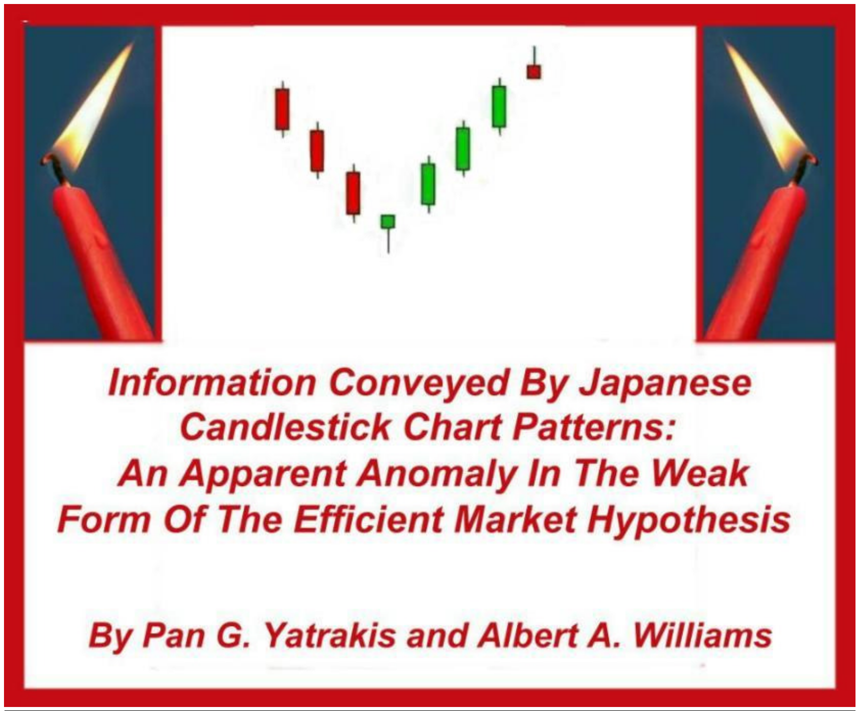

Peer Reviewed

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Abstract

This paper reports on research performed with Japanese candlestick charts in an effort to assess whether they contain predictive information in violation of the weak form of the *efficient market hypothesis* (EMH). The paper begins with a brief review of the empirical and theoretical arguments in favor of exceptions to EMH that collectively comprises the *behavioral finance* school of thought. An introduction to the history and practice of Japanese candlestick charting follows, along with a discussion of its originators' belief that it reflects the influence of sometimes irrational human emotion in the marketplace. The findings of the only other paper to examine candlestick charts are presented and evaluated. The present research utilizes a sample of 257 NYSE stocks drawn from a universe of 84,000 observations during the March-April 2005 period. Each stock exhibiting a specific candlestick pattern during that period is analyzed for excess

returns on twenty subsequent trading days. The results indicate a small but statistically significant excess return over the five days following the appearance of the candlestick pattern and suggest the existence of a short-lived anomaly in the weak form of the EMH.

Introduction

For over two decades since Eugene Fama's seminal dissertation [1963], the *efficient market hypothesis* (EMH) held sway as the unchallenged paradigm for explaining movements in financial markets. According to EMH, stock prices at any given time reflect all known information and, absent new data, any movement in those prices is random noise. Empirical research in the late 1960s, 1970s, and early 1980s generally corroborated the hypothesis. Studies focused on share price reaction to past prices and current events, and tended to conclude that prices follow a random walk model and that markets are indeed efficient (e.g., Ball and Brown [1968], Fama, Fisher, Jensen, and Roll [1969], and Jensen and Ruback [1983]). Of the three forms of EMH elaborated by Fama [1970], the strong form was quickly dismissed as inapplicable under conditions of unequal information (Seyhun [1986]). But the semi-strong and especially the weak form, which suggests that past prices contain no information of predictive value, were generally accepted as valid.

However, beginning in the mid-1980s and continuing for the past twenty years, empirical researchers focusing on the semi-strong form began to find mounting evidence of anomalies in the EMH (Roll [1988], and Cutler, Poterba, and Summers [1989]). For example, Banz [1981] identified the small firm effect, while Lakonishok and Smid [1988] documented the closed-end fund effect. And subsequent research began to question even the weak form, documenting such anomalies as the January effect (Bhardwaj and Brooks [1992]); other seasonal effects (Agrawal and Tandon [1994]); and even the influence of sunshine on the mood of traders (Saunders [1993] and Hirshleifer and Shumway [2003]).

