Random Walks In Stock Market Prices

Early in the Nineteenth Century the botanist Robert Brown noted that if he looked through a microscope at a pollen grain suspended in water it exhibited continual and haphazard motion in all directions. This phenomenon is known as Brownian motion and has been observed with small particles of all kinds. It is caused by the continual bombardment of the suspended particles by the molecules of water. The particle is buffeted this way and that so that it moves irregularly through the water. The path that it traces is known as a Random Walk.

by
EUGENE F. FAMA
Reviewed by
ADRIAN HOLST

We are accustomed to making decisions in the stock market on the basis of fundamental or intrinsic value analysis, or perhaps on the basis of technical analysis relying on some charting method. Each of these approached to the stock market implies a theory or model of stock market behaviour. In his article Professor Fama discusses an alternative way of looking at stock market prices, a different model of the behaviour of the stock market, the random walk model.

Random walk models have been applied to problems in the physical sciences, and long before the model was applied to the stock market it was well understood by physicists, mathematicians and statisticians. With these origins it is not surprising that the theory of random walks is of more interest within the academic world than outside it. Most of the discussion of the theory has been in technical academic journals and in a form which non-mathematicians would usually find incomprehensible. In comparison with the fundamentalist view or chartist view, the random walk model of stock market prices is barren and sterile. It is basically a negative theory and the few positive deductions from the theory are of little use in the market-place.

"Random walk theorists usually start from the premise that the major security exchanges are good examples of 'efficient' markets. An 'efficient' market is defined as one where there are large numbers of rational profit maximizers actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants.

"In an efficient market, competition among the intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now the market expects to take place in the future. In other words, in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value."

Having described the random walk model of stock market prices, and presented the evidence to support this model, the article goes on to describe its implication. It first points out the fundamental difference between the random walk model and the chartist approach.

Central to the philosophy of the chartist is the belief that history repeats itself. He learns, by observing the past, that a certain pattern is followed by a rise in the price of a stock, and when he sees this pattern again he expects the market to rise. This belief is also inherent in the Dow theory and it implies that, in some way, successive price changes are dependent.

In his article Professor Fama describes the efforts that statisticians have made to detect any dependence between successive changes — all of them unfruitful. However these have been very simple tests such as looking at the likelihood of a rise in price being followed by another rise in price. The article infers that since these searches for patterns have been unsuccessful there are probably no mechanical trading rules, or chartist techniques, based solely on patterns in the past history of price changes which would make the expected profit of the investor greater than they would be with a simple buy-and-hold policy.

While I find the conclusion appealing, I do not feel the very simple statistical tests described in the article disprove the validity of the complex patterns the chartists use. But the onus of proof should be shifted to the chartist. He must show that he can consistently use these patterns to make meaningful predictions. Professor Fama concludes on chartist theories: "the two theories are diametrically opposed, and if, as the empirical evidence seems to suggest, the random walk theory is valid, then chartist theories are akin to astrology and of no real value to the investor."

Having dealt with chartists fairly vigorously the Professor goes on to discuss the challenge the random walk model poses for the intrinsic analyst. "There is nothing in the above discussion which suggests that superior fundamental or intrinsic

● *Eugene F. Fama is Assistant Professor of Finance in the Graduate School of Business, at the University of Chicago.*

This article has been published in the September-October, 1965 issue of the Financial Analysts Journal N.Y. and reproduced in London in the December, 1965 issue of the Investment Analyst. The article challenges some of the traditional wisdom of the stock market and has provoked a deal of discussion overseas.

value analysis is useless in a random walk efficient market. In fact the analyst will do better than the investor who follows a simple buy-and-hold policy so long as he can more quickly identify situations where there are non-negligible discrepancies between actual prices and intrinsic values than other analysts and investors, and if he is better able to predict the occurrence of important events and evaluate their effects intrinsic values." The article then points out that while the returns to sophisticated analysts may be quite high, they establish a market in which fundamental analysis is a fairly useless procedure for the average analyst or investor. Tongue in cheek Professor Fama concludes: "There probably aren't many analysts (in fact I know of none) who would willingly concede they are no better than the average analyst."

I can imagine an investor who uses the random walk model selecting his investments in two minutes flat, with the aid of a blindfold and a pin. Nevertheless the model does give a surprisingly accurate description of the behaviour of stock market prices and it constitutes a challenge to the analyst. As I have said earlier, the chartist must now demonstrate that he can consistently use his price patterns to make meaningful predictions. The challenge to the fundamental analyst is to demonstrate that he can do better than the market average.

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pared funds statements in a rather similar form.

Comparative funds statements would reveal the sources of finance which the company has availed itself of in the past and the use made of that finance. This should be a guide to the analyst in assessing future financing needs of a business. If supplementary accounting statements were available showing adjustments for changes in the purchasing power of money, similar adjustments should be shown in a supplementary funds statement. The result should be a statement explaining the growth achieved by the company. Of course, the extra items appearing on such an adjusted funds statement might require the interpretation of a skilled and expert investment analyst.

These suggestions do not preclude the provision of simplified summaries and "highlights" for the lay investor in a prominent place in company published reports. Statistics and summaries for the skilled and demanding investor could properly be disclosed in a supplement or appendix.

Summary

There is much confusion of thought on what is being sought by investors from a cash flow calculation. Cash flow is an ambiguous term. It is not a one figure measure of operating and financial performance and if this is being sought, it probably represents a search for a simplicity which is unattainable at the present time. If analysts could clarify their thoughts on the operating and financial data needed, it might be the first step to obtaining improvements in data published if disclosure is in fact related to what is demanded by society.

The author suggests that informed investors should be seeking improved standards of disclosure in published reports through:—

1. The development of accounting statements which reveal a close approximation to the economic situation of the company, probably by disclosing current cost information as well as historical costs.
2. Comparative statements of changes in financing and changes in company assets in a form which can be redesigned to highlight information useful for the skilled investor.
3. More disclosure of management plans and summarized budget data in the directors' report, particularly where short-term securities have been issued.