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Random Walks, Lemmings, and Behaviorism; The Search for a Market Lodestar

By

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RANDOM WALKS, LEMMINGS, AND BEHAVIORISM; THE SEARCH FOR A MARKET LODESTAR

Random Walk: Burton Malkiel defines a random walk as “one in which future steps or directions cannot be predicted on the basis of past actions.” Within the context of the stock market, a random walk for a stock’s price means that it is as likely to fall as to rise, regardless of previous price performance (Malkiel, 1996). To hold the random walk hypothesis as truth is to forsake all punditry regarding fundamental and technical analysis and to abandon long-standing shibboleths such as evolving industries and sectoral rotation. Essentially, random walk implied that “winners” could not consistently be picked. The *Wall Street Journal* lends credence to this hypothesis with its long-running contest of “darts versus the experts,” where stocks selected by darts tossed at the financial page are matched, performance-wise, with stocks selected by market experts. The random walk hypothesis is not particularly popular in the general financial community as it implies that financial management brings only a layer of cost – and the investor is better served by investing in a fund which closely represents the overall market. “Random walk” was derided as an academic contrivance by many in the financial sector. However, the hypothesis gained support as financial information flowed more freely and in greater volume over time, and market/industry/firm transactions became more transparent.

Random walk can be viewed as a variation on, or the apex of, the efficient market hypothesis, in all its manifestations. An efficient market can be proposed to exist when the following conditions hold:

- a. Many active, well-informed, and rational investors participate in a market where no one individual has any power to manipulate a security’s price.
- b. Information is relatively costless and is equally available to all investors.
- c. New information is generated randomly, with information events independent of one another.
- d. Investors act quickly and rationally in response to new information.

To a large extent, these conditions reflect the current state of securities markets. Moreover, in their presence, new information about corporations will be quickly incorporated into stock prices. Furthermore, price movements are independent of one another and tend to be random in nature. That is, today's price change is in response to new information - different information from that which drove yesterday's price change. (Jones, 2000).

The Efficient Market Hypothesis (EMH) comes in three constitutions, from weak to strong.

- a. Weak form: All past price and volume information is incorporated in present stock price. It follows, then, that technical analysis – which proposes that past price trends tend to repeat themselves, is of peripheral value.
- b. Semi-strong form: Along with historical price and volume data, all information disseminated to the public – including product innovations, management changes, earnings announcements, company “guidance,” competitive realignments, etc. is quickly incorporated into a stock's price. Hence, if the semi-strong state of EMH holds, then no investor can profit, post-announcement, from changes in expected earnings, corporate acquisitions, management shakeups and the like. If the investor can profit in the wake of corporate news, then the market is not semi-strong efficient.
- c. Strong form: Subsumes both weak and semi-strong forms of EMH and adds non-public information as being quickly and costlessly incorporated into a company's stock price. If the strong form of EMH prevails, then even corporate or exchange insiders could not benefit from share price appreciation based on information yet to be made available to the public at large.

It follows that the strong form of EMH represents the highest state of market efficiency and the weak form the lowest (Jones, 2000). All variants have been repeatedly tested by academicians representing different disciplines, with the (very) general result of some support for all strength gradations, but diminishing support as fortitude increases. Nonetheless, the Efficient Market Hypothesis, to the extent that it is held, has profound ramifications for the financial industry. A “true believer” would have no use for technical analysis, evidence on deviations from intrinsic value, or money management skills in general; he/she would simply take what the market gives them by buying into a fund (or selecting individual stocks) that is/ are representative (a blood sample) of the overall stock market.