In parallel with the research that identified an increasing number of empirical anomalies, a body of thought has also developed which challenges the basic assumption of human rationality underpinning the EMH. One of the seminal contributors to this school was Herbert Simon [1957], who developed the concept of "bounded rationality". According to Simon, human behavior does not follow a purely rational model because decision-makers face transaction costs in obtaining information and uncertainty about future conditions. Lacking perfect information, they use heuristics derived from the limited information set available to them to make decisions that may not be optimal, but that nevertheless "satisfice", i.e. are good enough under the circumstances. This concept was in turn elaborated by others, who argued that inductive reasoning is more typically used in complicated or ill-defined situations in preference to deductive reasoning, which can only apply under conditions of perfect and complete information (DeGroot [1965], Holland, Holyoke, Nisbett and Thagard [1986], Sargent [1994], and Arthur [1994]).

Another important theoretical challenge to the rationality assumption of the EMH comes from prospect theory, developed by Kahneman and Tversky [1979]. Prospect theory is based on empirical evidence and describes how decision-makers assess potential losses and gains. In contrast to the expectations of the EMH, it states that value functions are asymmetrical in that losses have a bigger impact than gains of the same magnitude. Thus, individuals tend to frame outcomes subjectively rather than objectively, as might be implied by the EMH. For example, Tvede [1999] identifies an "irrational tendency" to protect gains, which motivates investors to sell profitable investments but hold losing ones in hopes of eventually recouping their losses. The empirical evidence of anomalies in the EMH, together with the theoretical challenges to the assumption of human rationality, have given rise to the *behavioral finance school*, which disputes the universality of the EMH and seeks to explain apparent deviations from it in terms of less than perfectly rational actions on the part of market players.

The research discussed in the present paper focuses on a potential anomaly in the weak form of the EMH, and it examines the ability of a particular heuristic, a specific pattern which appears periodically in Japanese candlestick charts, to evoke seemingly "irrational" behavior on the part of investors in the absence of other relevant information. A pattern believed to be bearish called the *shooting star* is used to test the presumably stronger effect of fear over greed as postulated by prospect theory. Using empirical data, the predictive information content of the *shooting star* pattern is evaluated over multiple time horizons.

Japanese Candlestick Charts

Candlestick charts originated in seventeenth-century Japan, following the country's unification under the Tokugawa Shogunate, a feudal military dictatorship that lasted for almost three hundred years from 1603 to 1868. The economic stability which ensued under this dictatorship permitted the establishment of centralized commodities markets, the most important of which was the Dojima rice exchange in Osaka. From its beginnings as simply a venue for the purchase and sale of the physical commodity, the Exchange soon developed a warehouse system and, shortly thereafter, started to issue and make a market in rice warehouse receipts. Before long, rice farmers in need of immediate cash began to sell receipts for future delivery and these, too, were traded on the Dojima Exchange, thus becoming the world's first commodity futures contracts [Hirschmeier and Tsunehiko, 1975].

One of the key players in this market was Munehisa Homma, a wealthy rice farmer, merchant, and commodity trader. Anticipating some of the arguments of *the behavioral finance* school of thought by almost 250 years, Homma believed that markets were influenced by human emotions that often created a gulf between current prices and intrinsic value. He created candlestick charts in an attempt to capture a measure of these emotions and utilize it to predict future price movements [Taylor, 2002]. From these beginnings, candlestick charting was extended to the analysis of other commodity and securities markets, and it has since become the dominant form of technical analysis used in Japan [Shimizu, 1986; and Nison, 2001].

Japanese candlestick charting techniques were introduced to Western audiences by Steve Nison [1989], a former technical analyst at Merrill Lynch and senior vice president of Daiwa Securities, who worked with the Nippon Technical Analysts Association and researched Japanese literature on candlestick charts. His book, *Japanese Candlestick Charting Techniques* [1992] is considered the seminal work of the modern age on candlestick charting. In this and subsequent publications, Nison identifies more than seventy Japanese candlestick chart patterns, some with fanciful names like *abandoned baby*, *hanging man*, *homing pigeon*, *morning star*, and *three black crows* [Nison 1994].

A candlestick chart is simply a different approach to depicting the same basic information portrayed on traditional bar or point and figure charts. However, because of their more visual nature, candlestick charts can convey more information, and are rapidly becoming the standard in technical analysis. Nison [2001] attributes their widespread acceptance to their versatility and their ability to depict not only trends but also the strength of market forces underpinning those trends. The basic elements of a single day's candlestick chart for a security, commodity, index or other financial instrument are shown in Figure 1, below. The figure shows a security whose closing price was higher than its opening price, the difference depicted as the body. It is shown with a white, or empty, candle and represents an upward price movement. The high and the low for the day are also shown, with the two extensions called shadows.

