Technical Analysis

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Abstract

An introduction to technical analysis. For more information, see Sewell (2001).

1 Introduction

2 A Note on Terminology

The noun *chartist* and related verb *charting* are also used, sometimes referring to a subset of technical analysis. Also, technical analysts are often referred to as 'noise traders' in the academic literature ('noise' being anything other than news).

3 Definition

p = price
d = data generated by the process of trading
t = time

Technical analysis is the art of inferring $E(p_{t:t>0}|d_{t:t-n...0})$.

4 Assumptions

Technical analysts rely on the assumption that markets discount everything *except information generated by market action*, ergo, all you need is data generated by market action.

5 Why is Technical Analysis so Popular?

If the weak (and therefore the semi-strong and strong) form of the efficient market hypothesis holds, then technical analysis has no value. Also, if a market price follows a Markov process then technical analysis has no value. Why, then, is technical analysis so popular? People often predict future uncertain events by taking a short history of data and asking what broader picture this history is representative of (independent of other information about its actual likelihood). This is a heuristic known as *representativeness* (Tversky and Kahneman 1974). Technical analysis *is* representativeness. Below are some more psychological explanations of why a large number of people have a strong belief in technical analysis.

Communal Reinforcement Communal reinforcement is a social construction in which a strong belief is formed when a claim is repeatedly asserted by members of a community, rather than due to the existence of empirical evidence for the validity of the claim.

Selective Thinking Selective thinking is the process by which one focuses on favourable evidence in order to justify a belief, ignoring unfavourable evidence.

Confirmation Bias Confirmation bias is a cognitive bias whereby one tends to notice and look for information that confirms one's existing beliefs, whilst ignoring anything that contradicts those beliefs. It is a type of selective thinking.

Self-deception Self-deception is the process of misleading ourselves to accept as true or valid what we believe to be false or invalid by ignoring evidence of the contrary position.

6 Literature Review

Brown and Jennings (1989) showed that technical analysis has value in a model in which prices are not fully revealing and traders have rational conjectures about the relation between prices and signals.

Frankel and Froot (1990) showed evidence for the rising importance of chartists.

Neftci (1991) showed that a few of the rules used in technical analysis generate well-defined techniques of forecasting, but even well-defined rules were shown to be useless in prediction if the economic time series is Gaussian. However, if the processes under consideration are non-linear, then the rules might capture some information. Tests showed that this may indeed be the case for the moving average rule.

Taylor and Allen (1992) report the results of a survey among chief foreign exchange dealers based in London in November 1988 and found that at least 90 per cent of respondents placed some weight on technical analysis, and that

there was a skew towards using technical, rather than fundamental, analysis at shorter time horizons.

In a comprehensive and influential study Brock, Lakonishok and LeBaron (1992) analysed 26 technical trading rules using 90 years of daily stock prices from the Dow Jones Industrial Average up to 1987 and found that they all outperformed the market.

Blume, Easley and O'Hara (1994) show that volume provides information on information quality that cannot be deduced from the price. They also show that traders who use information contained in market statistics do better than traders who do not.

Neely (1997) explains and reviews technical analysis in the foreign exchange market.

Neely, Weller and Dittmar (1997) use genetic programming to find technical trading rules in foreign exchange markets. The rules generated economically significant out-of-sample excess returns for each of six exchange rates, over the period 1981–1995.

Lui and Mole (1998) report the results of a questionnaire survey conducted in February 1995 on the use by foreign exchange dealers in Hong Kong of fundamental and technical analyses. They found that over 85% of respondents rely on both methods and, again, technical analysis was more popular at shorter time horizons.

Neely (1998) reconciles the fact that using technical trading rules to trade against US intervention in foreign exchange markets can be profitable, yet, long-term, the intervention tends to be profitable.

LeBaron (1999) shows that, when using technical analysis in the foreign exchange market, after removing periods in which the Federal Reserve is active, exchange rate predictability is dramatically reduced.

Lo, Mamaysky and Wang (2000) examines the effectiveness of technical analysis on US stocks from 1962 to 1996 and finds that over the 31-year sample period, several technical indicators do provide incremental information and may have some practical value.