That being said, the EMH is most useful as a benchmark for efficiency; a means of comparison between the ideal and the actual. Many studies have indicated strong deviations from EMH to include time-adjustment lags, overreaction and underreaction, the January effect, the small-cap effect, the weekend effect, herd behavior, momentum investing – to name a few. Most investors feel they can outperform the stock market; otherwise, they'd place their savings in index funds and be done with it. Furthermore, the decision to buy a particular stock at a particular time and the choice among alternative investments are grounded in psychological and sociological verities as much as in economic theory. Homo economicus is rational enough to recognize that irrational behavior is not an outlier, but the norm, and must be factored into the investment equation. In this day of market capitalization in excess of GDP, few investors are zealots who ascribe to only one theory of sound investing; be it fundamental-valuation; technical analysis; or behavioral reactivity. Most investors' philosophy is likely to espouse some amalgam of all three. The irony, and the focus of this paper, is that as market information becomes more voluminous, timely, accurate, and universally available, the validity of the Efficient Market Hypothesis may actually diminish. The EMH may become a diminishing image in the rear-view mirror rather than an expanding one in the investment process.

Fundamental Analysis: Contemporary investment philosophy can be segmented into three or four loosely perimetered camps; fundamental value, technical analysis, momentum, and behaviorist. While the variables driving the investment decision differ among philosophical segments, investors tend not to be zealots, and draft their personal lodestar by drawing from diverse segments. Fundamentalists attempt to arrive at a firm's intrinsic value by looking at earnings, dividends, earnings growth and income/balance sheet ratios. After calculating a stock's intrinsic value with a standard formula, it is compared to market price to determine whether the security is a buy or a sell. John Burr Williams, in *Theory of Investment Value*, was first to develop an actual formula, the Dividend Discount Model (DDM) for calculating a stock's

fundamental value. (Malkeil, 1996). However, the “value school of investment was institutionalized by Benjamin Graham, who with David Dodd authored *Security Analysis* and, individually, *The Intelligent Investor*. Graham took a conservative tack in his investment strategy; carefully drawing the line between “speculation” and investment. Per Graham, “An investment operation is one which, upon thorough analysis promises safety of principal and an adequate return. Operations not meeting these requirements are speculative.” (Graham, 1973). In fact, Benjamin Graham considered anyone with a margined position to be a speculator. Nonetheless, Graham, with Dodd, became the beacon light for generations of value investors, who, over time, became more comfortable with risk.

Technical Analysis: Technical analysts pride themselves in being oblivious to intrinsic value and regard research into financial statements as peripheral to the investment decision. Rather, it is the potential supply (sellers) and demand (buyers) for a stock which matters. Technicians study price and volume data for trends which tend to repeat themselves over time and form the basis for the buy/sell decision. Applying patterns of past stock performance to present market data enables the technician to identify buy and sell signals. Moreover, antithetical to the EMH, price trends, as the term suggests, persist over periods of time which suggests that either new information is filtered into investors, or, receipt of new information occurs over a significant time frame.

Finally, both supply and demand for stocks are affected by a spectrum of information; from macroeconomic data, to sentiment, to psychology, to social behavior (Reilly and Horton, 1995).

Momentum Investing: Momentum investing hinges about a variation in the theme of inertia – that a body in motion tends to remain in motion. Hence, a company whose growth is flat tends to remain that way and a stock experiencing rapid growth is likely to do so for a considerable period. Momentum investors eschew searching for hidden value in perceptibly moribund stocks

and, rather, look for companies experiencing some signal event which is likely to drive stock price upward for an extended period of time. Momentum investors tend to lag behind value investors in buying a particular stock and tend to hold the stock after value investors have taken profits. (Duncan, 1995). To an extent, momentum investing exemplifies the “bandwagon effect” in microeconomic theory, where a product becomes more valuable as its purchases increase. Momentum investors wait for a visible change in fundamentals before buying and tend to “ride” a stock longer than value investors, which makes them more susceptible to plunges in stock prices from lofty heights – when signals change. One common indicator of momentum or to measure whether a stock exhibits momentum is the relative performance benchmark. Relative performance is a ratio of a stock’s weekly closing price to the week’s end Dow Jones Industrial Average (DJIA). If this value, when plotted, is a positively sloped function, then the stock in question is outperforming the DJIA (Lutts, 1995).