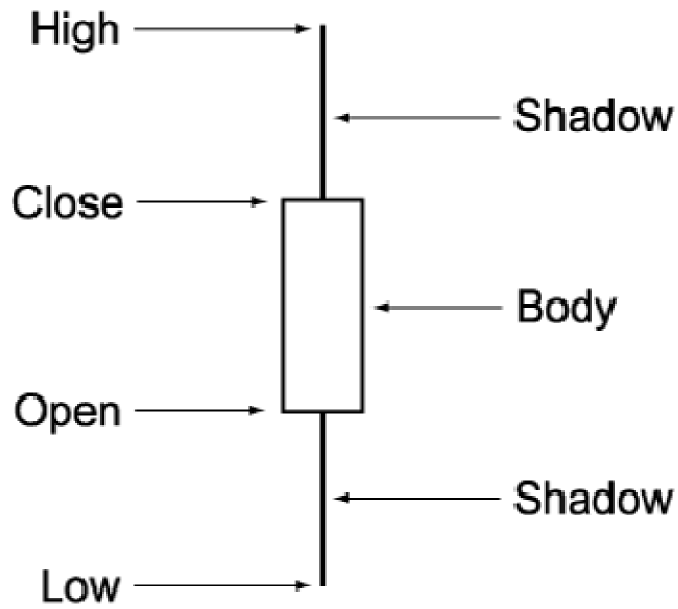

Figure 1. White or Empty Candle

Figure 2 below shows a security which closed lower than it opened. A black, or full, candle is used to portray the downward movement of this security. Again, the part of the pattern which lies between the opening and closing prices is called the “body” of the candle, while the lines between the body and the day’s high and low are known as “shadows”.

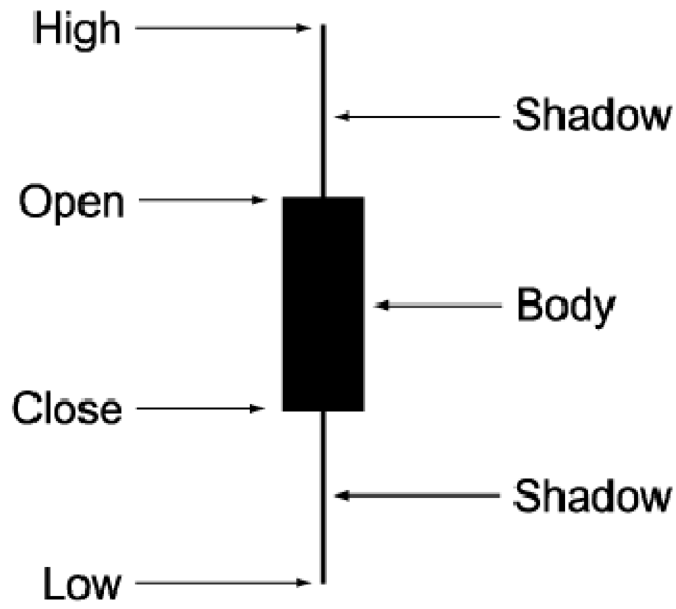

Figure 2. Black or Full Candle

Shadows don't always appear on candlestick charts. For example, a stock with a black candle that closes at the low of the day will have no lower shadow since the close and the low are identical. A candle with no body is also possible if a stock opens and closes at the same price. In such a case, a horizontal line represents the body. While candlestick charts are most commonly used to portray daily movements in stock prices, the methodology lends itself equally well to measurements over other time periods, from as little as one minute to as much as one month. Chartists tend to rely on daily, weekly, and sometimes monthly candles, while day traders may use hourly, 15-minute or even five-minute candles in making trading decisions.

The candlestick pattern examined in this study is the *shooting star*. It occurs at the end of an uptrend; in Figure 3, below, it is the rightmost candle. The uptrend can consist of any number of periods; the illustration uses four periods preceding the *shooting star*. Any combination of full (black) and empty (white) candles can precede the *shooting star*. In Figure 3, the *shooting star* is preceded by three empty and one full candle, making up the uptrend.

The *shooting star* is believed to be a bearish reversal pattern, which occurs at the peak of a price uptrend (represented by the four candles preceding the *shooting star*). It is supposed to signal that the uptrend has come to an end and will be followed by a reversal, i.e., a downward move in the price of the security. The *shooting star* is selected as the subject of this study because it occurs fairly frequently and is regarded by chartists as containing an average level of predictive information. The occurrence of this pattern is said to demonstrate eroding momentum and emerging weakness in market sentiment because, although bullish traders are initially able to push up the price of the security, the market subsequently rejects the higher prices [Nison 2002]. The research described in this paper examines whether the purely historical data depicted by the *shooting star* candlestick pattern do in fact contain information about the emotional behavior of traders, which can be shown to influence the subsequent price of a security in violation of the weak form of the EMH.

