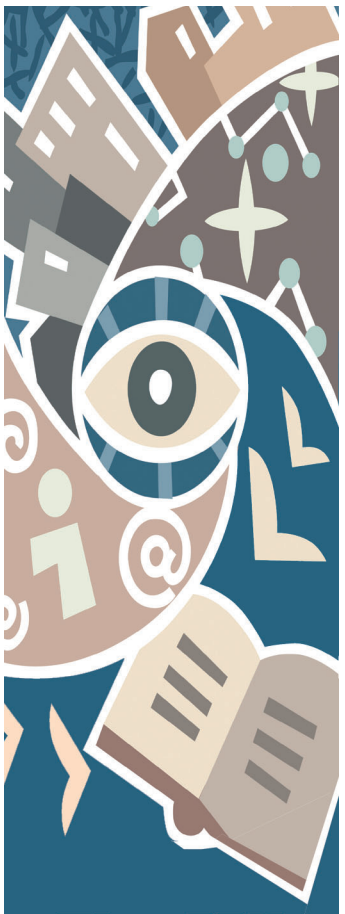


The FEN Book Review

*Richard Norgate, Ph.D.*

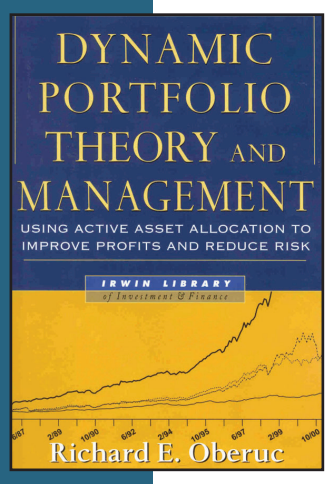
# Dynamic Portfolio Theory and Management

As regular readers of this column know, a large number of the books that I review relate to financial engineering within banking, and so it is always interesting when books from other areas land on my desk for review. This month, I was pleased to see a publication from the world of asset management. This is an area that interests me because it seems to be so full of contrasts.

At its most mathematically advanced, there are groups of amazingly intelligent mathematicians toiling away to develop ever-more-complex algorithms to predict ever-more-accurate future values of certain investments. The work that these teams do is similar in nature to some of the more esoteric methods used in market risk measurement in banking, and it is without doubt an intellectually challenging world. While the world at large is often not aware of the spectacular upside that these teams can create, there are occasions, such as the LTCM episode a few years ago, when the world is only too aware of the equally spectacular results when the maths goes wrong.

On the other side of the coin, there is a much more sedate approach to asset management. This more traditional world often appears from the outside to be moving very slowly. Few active decisions are made each month within a fund, even if there is a team of analysts working late into every night preparing analysis from yet another angle for the fund managers to pore over the following morning.

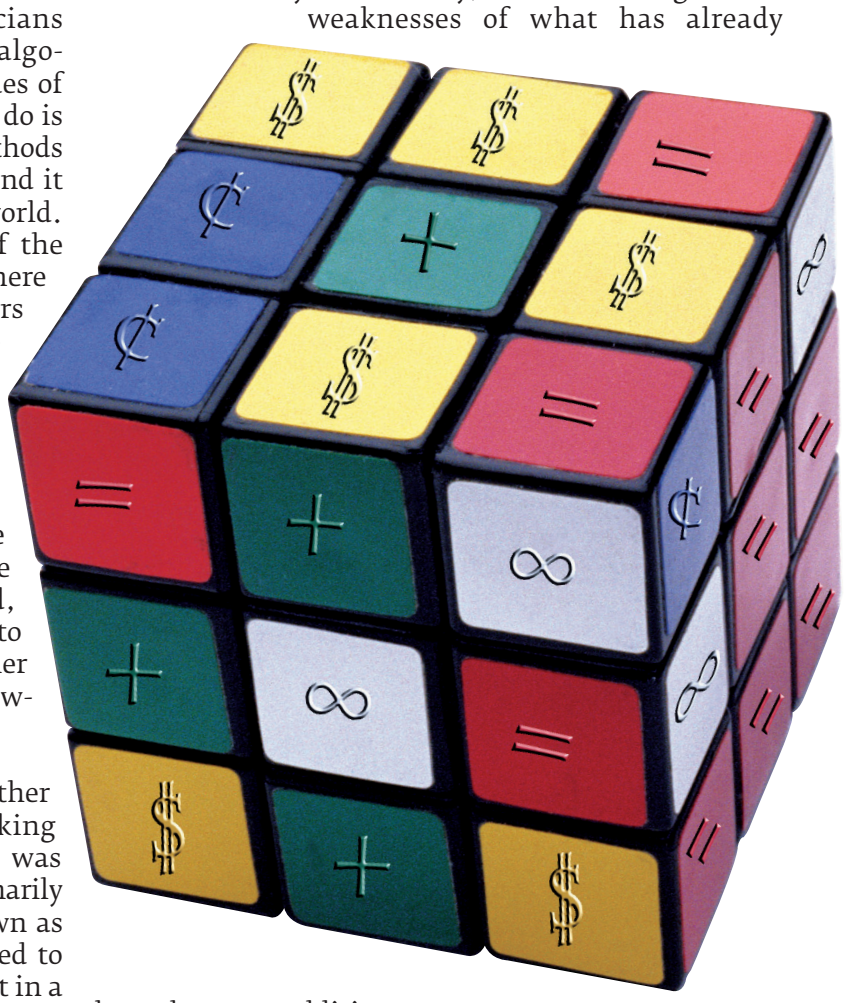
Rather than using spectacular maths, and rather than using the more subjective decision-making process, an alternative mathematical method was developed in the 1990s. The new method was primarily developed by Harry Markowitz, and is now known as modern portfolio theory (MPT). MPT can be used to provide an algorithm that will flag when to invest in a particular asset class, and when not to, based on some simple mathematical concepts. *Dynamic Portfolio Theory and Management* is one of the most recent publications in what is becoming a popular area of research in asset management, and it appears this growth is not least because of the type of maths involved. Whereas the mathematicians mentioned earlier spend their lives immersed in partial differential equations and stochastic calculus, the approach suggested within MPT uses simple concepts, such as linear programming, to provide an asset allocation decision. The advantage of this, of course, is that most fund managers can understand what is going on, and problems can be posed and solved using readily available (and cheap) linear programming packages.