Animal Spirits and Behaviorism: Behavioral investing involves the application of psychology to overall market behavior and to the individual investors, who, in the aggregate, comprise the market. The wider amplitude of stock price variation relative to dividend variation (recall the dividend discount model {DDM} of stock valuation) suggests that the EMH has (more) credibility problems (Mazzucato and Semmler, 1999). According to Shefrin (2000) there are three psychological elements underlying investor behavior. First, investors tend to fall back on past experience in establishing their future investment strategies. The *Oxford Dictionary and Thesaurus* defines the heuristic method as “ a system of education under which pupils are trained to find things out for themselves.” Investors develop and adhere to certain rules of thumb in undertaking financial investments. These benchmarks tend to be error-prone and, as a result, most investors, in drawing from their heuristic baggage, tend to act in a pre-disposed and biased manner. Frame dependence implies a pre-disposition to act in a particular manner under a set of circumstances. Traditional investment theory supposes that investors will act in an objective,

non-recurring manner; with each reaction to new information independent of the previous reaction. Investors will prefer some behavioral frames to others. While some might say that avarice and fear rule the marketplace, other investors would substitute hope. Investors may substitute self-developed behavior paradigms for unbounded rationality. Hence, the motivating force may be to maximize control over an investment situation, or, to avoid losses and hence regrets. Finally, errant heuristic guidelines and frame dependence may, in turn, affect stock prices and move them away from, rather than toward, intrinsic value. It follows that such behavior will make markets less, rather than more, efficient (Shefrin, 2000).

Before Keynes so aptly tied the term “animal spirits” to the antics of investor behavior it was used by Descartes to characterize a muscular (knee-jerk) reaction initiated by the brain. Ultimately, the term is traceable to Galen, a Greek doctor/practitioner, who developed a hypotheses of *pneumata*, or vital spirits generated by various organs of the body (Koppl, 1991). But animal spirits, per Keynes, are not merely a spontaneous, reflexive reaction to new market information. Rather, animal spirits are a positive for the marketplace; driving trading and transactions when informational signals are mixed – or even in their absence. Given uncertainty, and the lack of a clear, logical path of action, it is animal spirits that provides the investor with the necessary impetus to overcome risk aversions and undertake transactions. (Matthews, 1991).

David Dreman has been an apostle of behaviorism for than thirty years. He proposes that any paradigm applied to market/stock performance must include a generous element of investor psychology. In an early work, *Psychology and the Stock Market*, (1977), uses a simple algebraic model to incorporate psychological aspects into value analysis. Under the EMH, the current price of a stock is its current intrinsic value; all news concerning the corporation is reflected in its price. The value of a security (V), is equal to its price (D), or $D = V$. Dreman posits that the investors’ mindset regarding the market, the specific stock, and his/her interpretation of new information quickly finds its way into stock price. Hence, the equation must be modified to:

$D = f(VIP)$. That is, a present market price is a function of fundamental value (V), investor interpretation of new information (I) and the investor's present psychological compass (P). Thus, psychological mindset and how new information is interpreted can be key variables in driving a stock's price. Moreover, the interplay between investor psychology and information interpretation is particularly critical. Per Dreman, these two variables move in the same direction as the general market, reinforcing changes in market fundamentals and have the potential to create wide, emotion-driven variances, between stock price and intrinsic value (Dreman, 1977).

At the core of investor behaviorism and the subsequent deviations of stock prices from fair value and bubble creation, lies investor confidence cum overconfidence. Daniel, et als. (1998) proposes that variations in investor confidence stem from "biased self-attribution." If the investor becomes increasingly confident in his ability to ferret out important data, assimilate and evaluate it, generating "private information" he will underestimate his own forecasting errors while overvaluing his abilities as a stock-picker. Moreover, the informed, overconfident investor will overreact to his self-generated private information and underreact to public signals (stock split announcement, dividend change, insider buying or selling) which may counter or corroborate his personal perspective on a stock. Studies indicate that personal overconfidence, in general, tends to be stronger for more complex tasks (illness diagnoses, stock analysis) than for relatively straightforward, though cerebral, tasks – such as mathematical calculations. The overreaction – correction behavior in the stock market is reflected in negative long run autocorrelation in market returns as in excess volatility in stock prices (Daniel, et als., 1998). Moreover, when public information supports investors private signals, confidence levels rise significantly. However, when public information contradicts private signals, confidence levels fall only modestly as investors attribute (investment) failure to external events – beyond their control.