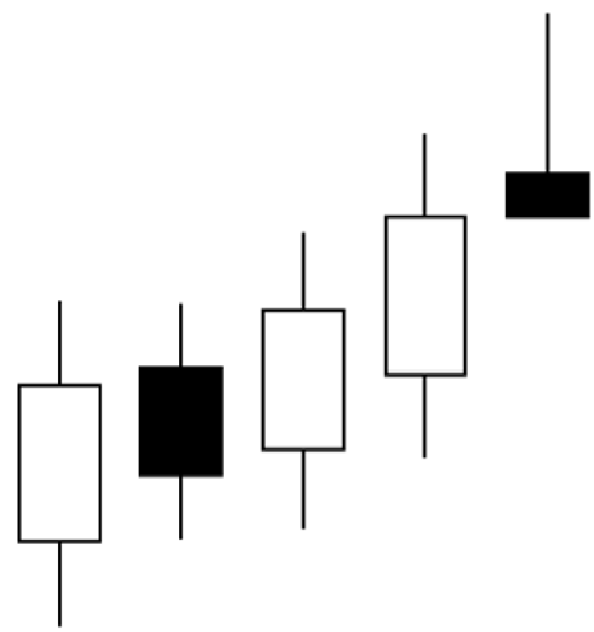

Figure 3. Shooting Star

Prior Research

Although there have been numerous studies of the effectiveness of technical analysis (for example, Alexander [1964], Fama and Blume [1966], Jensen [1978], and Brock, Lakonishok and LeBaron [1992]), only one academic paper has focused specifically on candlestick charting. The dearth of academic research on technical analysis in general may have been the result of the findings of the earlier studies, which concluded that transaction costs nullify any advantage that traders may obtain from the use of charting techniques.

Despite the wealth of technical and practitioner literature on candlestick charting, the sole academic treatment of the subject is contained in a recent paper by Marshall, Young and Rose [2006]. The authors tracked the individual component stocks of the Dow Jones Industrial Index between 1992 and 2002, a universe of about 66,000 data points. They examined trades held open for ten days following the appearance of 28 candlestick patterns, and concluded that a trading strategy based on candlestick charting would not have been profitable for those stocks during the study period.

The objective of the present research is to extend the examination of the information content of Japanese candlesticks beyond the small sample of companies comprising the Dow Jones Industrials, used by Marshall et al. [2006]. Since the Dow Jones stocks are among the most widely held and most closely followed by investment bankers, it is quite possible that their prices are more efficient in incorporating historical information than are those of less widely followed stocks. If that is indeed the case, traders might still potentially obtain excess returns by using this strategy in the broader market.

Data and Results

In the two decades since the introduction of candlestick charting in the United States, this method has gained such popularity among traders and technical analysts that a number of on-line services have been established to track and analyze candlestick patterns. One such site is StockCharts™ (http://www.stockcharts.com). At the end of each trading day, StockCharts™ uses a proprietary algorithm to compile a summary of stocks which exhibit specific candlestick patterns for that day. For this study, the daily StockCharts™ report of stocks displaying the *shooting star* pattern was used as the primary data base. Because of the proprietary nature of the StockCharts™ algorithm, it is unfortunately impossible to reproduce its exact mathematical definition here. The sample selected from these data was restricted to stocks traded on the New York Stock Exchange (NYSE), excluding preferred issues and shares trading under $2. The purpose of these constraints was to limit the sample to those stocks whose trading volumes and lack of extreme volatility were more likely to ensure orderly market movements.

The sample period covered the interval between March 1 and April 30, 2005. Approximately 2000 stocks were tracked over a period of 42 trading days, for a total of about 84,000 daily observations. During this period, there were 257 appearances of the *shooting star* candlestick pattern among NYSE common stocks trading at prices over $2. A list of these stocks, together with the dates when this pattern occurred for each one, is provided in Appendix A, below.

The next phase of the research consisted of obtaining prices for each of these 257 stocks at twenty subsequent points in time, so as to determine whether the *shooting star* patterns contained information capable of predicting future prices. The comparison points examined were the daily closing prices on the first through the twentieth day after the appearance of the *shooting star*. Since this is believed to be a bearish pattern, the expectation of candlestick chartists would be for a subsequent decline in the prices of the sample stocks. The methodology employed in this research uses a lower tailed t-test for this decline, and also endeavors to determine the period of time, if any, over which any information about investor psychology, momentum, or any other factor embodied in the *shooting star* pattern may affect prices negatively. To compensate for effects of systematic market movements, changes in the prices of the sample stocks were expressed in percentage terms and were reduced by the percent changes in the New York Stock Exchange (NYSE) Index over the same time periods. The resulting data thus measure excess returns, the difference in the returns which investors might obtain from buying specific stocks upon the appearance of the *shooting star* pattern, over and above what they might obtain from buying the NYSE or a proxy exchange-traded fund (ETF). Since the *shooting star* is a bearish pattern, the expected sign of the difference in the returns is negative. The differences in returns are measured from the market close on the day when the *shooting star* appears to the market close on each of the subsequent twenty trading days. To control for outliers, the 257 excess returns were truncated by removing the top and bottom two percent of the data. Technically, the *shooting star* stocks should be removed from the NYSE Index when performing the above calculation. However, this procedure was deemed excessively cumbersome in light of the small fraction of the Index represented by these stocks, and it was not performed. In any event, removing the *shooting star* stocks from the Index would only increase the magnitude of the observed excess returns.

