

Referee Report:
“Information in Stock Price Patterns”
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October 13th, 2009
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SUMMARY

This paper reexamines the evidence of Lo, Mamaysky, and Wang (2000) that patterns used in technical analysis provide information about future returns. The motivation is that Lo et al.'s tests, which compared the distribution of returns conditional on a pattern occurring with the distribution of unconditional returns, may be misspecified because they ignore how basic characteristics of a stock's returns fluctuates over time. Specifically, market and stock-specific volatility, and momentum change through time, although they are persistent over short periods. Lo et al compare the normalized conditional return distributions to normalized unconditional return distributions, and this paper argues that their normalization procedure does not sufficiently control for the heterogeneity of conditions through time. To address this, the paper compares the conditional return distributions to a distribution of returns from approximately a month earlier, which acts as a proxy for the underlying volatility and momentum conditions. The paper finds that this proxy comparison decreases the significance of Lo et al.'s results in some cases.

COMMENTS

1. Jens finds a lot more technical patterns in the data than do Lo et al. Below I've included a table that compares the totals from Jens (Table 1) and Lo et al. (Table 1) for overall conditional returns and the two heads and shoulders patterns (similar results are obtained across each pattern type). The raw number for Jens is the sum of unconditional returns and all conditional returns, while the raw number for Lo et al is reported in their table. In the five year period studied in this paper 13.5% of the returns used are marked as being related to a technical pattern, while only 2.4% of the returns in the Lo et al. paper are (and note that this 2.4% includes the two patterns that are not studied in this paper). The overall sample sizes are similar given the data restrictions in this paper (fewer stocks, only 5 years), but this higher rate of occurrence is questionable. Similarly, head and shoulder patterns occur as 11.2% of this paper's total conditional returns, but as 15.6% of Lo et al.'s. This difference is statistically significant given the standard errors reported, and holds across each of the pattern types. As a check I also compared this paper's numbers to those from the two 5-year periods in Lo et al. with the highest frequencies of conditional returns (1962-1966, and 1992-1996), but found the same results. Either the 2003-2008 period is significantly different from the earlier period studies by Lo et al., or there is a problem with the pattern-detection algorithm. This bears further investigation, and either correction or explanation.

2. The tests here likely suffer from low power, as the author mentions in the paper. This stems from the fact that the proxy limits the number of observations available for computing the unconditional distribution. A benefit of the current proxy is that it is not based on any particular characteristic, such as momentum or volatility, but instead simply assumes that the general character of returns should be

similar one month apart. However, this is also a weakness not only from a power standpoint, but also because it does not discriminate between explanations for why the proxy gives different results from the unconditional returns. One possible way to get around this would be to sort returns not only on their decile, but also on a secondary characteristic such as daily return volatility over a short period or momentum. Then the distributions could be compared with a simple chi-squared test, and the effect of volatility or momentum can be seen, while power is kept with a larger sample.

3. The paper does not explain why we might expect patterns to occur more often when there is high volatility versus low volatility, or when momentum is positive versus negative. While the original Lo et al. paper used no theory to explain why technical analysis may predict something about returns, it was only investigating whether technical analysis may, in a preliminary analysis, have any value. This paper is seeking to explain why technical analysis appears to have benefit, but needs more motivation. What is it about changes in volatility or momentum that would change the pattern and relation of extrema so as to create patterns?

4. More motivation is necessary for why Lo et al.'s normalization procedure would not correct for most of the long-term fluctuations in volatility of concern in this paper. Each five-year sample period either has fairly constant volatility, and so this is not a concern, or it has fluctuating volatility, and the unconditional returns are based on both higher and lower relative volatility periods. What is the magnitude of this fluctuation in a five-year period, and is it enough that we should expect it to be the cause of Lo et al.'s results?

5. The (admittedly informal) conclusion drawn from figure 1 is not very convincing. The fact that the distribution of conditional returns appears to be leptokurtic does not imply that those returns necessarily come from a period with lower volatility. It may just mean instead that the rectangle bottom pattern is good at predicting less variable returns for the third day after the period ends, without saying anything else about the time period of the pattern.

	Raw	Conditional	HS	IHS
Jens	30348	4095	459	789
% of Total	86.51%	13.49%	1.51%	2.60%
SE	0.20%	0.20%	0.07%	0.09%
% of Conditional			11.21%	19.27%
SE			0.49%	0.62%
Lo et al	423556	10323	1611	1654
% of Total	97.56%	2.44%	0.38%	0.39%
SE	0.02%	0.02%	0.01%	0.01%
% of Conditional			15.61%	16.02%
SE			0.36%	0.36%