Psychologists find that people systematically discount certain types of information consistent with a held set of beliefs while placing a premium on information that fits their

paradigm. Most individuals make unrealistic self-valuations and rate their innate abilities higher than those of their cohort, while ranking themselves higher than others do. Odean (1998) notes that if overconfident traders weigh their own (self-generated) signals more than public or common signals, the private signals will be heterogeneous among traders and result in a higher volume of trading – than if all traders gave a greater weight to the common signals. Psychologists have opined that the motivational state (driving investment) is one that is tailored by our particular society – in terms of what we do and how we do it. In turn, the motivational state is characterized by impulses (animal spirits) such as the particularly American taste for victory, in an of itself, and aggression (Matthews, 1991). Breaking down general theory into investor behavior, *Psychology Today* (1999) proposes the following: (a) According to Daniel Kahneman at Princeton University, investors (American) are enamored with their own skills and regard themselves to be better than other investors; (b) the disutility of losses is greater than the utility of gains, with the result that investors hold onto losers – in tacit denial of having made a poor choice; and, (c) Investors like to think they’re in control and evidence this by frequent (too) trading to create the illusion of structured improvement in one’s financial well-being.

Keynes had it about right when he stated: “The state of long-term expectation, upon which our decisions are based does not solely depend on the most probable forecast we can make. It also depends on the confidence with which we make this forecast – on how highly we rate the likelihood of our best forecast turning out quite wrong “(Keynes, 1936).

Individuals tend to weigh more recent information more heavily and short weight older information. If all the traders in the stock market were homo economicus, the market would act as if it had a “single driver.” Biased self-attribution inserts a “second driver” into the investment seat which, in turn, distorts prices and increases volatility (and volume) while reducing market efficiency (Odean, 1998).

Bubbles and Herds: A speculative bubble can be said to exist when prices deviate substantially from true value over a period of time, simultaneously expanding and approaching the explosion point. History, both ancient and current is replete with examples of speculative bubbles. Tulipmania in the Netherlands in the 17th century and the Mississippi and South Sea Land companies of the 18th century provide anecdotally rich examples. More recently, the stock market crashes of 1929, 1987, and the Nasdaq meltdown in 2000 provide rich evidence of bubbles in US financial markets. Perhaps the largest bubble (and subsequent explosion) formed in Japan's real estate and stock markets in the period from 1955 to 1990. In 1990, the total appraised value of Japanese property was five times that of total US property valuation. Moreover, Japanese stocks were valued at 1.5 times that of all US equities – or 45% of world market capitalization (Malkiel, 1996). While some economists would argue that bubbles are the result of rational economic decision making, others would attribute bubbles to some sort of market psychoses. Garber (1990) argues the former in considering the Mississippi and South Sea companies, that investors could not afford to ignore the “opportunity” (at least in the short run) afforded by these investment opportunities. It was the only game in town at the time. Garber's rationale translates well in helping to explain “herdlike” institutional investor behavior in US stock markets. Scharfstein and Stein (1990) propose that herdlike behavior among fund managers may be responsible, in part, for observed market volatility. Concerned with fund performance and job security, fund managers tend to emulate the actions of other fund managers – an application of the bandwagon effect. Obsessed with quarterly performance, managers will pile in and pile out of a particular stock or sector, reinforcing the general trend. Managers would rather risk being wrong with the rest of their cohort – and proceed with “groupthink” than listen to their own private signals and act in opposition to the general trend. The disutility of flying solo and being wrong (termination) evidently outweighs the utility of standing alone and being correct. (Sharfstein and Stein, 1990).

