

# Stars, crows, and doji: The use of candlesticks in stock selection

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## Abstract

This paper examines Japanese Candlestick methods of technical analysis for 349 stocks. Using more data and alternative tests, the study contradicts an earlier article in the literature, finding little value in the use of candlesticks and providing more support for the weak form of the Efficient Markets Hypothesis.

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## 1. Introduction

Technical analysis, or charting, has a long history. Using only the past returns of an asset successfully to predict future turning points in the asset's performance has been the holy grail of investing, potentially enabling the investor to amass a fortune without having to bother with accounting data or the like. A best-selling survey of charting methods by [Pring \(2002\)](#) is testimony to the hold that technical analysis has had on investors.

The academic literature has been critical of trying to time trades with only past prices of an asset. Reaching prominence with [Fama \(1965, 1970\)](#) and continuing with [Malkiel \(2003\)](#),<sup>1</sup> studies have found technical analysis to be of little or no value. The weak form of the Efficient Markets

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<sup>1</sup> [Cootner \(1964\)](#) provides a literature review of those early studies that investigated random walks as effective models of stock returns. Among these, [Cowles \(1933\)](#) and [Working \(1934\)](#) questioned the use of past price information in predicting future prices.

Table 1  
Daily price data for alcoa aluminum (2–7 February 1992)

Date	Open	High	Low	Close
2 February 1992	64.5	65.37	64.37	64.5
4 February 1992	64.5	65.25	63.75	64.75
5 February 1992	64.75	65.25	63.5	64
6 February 1992	64	64.37	63.5	63.5
7 February 1992	63.75	65	63.75	64

Hypothesis (EMH) implies that past price information for a stock is of no value in predicting future movements of the stock's returns.

Some recent studies, however, have called the EMH into question.

Bessembinder and Chan (1998), Caginalp and Laurent (1998), Lo, Mamaysky, and Wang (2000), and Ready (2002) are some of the more recent studies that have provided a ray of hope to investors seeking to discover just the right combination of signals to profit from charting. Caginalp and Laurent (1998) favorably evaluate the Japanese method of "Candlestick Charting" for profiting from stocks.

## 2. Candlestick charting

The subject of more than 20 products currently offered at Amazon.com, Candlestick Charting was popularized in this country by Nison (1991).<sup>2</sup> The method requires the following information for the financial asset: Opening Price, High Price, Low Price, and Closing Price. These four pieces of information can be used to construct a figure called a "candlestick." The interval between the opening price and closing price is the body of the candlestick, colored white if the close exceeds the opening and colored black if the opening exceeds the close. The distance by which the low price is less than this interval, if any, is called a "shadow" and is represented by a line segment over the distance. The distance by which the high price is greater than this interval, if any, is called a "wick" and is represented by a line segment over the distance. Wicks and shadows can be of virtually any length, including zero.

An example is shown below. Using Table 1, price data for Alcoa Aluminum, Fig. 1 shows the corresponding candlestick formations.

"Up" days are in white, while "down" days are in black. But according to Candlestick Chartists, much more information is contained in such a chart. For example, the first figure, representing February 3, in which the market close was the same as the market high, is called a "Doji." Nison devotes an entire chapter to this phenomenon, entitled "The Magic Doji," in which he claims that "The Doji is a distinct trend change signal".<sup>3</sup> Furthermore, the last figure, representing February 7, is the exact opposite of what Nison calls a "hammer." Were the figure possessed of a long shadow rather than a long wick, the hammer formation would indicate that "the market is hammering out a base." (p. 29) Alas, since the figure is not a hammer, such a conclusion about early February 1992, would be inappropriate.

<sup>2</sup> Excel spreadsheets will even plot Candlestick charts as part of the standard graphics option.

<sup>3</sup> He goes on to say "However, the likelihood of a reversal increases if subsequent candlesticks confirm the doji's reversal potential. Doji sessions are important only in markets where there are not many doji"(p. 150). Just how many are "not many?" Nison does not say.

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