



Wireless Investor

The Efficient Market Approximation

■ Peter Blakey, Associate Editor

This is the third column in a series on investment engineering. The first column introduced a generic system-level block diagram of financial asset management accounts. Examination of this block diagram led to a focus on buy and sell decisions, which led to a focus on the price behavior of financial assets. The second column presented the lognormal model of asset prices, which describes the random component of price behavior in terms of a random walk. This column looks at some of the causes and consequences of random price behavior.

Pervasive Randomness

Numerous academic studies have confirmed that stock prices exhibit a high level of randomness. To quote one financial text:

Researchers have looked at daily changes, weekly changes, and monthly changes; they have looked at many different stocks in many different countries and for many different periods; they have calculated the coefficient of correlation between these price changes; they have examined

some of the so-called *technical rules* that have been used by some investors to exploit the “patterns” they claim to see in past stock prices. With remarkable unanimity, researchers have concluded that there is no useful information in the sequence of past changes in the stock price. As a result, many of the researchers have become famous: none has become rich.

The existence of a high level of randomness in the behavior of stock prices does not imply the validity of every assumption contained in the lognormal model of asset prices. The lognormal model assumes that the magnitudes of short-term price fluctuations have a normal distribution and are statistically independent. As noted in the previous column, neither of these assumptions is strictly accurate. Real distributions exhibit “fat tails” and contain correlations whose levels are low but detectable. However, it is unclear whether there is any way to exploit (i.e., profit from) these limitations.



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Most academics start from the premise that “randomness rules” and then try to answer questions such as: Why is random behavior so pervasive in financial markets? What are the implications of the randomness for investment strategies? Most practitioners believe that randomness does not always rule, and many practitioners focus their energy on trying to identify and profit from such circumstances.

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The Efficient Market Hypothesis

The academic point of view is encapsulated in the efficient market hypothesis (EMH). Prof. Eugene Fama has provided a concise statement of the EMH: "Information is always correctly reflected in securities prices." This statement leaves open important issues such as "what information?" and "in what sense is information reflected *correctly*?" Consideration of the first issue leads to three distinct forms of the EMH. These are referred to as the weak, semistrong, and strong forms. The EMH is the focus of this column. The second issue is one of the keys to modern financial theory and will be discussed in the next column in this series.

The "weak" form of the EMH states that prices reflect all of the information contained in the record of past prices. The corollary is that there is no point in performing technical analysis. The "semistrong" form states that prices reflect past prices and all other published information. The corollary is that there is no point in acting on published information. The "strong" form states that prices reflect not just past prices and public information but also all of the information that can be acquired by painstaking fundamental analysis of the company and the economy and all private (insider) information. The corollary is that there is no point doing fundamental analysis of individual companies or of the economy as a whole.

The EMH is consistent with a model of markets in which no participants exert market power, new information is processed very rapidly, and prices reflect the unbiased assessments of participants who behave rationally. Under these circumstances, all known information is already priced into the market, so only new information can impact price behavior. The impact of new information on perceived risk is randomly positive or negative (because any known bias is already reflected in the price). Price fluctuations are the market's responses to new information and are also randomly positive or negative.

An ironic feature of each form of the EMH is that it can only be true if enough people believe that it is false, perform supposedly pointless analysis, and act

on their analyses in ways that impact current prices! Academic studies tend to support the weak and semistrong forms of the EMH, but provide solid evidence against the strong form. The semistrong form of the EMH leads, via modern portfolio theory (MPT), to popular financial strategies such as diversification among asset classes and indexing.

The idea of classifying the EMH into weak, semistrong, and strong forms dates back almost 40 years. Debate about the "validity" of the various forms of the EMH has been prolonged but inconclusive. Some recent authors have chosen to bypass the details of the debate. When developing theories of finance and investing, they assume only that the efficiency of markets makes it very difficult for anyone to profit from information that is widely available.

Real Markets

Market practitioners are unimpressed by the pronouncements of academics. Most practitioners believe that the price behavior that occurs in real markets is impacted by at least four factors and that they can gain a statistical edge by being positioned on the correct (i.e., profitable) side of each factor. The four factors are: fundamentals, sentiment, liquidity, and manipulation.

The various forms of the EMH focus on the role of fundamentals. Practitioners accept that fundamentals determine returns over the long term but argue that short-term returns are impacted significantly by market sentiment. They believe that the emotions of fear, greed, panic, and euphoria cause individuals, and the market as a whole, to behave very differently from the collection of rational, unbiased agents postulated by most academics.

A belief that sentiment plays a central role in price behavior is perfectly consistent with high levels of randomness. Fluctuations in sentiment merely augment and may, over the short and medium term, dominate changes in the market's perception of fundamentals. If sentiment has a role in determining price behavior, the EMH is undermined in a very important way. Psychologists have demonstrated significant predictability in the ways individuals and

crowds react to stimuli. If market stimuli lead to recurring patterns of behavior, it may be possible to detect these patterns and project future trends with better than random accuracy by examining the behavior of past prices and volumes. This opens the door for the application of technical analysis!

Many practitioners believe very strongly that technical analysis provides insight into the present state and the potential future states of market sentiment. However, thoughtful practitioners also acknowledge that in order to profit from technical analysis it is necessary to do each of three things well: 1) process price and volume information in a way that yields useful information, 2) incorporate the results in a valid trading system, and 3) operate the system consistently.

It is extremely difficult, but not absolutely impossible, to do all three things well. Academics interpret the difficulties of exploiting technical analysis as providing additional support for the "validity" of the EMH. Their logic seems flawed.

