

Technical analysis compared to mathematical models based methods under parameters mis-specification

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Abstract

In this study, we compare the performance of trading strategies based on possibly mis-specified mathematical models with a trading strategy based on a technical trading rule. In both cases, the trader attempts to predict a change in the drift of the stock return occurring at an unknown time. We explicitly compute the trader's expected logarithmic utility of wealth for the various trading strategies. We next rely on Monte Carlo numerical experiments to compare their performance. The simulations show that under parameter mis-specification, the technical analysis technique out-performs the optimal allocation strategy but not the Model and Detect strategies. The latter strategies dominance is confirmed under parameter mis-specification as long as the two stock returns' drifts are high in absolute terms. © 2006 Elsevier B.V. All rights reserved.

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1. Introduction

The financial services industry typically relies on three main approaches to make investment decisions: the fundamental approach that uses fundamental economic principles to form portfolios, the technical analysis approach that uses price and/or volume histories and the mathematical approach that is based on mathematical models. Technical analysis has been used by professional investors for more than a century. The academic community has looked at its foundations and its performance with a rather skeptical frame of mind. Indeed, technical analysis techniques have limited theoretical justification, and they stand in contradiction to the conclusions of the efficient market hypothesis. More recently, there has been a renewal of academic interest in the performance of technical analysis based methods. Indeed, the pioneering study by Brock et al. (1992) applied 26 trading rules to the Dow Jones Industrial Average and found that they significantly out-perform a benchmark of holding cash. In their impressive study, Sullivan et al. (1999) examine close to 8000 technical trading rules and repeat Brock et al. study while correcting it for data snooping problems. They find that the trading rules examined by Brock et al. do not generate superior performance out-of-sample. Lo et al. (2000) propose to use a non-parametric kernel regressions pattern recognition method in order to automate the evaluation of technical analysis trading techniques. In their comprehensive study they compare the unconditional and the conditional – on technical analysis indicators – distribution of a large number of stocks traded on the NYSE/AMEX and on the NASDAQ. They conclude that “several technical indicators do provide some incremental information and may have some practical value”. However, as pointed out by Jegadeesh, 2000 in his comment of the Lo et al. (2000) paper, none of the technical analysis indicators examined by the authors is able to identify profitable investment opportunities. Thus, it seems that the debate about the effectiveness of technical analysis usefulness is still very much alive.

The purpose of our study is to examine chartist and mathematical models based trading strategies by providing a conceptual framework where their performance can be compared. If one considers a non-stationary economy, it is impossible to specify and calibrate mathematical models that can capture all the sources of parameter instability during a long time interval. In such an environment, one can only attempt to divide any long investment period into sub-periods such that, in each of these sub-periods, the financial assets prices can reasonably be supposed to follow some particular distribution (e.g., a stochastic differential system with a fixed volatility function). Due to the investment opportunity set's instability, each sub-period must be short. Therefore, one can only use small amounts of data during each sub-period to calibrate the model, and the calibration errors can be substantial. Yet, any investment strategy's performance depends on the underlying model characterizing the evolution of the investment opportunity set and also on the parameters involved in the model. Thus, in a non-stationary economy, one can use strategies which have been optimally designed under the assumption that the market is well described by a prescribed model, but these strategies can be extremely misleading in practice because the prescribed model does not fit the actual evolution of the investment opportunity set. In such a situation, is one better of using a technical analysis based trading rule which is free of any model dependency? In order to answer that question one should compare the performance obtained by using erroneously calibrated mathematical models with the one associated with technical analysis techniques. To our knowledge, this question has not yet been investigated in the academic literature.

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