Fernández-Rodríguez, González-Martel and Sosvilla-Rivero (2000) apply an artificial neural network to the Madrid Stock Market and find that, in the absence of trading costs, the technical trading rule is always superior to a buy-and-hold strategy for both 'bear' market and 'stable' market episodes, but not in a 'bull' market. One criticism I have is that beating the market in the absence of costs seems of little significance unless one is interested in finding a signal which will later be incorporated into a full system. Secondly, it is perhaps naive to work on the premise that 'bull' and 'bear' markets exist.

Lee and Swaminathan (2000) demonstrate the importance of past trading volume.

Neely and Weller (2001) use genetic programming to show that technical trading rules can be profitable during US foreign exchange intervention.

Cesari and Cremonini (2003) make an extensive simulation comparison of popular dynamic strategies of asset allocation and find that technical analysis only performs well in Pacific markets.

Cheol-Ho Park and Scott H. Irwin wrote 'The profitability of technical analysis: A review' Park and Irwin (2004), an excellent review paper on technical analysis.

Kavajecz and Odders-White (2004) show that support and resistance levels coincide with peaks in depth on the limit order book [1] and moving average forecasts reveal information about the relative position of depth on the book. They also show that these relationships stem from technical rules locating depth already in place on the limit order book.

7 Is Technical Analysis Self-Fulfilling?

Is technical analysis self-fulfilling or self-destructive? A priori, I hypothesize that if one conditions on price, then technical analysis is self-fulfilling; and if one conditions on time, then technical analysis is self-destructive. The evidence for the former includes the success of support and resistance, and the evidence for the latter includes the documented erosion of calendar effects.

8 In Which Markets Does Technical Analysis Work?

For reasons of market efficiency, a priori, one would assume that there is no privileged market. Due to risk aversion, investors require a small positive expected return in risky markets. In long-only markets—like a stock market—this implies a positive upward drift. In symmetric markets which traders are as likely to be long as they are short, like futures and foreign exchange markets, the implication is that one would expect the price to be predictable to some degree. Furthermore, government intervention in foreign exchange markets may make them more predictable still. So, for theoretical reasons, one may expect that foreign exchange markets should be the most predictable, futures markets intermediate and stock markets the least predictable. The empirical evidence found in Park and Irwin (2004) and James (2006) confirms this theory. However, a buy-and-hold strategy in the stock market should make money because stock markets are a positive sum games, whilst the same can not be said for futures or FX markets. Costs in futures and FX markets are tiny; FX is the best with $1m of notional costing $3 to trade, whilst futures costs are considerably less than one tick. Costs are dominated by the spread.

9 Conclusions

Publication bias should not adversely affect the *relative* performance of technical analysis, such as comparing different techniques, or different markets. The

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[1]A limit order is an order to a broker to buy(sell) a security at or below(above) a specific price; whilst a limit order book is a record of unexecuted limit orders maintained by the specialist.

excellent review paper by Park and Irwin (2004) does precisely that. The literature review undertaken here together with Park and Irwin's results give rise to the following conclusions:

- There is evidence in support of the usefulness of moving averages, momentum, support and resistance and some patterns; but no convincing evidence in support of Gann Theory or Elliott Wave Theory [2].

- Technical analysis works best on currency markets, intermediate on futures markets, and worst on stock markets[3].

- Chart patterns work better on stock markets than currency markets.

- Non-linear methods work best overall. This is not at all surprising in light of the non-linearities found in markets (Hsieh 1989; Scheinkman and LeBaron 1989; Frank and Stengos 1989; Brock, Hsieh and LeBaron 1991; Abhyankar, Copeland and Wong 1995; Brooks 1996; Abhyankar, Copeland and Wong 1997; Barkoulas and Travlos 1998; Ammermanna and Patterson 2003).

- Technical analysis doesn't work as well as it used to. As transaction costs decrease, available computing power increases and the number of market participants increases, one would expect markets to become increasingly efficient and thus it is not surprising that the efficacy of technical analysis should diminish.

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[2]For details of traditional technical analysis, see Murphy (1999), Achelis (2000), Pring (2002) and Edwards, Magee and Bassetti (2007). There is money to be made selling books on technical analysis. Caveat emptor! The eminently more sensible Aronson (2006) offers a glimmer of hope.

[3]This is explained in Section 8 (page 4).

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