Empirical studies such as this one are potentially susceptible to data snooping bias. Lakonishok and Smidt [1988] and Lo and MacKinlay [1990] suggest that such bias may increase as more studies are performed on the same data. Marshall, Young and Rose [2006] propose that, since candlesticks were developed in the context of the Japanese rice market in the seventeenth century, testing candlestick charts on recent U.S. stock data is an out-of-sample test and is, therefore. robust to such criticism. However, this assertion is arguable since many other studies also use recent U.S. data. Another potential pitfall of empirical researchers is the ex-post selection of trading rules or search technologies. Once again, however, the existence of candlestick trading rules for 250 years and their use of open, high, low and close prices in place of closing price data alone differentiate candlesticks from other trading rules, which rely just on closing prices [Marshall, Young and Rose, 2006]. Moreover, the use of an external source such as StockCharts™ to identify stocks displaying the *shooting star* pattern eliminates bias that could potentially arise through endogenous definition of the pattern. Finally, the use of data from individual NYSE stocks should overcome any bias caused by nonsynchronous trading, as might occur with an index.

For the market close on the first day after the shooting star pattern was identified, the average excess return is -0.35 percent. This value is significantly different from zero and has a t statistic of –3.6464 with a p-value of 0.0002 (See Table 1 below.). For the cumulative daily returns for the first two days, the average excess return falls slightly to -

0.30 percent, but is also significant, with a t statistic of -2.9186 and a p-value of 0.0144. By including the third day, similar significant results are found. The average excess return is -0.35 with a t statistic of -2.2386 and a p-value of 0.0130. By including the fourth day, the excess return was -0.44 percent, with a t statistic of -2.4769 and a p-value of 0.0070. By including the fifth day, the average excess returns increase to -0.49 percent and is statistically significant, with a t statistic of -2.4672 and a p-value of 0.0071. However, by including day six, the average cumulative excess return declines to -0.31 percent, with a t-statistic of -1.4187 and a p-value of 0.0786, implying that it is not statistically significant. Excess returns thereafter are not statistically significant. These results are further substantiated using large sample Wilcoxon's signed rank tests for median returns (Table 1). The cumulative excess median returns are only significant different from zero for the first five days. Also, the mean excess returns were not statistically different from the median excess returns for each of the 20 days.

The largest mean excess return of -0.35 percent is seen on Day 1. For Day 2, the excess mean return is -0.30 percent, a change of 0.05 percent. The mean excess return for Day 3 is -0.35 percent, a change of –0.05 percent from Day 2. For Day 4, the mean excess return is -0.44 percent, a -0.09 percent change from Day 3. The mean excess return for Day 5 is 0.49 percent, a change of -0.05 percent from Day 4. Therefore, the maximum negative reaction occurs on Day 1.

These findings suggest that the effect of the *shooting star* candle is relatively short-lived. Arbitrage is a potential explanation for the reversal of the effect of the bearish chart pattern to prices at the pre-*shooting star* levels. However, the short-term excess returns of up to 0.49 percent may exceed transaction and information acquisition costs. Further tests will be necessary to determine whether negative stock market reaction causes the prices to be irrationally low.

The findings also seem to corroborate the results of Marshall, Young, and Rose [2006], who found no positive returns following a holding period of ten days. Opportunities for profiting from the information contained in this pattern are decidedly brief and presumably would appeal only to nimble short-term traders.

The standard deviation of the average excess returns increases from 1.51 percent on Day One to 3.43 percent on Day Six, and continues to increase to 6.44 percent by Day 20. Based on trend regression analysis, the standard deviation is observed to grow at 0.25 percent per day over the 20-day period after the pattern's appearance. Thus, the volatility of excess returns increases over time. Therefore, expected excess returns are more likely on days shortly following the *shooting star's* occurrence.

Table 1. Cumulative Daily Stock Returns Net of NYSE Composite Returns for 20 Days after Observation of Shooting Star Candlestick Pattern

DAYS	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+8	t+9	t+10
MEAN RETURN	-0.0035	-0.0030	-0.0035	-0.0044	-0.0049	-0.0031	-0.0013	0.0012	0.0039	0.0045
Std. Deviation	0.0151	0.0212	0.0247	0.0280	0.0311	0.0341	0.0349	0.0373	0.0393	0.0416
Mean Return = 0 (lower-tailed test)										
t statistic	-3.6464***	-2.1986*	-2.2386*	-2.4769**	-2.4672**	-1.4187	-0.5646	0.5091	1.5596	1.7060
p-value	0.0002	0.0144	0.0130	0.0070	0.0071	0.0786	0.2864	0.6944	0.9399	0.9554
MEDIAN RETURN	-0.0023	-0.0032	-0.0026	-0.0026	-0.0043	-0.0025	-0.0012	-0.0010	0.0027	0.0016
Median Return = 0 (Large Sample Wilcoxon's Signed Rank Test)										
z statistic	-3.2295***	-2.3897**	-1.8950*	-1.9866*	-2.0729*	-1.2073	-0.5480	0.1762	1.0293	1.1859
p-value	0.0006	0.0084	0.0290	0.0235	0.0191	0.1137	0.2918	0.5699	0.8483	0.8822
Median Return = Mean Return (Large Sample Wilcoxon's Signed Rank Test)										
z statistic	0.1984	-0.0934	0.3692	0.1957	0.0979	0.1735	0.0472	-0.3612	-0.4653	-0.4582
p-value	0.5786	0.462787	0.644	0.5776	0.539	0.5689	0.5188	0.359	0.3209	0.3234