Liquidity and Manipulation

Prices may also fail to reflect information correctly as the result of either liquidity issues or various forms of legal and illegal manipulation. The liquidity of a market is the extent to which market participants can buy and sell whatever amounts they wish without having a significant impact on price. Small investors who want to buy or sell small lots of well-known large cap stocks normally experience a high degree of liquidity. Institutional traders who want to buy or sell large amounts of stock experience much less liquidity, and all market participants face problems with liquidity when trying to buy or sell stock in thinly traded companies. Suppose that orders in illiquid markets are a random mixture of buy orders, which tend to cause a price increase, and sell orders, which tend to cause a price decrease. Imperfect liquidity is then a source of significant price fluctuations that is quite independent of new information. Academics happily interpret the price fluctuations as further "evidence" of the "validity" of the EMH.

Market participants whose trades impact the balance between supply and demand can manipulate markets in ways that are perfectly legal. For example, institutional traders who need to buy or sell large positions do not want their trades to have a negative impact on the prices they pay or receive. They can use a succession of small trades in the “wrong” direction to drive the price up or down. This attracts the attention of traders who pile on and reinforce the short-term trend, thereby providing increased supply or demand in the direction that the institutional trader is seeking. Some mutual funds perform “window dressing” at the end of each quarter. By buying relatively small amounts of additional stock they increase the apparent value of their holdings that they report to shareholders. Underwriters of secondary offerings who receive an overallotment option are able to short stocks prior to the announcement of the secondary offering and then cover their shorts using their overallotment. Thinly traded stocks are very vulnerable to being manipulated via relatively small quantities of purchases or sales. This explains the eternal popularity of “pump and dump” schemes run by numerous newsletters and Web sites.

Coherent Markets

The insight that sentiment, in addition to fundamentals, plays an important role in price behavior can be depicted graphically, as shown in Figure 1. The basic idea is to plot fundamentals on the x-axis, on a scale that ranges from poor to excellent, and to plot market sentiment on the y-axis, on a scale that ranges from panic to euphoria. The origin corresponds to neutral fundamentals and neutral sentiment. The evolving state of the market is represented as a path in the x-y (fundamentals-sentiment) plane. Over the short term, there is considerable uncertainty in the precise location of the fundamentals coordinate and the sentiment coordinate. This corresponds to two-dimensional

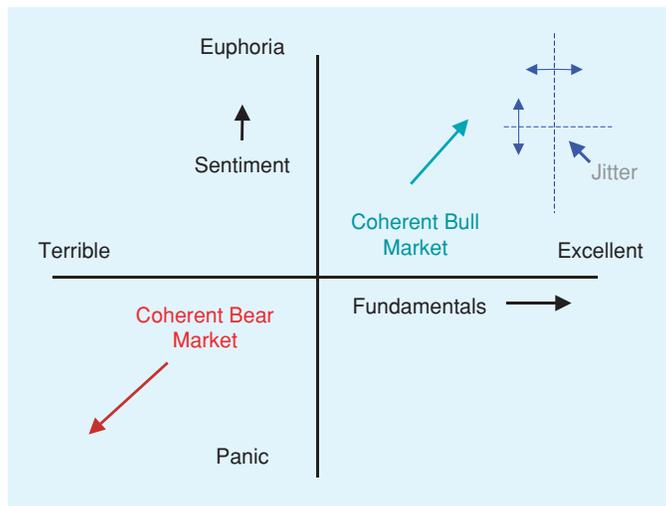


Figure 1. A two-dimensional map of market dynamics.

“jitter” that is manifested as a high degree of randomness in price changes. Over the medium and longer terms, the nature of the track becomes clearer. Investing strategies need to change in response to the location and velocity of the market track in the plane.

For example, when the market track is in the upper right quadrant and moving away from the origin, a coherent bull market is in place, and the appropriate strategy is to go long. When the track is in the lower left quadrant and moving away from the origin, a coherent bear market is in place, and the appropriate strategy is to sell or go short. When the track is in one of the other two quadrants and moving away from the origin, the market is inconsistent, and an appropriate strategy is to stand aside and wait for a reversal of sentiment. When the track is milling around close to the origin, the market is in an incoherent state, and selling covered calls may be attractive option. (Two-dimensional views of market dynamics and the importance of identifying coherent market states were discussed more than ten years ago in a book by Tonis Vaga that is now out of print.)

Assessment

With the benefit of hindsight, the long and often bitter debate about the validity of the EMH looks like a blind alley that was triggered by semantic imprecision. As practitioners of “the dismal science,” economists tend to envy disciplines that benefit from application of the “scientific

method.” For the purposes of boosting their personal self-esteem and getting their papers published in journals, economists would rather be developing and testing a series of portentous “hypotheses” than merely analyzing the consequences of an approximate model of efficient markets. If academics had introduced the efficient market approximation, rather than the efficient market hypothesis, years of pointless debate and a huge schism between academics and practitioners would both have been avoided.

The fact that a model is an approximation does not mean that it is not useful for certain purposes. Is information “always correctly reflected in securities prices”? Practitioners are certain that the answer is no, and common sense is on their side. On the other hand, is it easy to profit from situations in which information is not reflected correctly in securities prices? Once again, the answer is no. Efficient market approximation has limitations, but its central insight (that the randomness of changes in stock prices makes it extremely difficult to profit from information that is widely known) is applicable to most participants in most markets. The EMH provides a starting point for developing financial strategies that approximately match the performance of the overall market, which is as much as most amateurs can realistically hope for. These strategies will be described in the next article in this series. On the other hand, the limitations of the EMH open the door for technical analysis, which will be the topic of some subsequent columns.

Coming Up Next . . .

The next column will provide a break from the series of articles on investment engineering. It will analyze the false allure of equity-indexed annuities. The next article in the series on investment engineering will provide a of survey modern portfolio theory. Feedback and questions are always welcome and may be sent to pblakey@yahoo.com. 