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# Benchmarking, portfolio insurance and technical analysis: a Monte Carlo comparison of dynamic strategies of asset allocation

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## Abstract

This paper makes an extensive simulation comparison of popular dynamic strategies of asset allocation. For each strategy, alternative measures have been calculated for risk, return and risk-adjusted performance (Sharpe ratio, Sortino ratio, return at risk). Moreover, the strategies are compared in different market situations (bull, bear, no-trend markets) and with different market volatility, taking into account transaction costs and discrete rebalancing of portfolios. The simulations show a dominant role of constant proportion strategies in bear and no-trend markets and a preference for benchmarking strategies in bull markets. These results are independent of the volatility level and the risk-adjusted measure adopted. © 2002 Elsevier Science B.V. All rights reserved.

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## 1. Introduction

Strategic asset allocation is defined as the process used to identify the optimal portfolio for a given investor over his or her investment horizon. In simple terms, such a portfolio will be a combination of risky assets (stocks, bonds) and risk-free components (cash, money market instruments). The strategic view will then have to be translated

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into short-term tactical strategies, each one having a different cost of implementation and different risk-return profiles.

The asset manager, if not contractually bound, has the option of choosing a particular tactical, trading strategy, in order to buy and sell risky and risk-free assets. This paper tries to offer useful suggestions deriving from a simulation analysis of popular alternatives.

The simplest case is a static strategy called “buy and hold”: the strategic portfolio is bought at the beginning of the investment period and nothing else is done until portfolio is liquidated at the end.

Other strategies, however, are truly dynamic, implying a periodic rebalancing process among the assets. In particular, three different kinds of dynamic trading strategies are considered: benchmarking, portfolio insurance and technical analysis.

At any rate, the strategies considered are not discretionary in nature, in the sense that they can be expressed in terms of precise quantitative rules of action by the asset manager. Moreover, all these strategies are currently implemented in actual markets.

Technical analysis is perhaps the oldest device designed to beat the market. It has a secular history given that its origins can be traced to the seminal articles published by Charles H. Dow in the *Wall Street Journal* between 1900 and 1902, and its basic concepts became popular after contributions by Hamilton (1922) and Rhea (1932). A complete jargon of words and pictures has been developed since then and many traders, nowadays, take their buying and selling decisions on the basis of technical analysis results appearing on their screens.

Portfolio insurance arose as a by-product of the option pricing theory. The story of its discovery has been reported by Leland and Rubinstein (1988) as a case of theoretical intuition and practical success. A simplified approach, not involving complex formulas but retaining the insurance feature was proposed by Black and Jones (1987). However, if the Wall Street crisis of October 1929 represents the first real test for technical analysis, the stock market crash of October 1987 was a hard lesson to learn for portfolio insurance techniques (Rubinstein, 1988).

Finally, benchmarking has in recent years become the truly risk-free choice for portfolio managers. In fact, given the general rule of contractually specifying a single or composite market index as the reference benchmark for both passive and active management it is soon apparent that tracking the index and minimising the so-called ‘active risk’<sup>1</sup> is, in a sense, a risk-free policy and a meaningful standard of comparison for any alternative. Less evident is the fact that, as we shall see, a benchmarking strategy is in itself an active policy from the point of view of the risky component of the portfolio.

An extensive comparison of the different strategies of portfolio management is still not available. Much research has been devoted to evaluating technical analysis, from early studies by Fama and Blume (1966), Jensen and Bennington (1970), to Brock et al. (1992). Only recently has the biasing effect of data-snooping on the performance of

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<sup>1</sup> Active risk or tracking error is defined as the volatility of the difference in returns between the managed portfolio and the benchmark.

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