DAYS continued	t+11	t+12	t+13	t+14	t+15	t+16	t+17	t+18	t+19	t+20
MEAN RETURN	0.0055	0.0034	0.0029	0.0028	0.0025	0.0026	0.0017	0.0023	0.0030	0.0042
Std. Deviation	0.0438	0.0457	0.0488	0.0508	0.0527	0.0594	0.0611	0.0615	0.0620	0.0651
Mean Return = 0 (lower-tailed test)										
t statistic	1.9611	1.1583	0.9204	0.8703	0.7412	0.6754	0.4410	0.5797	0.7606	1.0167
p-value	0.9745	0.8761	0.8209	0.8075	0.4593	0.7500	0.6702	0.7187	0.7762	0.8449
MEDIAN RETURN	0.0022	0.0024	-0.0015	-0.0021	-0.0010	-0.0009	-0.0003	-0.0019	-0.0004	0.0012
Median Return = 0 (Large Sample Wilcoxon's Signed Rank Test)										
z statistic	1.5124	0.7304	0.4039	0.3674	0.4030	0.6308	0.3479	0.2998	0.5107	0.5756
p-value	0.9348	0.7674	0.6569	0.6434	0.6565	0.7359	0.6360	0.6178	0.6952	0.7176
Median Return = Mean Return (Large Sample Wilcoxon's Signed Rank Test)										
z statistic	-0.3390	-0.3603	-0.5009	-0.5676	-0.3541	-0.0818	-0.1041	-0.3479	-0.2500	-0.4057
p-value	0.3673	0.359305	0.3082	0.2852	0.3616	0.4674	0.4585	0.3640	0.4013	0.3425

*** Significant at the 99.9 percent level.

** Significant at the 99 percent level.
*   Significant at the 95 percent level.

Conclusion

Contrary to the expectations of the weak form of the EMH, the conclusion of the present research is that the candlestick pattern studied herein does indeed convey information that can be used to predict future stock prices, at least in the very short run. It is, of course, impossible to determine whether this information is inherent in the candle pattern itself (e.g., depicting irrational human emotions as Homma surmised), or is generated merely by the appearance of the pattern and the reaction which it evokes on the part of noise traders [Barberis and Thaler, 2003]. According to the EMH, arbitrageurs would anticipate such a reaction and move quickly to take advantage of the noise traders' irrational mis-pricing by buying stock at the artificially low levels brought about by their selling. However, the persistence of the short sellers' excess returns for several days beyond the pattern's appearance suggests that this may not be the case [Shleifer and Vishny, 1997]. Nevertheless, whether due to inherent information or because the behavior of noise traders makes the *shooting star* a self-fulfilling prophecy, the empirical results demonstrate that the historical information conveyed by this candlestick pattern can affect future prices and should, therefore, be regarded as one more anomaly in the weak form of the EMH.

It should be noted that these results are generally at variance with those of Marshall, Young, and Rose [2006], despite the common finding that holding stocks over a ten-day period following the trading signal does not seem to be profitable. The differences in the findings might be caused by a number of factors. In both studies, the universes of data analyzed were quite large. The sample in the Marshall et al. study was selected from approximately 66,000 data points, drawn from the 30 stocks of the Dow Jones Industrial Average. In the present study, the sample is chosen from approximately 84,000 data points, which stem from about 2,000 common stocks traded on the New York Stock Exchange selling for over $2 at the time of the candlestick pattern.

Contrariwise, the sample period of the Marshall et al. study was the eleven years between January 2, 1992 and December 31, 2002, whereas the sample period of the present study was only the two-month period between March 1 and April 30, 2005. In both studies, the number of candlestick patterns examined was less than the seventy identified by Nison [1994]; Marshall et al. examined only 28 of the 70, while the present study focused on just one. Marshall et al. acknowledge that the precise definition of candlestick patterns is a matter of considerable debate. They defined the patterns themselves and applied sensitivity analysis to test the robustness of their definitions to potential criticism of ex-post selection of trading rules. In contrast, the present study used data based on the exogenous algorithms applied by the most popular source used by candlestick chart practitioners, StockCharts™. The Marshall et al. study examined returns after a 10-day holding period, with sensitivity analysis at the two and five-day intervals; the present study analyzed returns after each day between the first and twentieth days following the trading signal. Finally, Marshall et al. assumed that positions are initiated at the opening prices of the day following the trading signal; the present study assumes execution at the closing prices of the same day when the signal was given. Marshall et al. base their entry point on the argument that it is difficult for traders to discern and act upon a signal on the same day that it is observed. However, there are now an increasing number of fee-based, computerized services that alert traders to developing candlestick patterns during the day, giving them ample time to act on these alerts by the close of trading.

