Debt option models have the remarkable feature of not just calculating the option premiums, but of simultaneously projecting the term structure and estimating bond prices as well.

Options and futures give rise to six basic strategies. It is possible to combine the basic strategies in many creative ways, giving an investor enormous flexibility in fine-tuning risks. The beauty of options is that they allow profiting from bear markets and sideways markets as well, not just from bull markets. Options and futures linked to various instruments, equities, bonds, currencies, commodities and market indices are available.

Portfolio management applications of derivatives include risk reduction and control, expediting policy changes, management of cashflows, improving the risk:reward trade-off and increasing tactical flexibility. Portfolio insurance and, in particular, dynamic hedging are further well-known applications of derivatives. Though the Black and Scholes and other models have facilitated the use of derivatives in general, it is dubious whether they are directly useful to fund managers. The same applies to the various measures of option premium sensitivities – volatility, delta, gamma, theta, rho and vega.

Asset Allocation

Stimulated by the needs of pension funds, asset allocation has been the focus of much attention, though the general approach applies to other types of client as well. It is a multi-faceted process embracing:

- The choice of asset classes;
- Policy, strategy and tactics;
- Techniques and models; and
- Comparison and issue selection.

The number of asset classes are proliferating, so much so that the old intuitive approaches will become increasingly cumbersome, especially given the growing multiplicity of techniques. These techniques cover three different types of decision over different time horizons. Policy decisions are taken for long-term reasons such as client needs. In the case of pension funds, asset liability considerations would influence policy. Strategy and tactical decisions would relate to the medium and short-term respectively.

Short-term asset allocation has attracted the most study and competition. Many different techniques are used. They come under two classifications. One set aims at return enhancement while the other is concerned with risk reduction. Portfolio insurance and dynamic hedging come under the latter category. The subject of asset allocation raises another important investment issue. The debate concerns the relative importance of asset allocation vis-à-vis issue selection. Some contend that the former accounts for much of the variation in performance between funds. There is no clear-cut answer.

Recent Developments

Artificial intelligence comprises one of the most exciting areas of the interface between investments and computing. The new technologies utilise neural networks, which attempt to mimic the brain, fuzzy logic, and genetic algorithms drawing upon Darwinian principle of natural selection.

Conclusion

Product and process differentiation have not yet affected the investment management industry in a market manner. But some signs are already apparent. Both established firms and potential newcomers need to assess carefully their desired positioning in the evolving battle of the techniques.