As happens frequently, the way in which the concept was created is also the cause of one of its most fundamental drawbacks. The initial Markowitz work was drawn out of risk management, and one of its main drawbacks is its closeness to risk management. In almost every branch of risk management, volatility is always seen as something to be avoided. The traditional measure of volatility is the standard deviation (as familiar to every high school statistics student) and hence reducing standard deviation is almost always seen as reducing risk. In the world of asset management, there is one fundamental difference: a variation upwards (in asset price, for example) can be a very good thing. One of the main benefits of the methodology put forward in this book is that it uses an alternative metric to measure downside-only risk.

The first section of *Dynamic Portfolio Theory and Management* does not dive straight into the model developed by the author, but instead it provides an excellent review of the literature in a number of areas. Early chapters describe factors that have been shown to influence stock returns, bond returns, interest rates, and hedge fund returns. While the result of all of this research is not always particularly successful, these chapters provide a comprehensive review of what has already been done in these areas, and this is, in itself, valuable. The factors considered are wide ranging, covering interest rates, exchange rates, various macro-economic factors, historical returns, other asset prices, and a number of other factors.

The second section of the book provides a review of the methods that have been used by other authors. Although it sounds as if the book is academic in style (indeed, it is academic in structure), each of the chapters is easily readable and highlights, in a pragmatic and utility-focused way, the main strengths and weaknesses of what has already been done. In addition to methods that use linear-programming, there are also suggestions for where quadratic programming and integer programming could be used to solve slightly different mathematical formulations.



The final section of the book introduces the author's model. The model is known as DynaPorte™, and unlike some of the earlier models in the literature, it appears to have been built with the intent that it should be used as a real tool for asset allocation, rather than as an academic exercise. Some of the assumptions made by earlier academics were useful in demonstrating concepts but did not provide useful models. For example, some models could not include transaction costs; others would only allow relatively small numbers of investments, and so on. The DynaPorte model appears to overcome all of these weaknesses and provide a useable model for asset allocation.

While there will always be a place for the serious mathematicians in asset allocation, it appears that the author has done a successful job of moving forward an alternative approach to provide a tool that is of real use in the industry. The last chapter of the book focuses on the results of the model, and it appears that the DynaPorte model really does allocate assets in a sensible way to outperform the markets.

What is not clear, however, is how ready the industry is for an automatic asset allocation algorithm. While it is clear that the fund managers of the world will not be replaced by algorithms in the near future, it is likely that this could be the start of a fundamental change in the way the fund management industry works. ■

*"Dynamic Portfolio Theory and Management," Richard E. Oberuc, McGraw Hill, ISBN: 0071426698*

## About the Reviewer

*Richard Norgate is an Executive Adviser in the Financial Risk Management team within KPMG's Risk Advisory Services Practice. He holds a Ph.D. in Mathematical Modeling and a Masc. in Numerical Methods and Software Systems. Dr. Norgate has worked in risk management for a number of banks and financial institutions worldwide and has been involved in numerous credit, market and operational risk management projects. He can be reached at rnorgate@fenews.com*