It is not the purpose of this study to determine whether the apparent anomaly identified in the results can be utilized successfully by traders to produce consistent profits. The extent of the excess returns is small and might not exceed acquisition and transaction costs in all instances, although these costs are continually falling. Information about stocks which display particular candlestick patterns is available without cost on the Internet, but these data are not posted until several hours after the market closes. Subscription-based alert services can bridge this gap, however, and the cost of these services is declining with improved technology and increased competition. Transaction costs have likewise fallen. For example, Scottrade™, an on-line broker, charges a commission of only $7 for each transaction regardless of the number of shares involved, or their price.

It should be noted that this research was confined to a single candlestick chart pattern, the *shooting star*, and the conclusions of this study should not, therefore, be generalized or applied to other candlestick chart patterns or to candlestick charting overall. However, since the *shooting star* was purposely selected because it is regarded by chartists as an "average" pattern, there is some likelihood that other patterns, especially those viewed as "strong", could have similar, or even more powerful, informational content. It should also be noted that the sample used in this study was comprised of NYSE common stocks trading for more than $2. It is possible that an even broader sample of stocks (e.g., including NASDAQ, ASE, Canadian stocks, preferred stocks, shares trading for under $2, etc.) could produce different results. However, such a broadening of the data base would include more thinly traded stocks than those used in the present research, and it is likely that a market thus defined would be even less efficient. Future research on this subject could test the robustness of the present conclusions by focusing on other candlestick patterns, other markets, and other types of securities.

Appendix A – Stocks Displaying Shooting Star Patterns, 3/1-4/30, 2005

Symbol	Date		Symbol	Date		Symbol	Date
EV	3/1/2005		ANN	3/7/2005		PT	3/9/2005
HAS	3/1/2005		BKS	3/7/2005		PWI	3/9/2005
HCR	3/1/2005		HIG	3/7/2005		UNT	3/9/2005
LNY	3/1/2005		IOM	3/7/2005		VLO	3/9/2005
UST	3/1/2005		KMT	3/7/2005		AIB	3/11/2005
ABM	3/2/2005		MOH	3/7/2005		AME	3/11/2005
ALG	3/2/2005		MX	3/7/2005		ASA	3/11/2005
BBY	3/2/2005		PCF	3/7/2005		AXL	3/11/2005
DNA	3/2/2005		PLA	3/7/2005		CYH	3/11/2005
EDR	3/2/2005		SRI	3/7/2005		DEO	3/11/2005
FIC	3/2/2005		STZ	3/7/2005		EIX	3/11/2005
GHL	3/2/2005		TMB	3/7/2005		FEZ	3/11/2005
JRN	3/2/2005		TYG	3/7/2005		GT	3/11/2005
LII	3/2/2005		UTX	3/7/2005		HNP	3/11/2005
MCD	3/2/2005		WNC	3/7/2005		KF	3/11/2005
MTX	3/2/2005		WNI	3/7/2005		KWD	3/11/2005
RPT	3/2/2005		ABM	3/8/2005		LDG	3/11/2005
SPW	3/2/2005		ARC	3/8/2005		ALL	3/14/2005
TIN	3/2/2005		HBP	3/8/2005		HMA	3/14/2005
UN	3/2/2005		JLL	3/8/2005		PBG	3/14/2005
AGL	3/3/2005		LRT	3/8/2005		POL	3/14/2005
ENH	3/3/2005		MX	3/8/2005		SMP	3/14/2005
FST	3/3/2005		NOK	3/8/2005		AGL	3/15/2005
IFS	3/3/2005		S	3/8/2005		BKH	3/15/2005
MRO	3/3/2005		ASH	3/9/2005		BW	3/15/2005
NZT	3/3/2005		BPT	3/9/2005		CNO	3/15/2005
PAA	3/3/2005		CDE	3/9/2005		EL	3/15/2005
TSU	3/3/2005		COF	3/9/2005		FPL	3/15/2005
ALV	3/4/2005		CYD	3/9/2005		IHP	3/15/2005
FDC	3/4/2005		ETP	3/9/2005		JLL	3/15/2005
KPN	3/4/2005		FLS	3/9/2005		KNX	3/15/2005
MTX	3/4/2005		IPS	3/9/2005		KRC	3/15/2005
NAL	3/4/2005		JEQ	3/9/2005		OSG	3/15/2005
NTT	3/4/2005		LZ	3/9/2005		PNY	3/15/2005
OTE	3/4/2005		MBT	3/9/2005		RCS	3/15/2005
TBL	3/4/2005		PBT	3/9/2005		RGC	3/15/2005
ABM	3/7/2005		PEO	3/9/2005		RVI	3/15/2005
AES	3/7/2005		PPG	3/9/2005		SLG	3/15/2005

Appendix A – Stocks Displaying Shooting Star Patterns, 3/1-4/30, 2005, cont.

