Available online at www.sciencedirect.com
SCIENCE DIRECT®
Decision Support Systems 37 (2004) 515–530
Decision Support Systems
www.elsevier.com/locate/dsw

A computational implementation of stock charting: abrupt volume increase as signal for movement in New York Stock Exchange Composite Index

William Leigh[a,*], Naval Modani[b], Ross Hightower[a]

[a] Department of Management Information Systems, College of Business Administration, University of Central Florida, PO Box 161400, Orlando, FL 32816-1400, USA
[b] Department of Finance, College of Business Administration, University of Central Florida, Orlando, FL 32816-1400, USA

Available online 18 July 2003

Abstract

In this case study in knowledge engineering, data mining, and behavioral finance, we implement a variation of the bull flag stock charting heuristic using a template matching technique from pattern recognition to identify abrupt increases in volume in the New York Stock Exchange Composite Index. Such volume increases are found to signal subsequent increases in price under certain conditions during the period from 1981 to 1999, the Great Bull Market. A 120-trading-day history of price and volume is used to forecast price movement at horizons from 20 to 100 trading days.

Keywords: Pattern recognition; Financial decision support; Market efficiency; Technical analysis; Stock market forecasting

1. Introduction

The original Dow Theory, establishing technical analysis, was conceived and promoted by Charles Dow in the latter part of the 19th century. Ref. [3] traces the history of the Dow Theory and evaluates its effectiveness. Technical analysis includes the use of "stock charting" heuristics, which identify buy/sell signals as graphical patterns in historical price and volume values. We use template matching, a basic technique from statistical pattern recognition, to implement a variation of one charting heuristic for timing the purchase and sale of stocks. Even though the pitfalls of market timing are well known [1], we find evidence that this heuristic for market timing, in those periods in which it applies, is effective in generating returns better than a passive buy-and-hold investment strategy.

To back-test the heuristic, we use price and trading volume data for the New York Stock Exchange Composite Index, from January 28, 1981 to September, 15, 1999 (4697 trading days). This period is the Great Bull Market of the 1980s and 1990s. There is question as to whether the results may be generalized to trading range or bear market conditions, but the method is likely to be found useful in other periods for characterizing and measuring market behavior, regardless of the results of further out-of-sample testing for periods of non-bull market conditions. We see the Great Bull Market period as a useful laboratory for

* Corresponding author. Tel.: +1-407-823-3173 fax: +1-407-823-2389.
E-mail address: leigh@pegasus.cc.ucf.edu (W. Leigh).

0167-9236/03/$ - see front matter © 2003 Elsevier B.V. All rights reserved.
doi:10.1016/S0167-9236(03)00084-8