ACADEMIC RESEARCH REVIEW

A New Anomaly: The Cross-Sectional Profitability of Technical Analysis

Yufeng Han, Ke Yang, and Guofu Zhou

Journal of Financial and Quantitative Analysis, Vol. 48, No. 5 (October 2013): 1433-1461

Research Analyst: Stephen, Justin

Overview

The paper measures the predictive ability of technical analysis with a common trend-following strategy.

[The strategy]

The author uses the technical analysis of moving averages to portfolios sorted based on their volatility/standard deviation of their daily returns.

[Basic Reasons]

The author applies technical analysis to portfolios of stocks with relatively high volatilities because when stocks are volatile, other fundamental signals are likely to be imprecise, and hence technical analysis tends to be more reliable. As Brown and Jennings showed in 1989, rational investors can gain from forming expectations based on historical prices and the gain is an increasing function of the volatility of the asset.

[Argument & Hypothesis]

Technical analysis of simple moving averages strategy applied on portfolios sorted according to their volatility delivers abnormally high return when compared with those of buy-and-hold and momentum strategies (The momentum anomaly, published originally in the academic literature by Jegadeesh and Titman (1993), is about the empirical evidence that stocks which perform the best (worst) over a three- to 12-month period tend to continue to perform well (poorly) over the subsequent three to 12 months).

Methodology

The construction of 10 decile portfolios is based on the NYSE/Amex stocks sorted into deciles according to their annual standard deviations, which are estimated using the daily returns within the prior year. Once stocks are assigned to portfolios, portfolio index levels (prices) and daily returns are calculated via equal-weighting. The portfolios are rebalanced each year at the end of the previous year. The sample period is 1 July 1963 to 31 December 2009.

Denote by P_{jt} $(j = 1, \dots, 10)$ the corresponding portfolio prices (index levels). The moving average (MA) at time t of lag L is defined as

$$A_{jt,L} = \frac{P_{jt-L-1} + P_{jt-L-2} + \cdots + P_{jt-1} + P_{jt}}{L}$$

which is the average price of the past L days.

Consider the trading decision with the use of the 10-day moving average, for example. On each trading day t, if the last closing price P_{jt-1} is above the MA price A_{jt-1}, we will invest in the decile portfolio j for the trading day t, otherwise we will invest in the 30-day Treasury bill. So the MA provides an investment timing strategy.

Next, the authors regress the return of the 10-day moving average strategy's portfolios on the CAPM market factor and the three Fama-French factors.

Findings

The results show that the positive alphas are significant at both 1% and 5% for all 10 portfolios, and the alphas also increase monotonically from the lowest-volatility decile to the higher-volatility deciles. The only exception is that the highest-volatility decile yields a slightly lower alpha than the second-highest-volatility decile.

The dependence of the superior performance of the MA timing strategy on information uncertainty is investigated next; the authors consider four alternative decile portfolios. These portfolios are formed by sorting stocks by the distance to default measure, credit rating, analyst forecast dispersion, and income volatility. The results are very similar to those of the main study.

To further understand the abnormal returns on the MAPs, the authors attempt to analyze the source of the profitability. After controlling for timing ability, the trend-following factor, investor sentiment, and the liquidity factor, abnormal returns still exist, which means that they cannot be explained by these factors. The MAPs, however, do seem to have sensitivity to default risk during recessions, but only when returns are explained by a conditional variant of the Fama-French model (Journal of Financial Economics 1993).

The results are robust when tested with longer MA lag lengths. The abnormal returns seem to be more short term, and their magnitude decreases as the lag length increases. They are still highly significant, however, over the longer lag lengths. The abnormal returns range from 7.93% to 20.78% a year across the deciles when the lag length is 20 days but are mostly more than 5% a year even when the lag length is 200 days.

The results suggest that the noise-to-signal ratio, or information uncertainty, is what leads to the superior performance of the MA timing strategy. When that ratio is high, the fundamentals are less informative and thus technical analysis is more profitable.

The authors believe that the abnormal returns on the moving average portfolios constitute a new anomaly. The momentum anomaly seems to be the only one supported by empirical evidence and earns roughly 12% annually, substantially less than the abnormal returns earned by the MA timing strategy on the highest-volatility decile portfolio.

Conclusion

The authors seem confident in the durability of economic abnormal returns after transaction costs — especially for low-volume strategies. However, we do have a concern about the trading cost of this strategy as wwitching between the index portfolio and the 30-day T-bill frequently could involve large transaction costs that could significantly erode abnormal returns.

According to the random walk model and the efficient market hypothesis, stock returns are unpredictable and technical analysis has no value. The current study provides a solid piece of empirical evidence to support the value of technical analysis.