Symbol	**Date**		**Symbol**	**Date**		**Symbol**	**Date**
SUP	3/15/2005		EQY	3/22/2005		SNA	3/31/2005
SWX	3/15/2005		FTO	3/22/2005		ALD	4/1/2005
ZLC	3/15/2005		GDI	3/22/2005		AMF	4/1/2005
DKS	3/16/2005		HNI	3/22/2005		BLT	4/1/2005
FCH	3/16/2005		JAH	3/22/2005		FRO	4/1/2005
LM	3/16/2005		JLL	3/22/2005		NPP	4/1/2005
LNN	3/16/2005		KDN	3/22/2005		STZ	4/1/2005
MCS	3/16/2005		KND	3/22/2005		TEI	4/1/2005
MMM	3/16/2005		MLM	3/22/2005		AGU	4/6/2005
MMP	3/16/2005		MMP	3/22/2005		ARB	4/6/2005
SKS	3/16/2005		NUE	3/22/2005		BKH	4/6/2005
TRU	3/16/2005		PDS	3/22/2005		CHE	4/6/2005
TSS	3/16/2005		PQE	3/22/2005		DRS	4/6/2005
WTI	3/16/2005		SAH	3/22/2005		FIC	4/6/2005
ETM	3/17/2005		SGY	3/22/2005		FIF	4/6/2005
HMA	3/17/2005		SLM	3/22/2005		GEF	4/6/2005
KMA	3/17/2005		SNS	3/22/2005		HPC	4/6/2005
KND	3/17/2005		SRZ	3/22/2005		OHI	4/6/2005
EPL	3/21/2005		STR	3/22/2005		PCH	4/6/2005
RVI	3/21/2005		SUP	3/22/2005		PPD	4/6/2005
ACS	3/22/2005		LPL	3/23/2005		PZE	4/6/2005
ADP	3/22/2005		MOV	3/23/2005		TYL	4/6/2005
ATW	3/22/2005		ALE	3/28/2005		VIP	4/6/2005
BCE	3/22/2005		JNY	3/28/2005		ADP	4/8/2005
BW	3/22/2005		PGR	3/28/2005		CBA	4/8/2005
CCC	3/22/2005		AVT	4/28/2005		CHB	4/8/2005
CNI	3/22/2005		CSQ	4/28/2005		DTV	4/8/2005
CSG	3/22/2005		DUK	4/28/2005		GOL	4/8/2005
CTV	3/22/2005		DW	4/28/2005		MMP	4/8/2005
CVO	3/22/2005		RMD	3/28/2005		STR	4/8/2005
CW	3/22/2005		GCO	3/30/2005		TNE	4/8/2005
CXW	3/22/2005		TMB	3/30/2005		TUP	4/8/2005
DRI	3/22/2005		DBD	3/31/2005		ELP	4/11/2005
EOC	3/22/2005		IBI	3/31/2005		PCN	4/11/2005

Appendix A – Stocks Displaying Shooting Star Patterns, 3/1-4/30, 2005, cont.

Symbol	Date		Symbol	Date		Symbol	Date
SBG	4/11/2005		PBH	4/15/2005		HOV	4/26/2005
CHA	4/14/2005		SNY	4/15/2005		HSP	4/26/2005
FCH	4/14/2005		TSN	4/15/2005		KTC	4/26/2005
HSP	4/14/2005		CPB	4/18/2005		MDC	4/26/2005
ITU	4/14/2005		FAM	4/18/2005		NT	4/26/2005
MFC	4/14/2005		NMA	4/18/2005		OXM	4/26/2005
MOT	4/14/2005		DSL	4/20/2005		PSO	4/26/2005
PMF	4/14/2005		GSL	4/20/2005		SPF	4/26/2005
PPC	4/14/2005		MUI	4/20/2005		SYK	4/26/2005
RCS	4/14/2005		PGR	4/20/2005		KCP	4/28/2005
RLF	4/14/2005		PSO	4/20/2005		MO	4/28/2005
NAU	4/12/2005		PT	4/20/2005		CYE	4/29/2005
TSU	4/14/2005		CEC	4/21/2005		IM	4/29/2005
GEF	4/15/2005		DSM	4/21/2005		TGX	4/29/2005
HB	4/15/2005		BKE	4/25/2005			
KEY	4/15/2005		DHI	4/26/2005			

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