Internet, Information Overload, Dimming Lodestar: The modest point of the paper is that financial markets will become more volatile over time. The added volatility, ironically, will stem in large part from improved technology which, in theory, should make the very same markets more efficient and less volatile. A cocktail combining prevailing investor psychology, elevated by superior, accessible technology should provide for more market turbulence.

In *Irrational Exuberance*, Robert Schilling traces the various factors from the media, to the maturing of the baby boomers, to the internet, the growth of mutual funds, hegemony of the US in the international arena, which will be behind the growth of future market bubbles. However, this author proposes, it is the peculiar chemistry of optimism, hubris, and technology that will drive the market, with larger gaps between fundamental and paper values, increased market volume and volatility, and recurrent bubbles. In data compiled by the International Data Corporation, the number of internet users in the US will exceed 175 million by 2003 (Schilling, p. 206). The internet itself, with its immediacy of information, gives the viewer a sense of empowerment; of being on top of any investment situation, kindling investor confidence and hence support for high market valuations. While the number of internet users in the US will move quickly in the direction of 100%, the number of on-line brokerage accounts – while growing rapidly, has much further to go till the saturation point. Currently, 50% of American households are involved, directly or indirectly (mutual funds, pension plans) in the market. On-line accounts numbered 3.1 million in 1999 and are projected to grow to 9 million in 2003 (Schilling, p.206). The potential for on-line accounts to grow exponentially should hold in the foreseeable future – particularly if 1%-2% of Old Age and Survivors insurance tax(6.2% per individual) is allowed to be funneled into private accounts. On-line investing generates an exuberance of its own, boosting confidence, trading, volatility. Internet investment and financial sites can provide the investor with encyclopedic information about a particular company or industry with a keystroke. The sweat equity (and hence cost) of becoming better informed has been reduced. Moreover, the individual investor has access to information that previously was

the private preserve of the institutional investor. In October 2000, a new Securities and Exchange Commission edict was implemented which requires corporations to give the same information to the public at large as it does to securities professionals. Regulation FD (fair disclosure) requires any information intentionally given to investment houses and brokerages – also be simultaneously released to the public. If the information release is inadvertent, the public has the right to know “promptly.” (Quickel, 2001). While the requirement may cause firms to hold information longer before release, it dramatically puts individual and institutional investors on a plane. The cozy relationship between “guidance” providing firms and institutional investment houses who provide underwriting services is unraveling while the market is becoming more egalitarian.

However, the torrent of information now available to the individual investor is not without cost. More than forty years ago, Herbert Simon identified two factors which tended to negate rationality in decision-making: (a) because of time constraints, it is not possible to consider all the information necessary to arrive at a rational decision; and (b) there are insufficient “inner” programs to properly digest all the information, resulting in informational overload (Schwartz, 1998). In the internet age, Simon’s axiom holds truer than ever; finite timeframes plus overload translates into less than rational decisions. Keynes would agree, arguing that the vacuum in decision making would be filled by animal spirits, which are vital to the functioning of any marketplace.

Thus, a common bond among observed deviations from efficient markets is investor psychology. Behavioral economics can help explain why some investment strategies fail and why others outperform the general market consistently, confounding the pundits (Dreman, 1998). A critical determinant in investor psychology is over-confidence (weak case) or hubris (strong case). Overconfidence is manifested by inordinately weighing successes, denying failures, self-aggrandizement, over-trading, and other symptoms. The internet age and changes in securities regulation expand the databank available to the individual investor and allow him/her access to

information previously the purview of institutional investors. Access to more information and the ability to see the effectiveness of one's decisions immediately, in streaming quotes, reinforce investor confidence, particularly when failures are veiled. Greater confidence is translated into more trading, volatility, and the emergence of bubbles; evidence the halving of the Nasdaq index over the past ten months, borne by the dot.com bandwagon. There are strong elements of both empowerment and the casino involved in on-line investing which are heightened by the never-diminishing waterfall of fresh information. Internet investing has become the perfect cottage industry for the 21st century: low barriers to entry, perfect information, and innumerable price-taking "firms." The irony is that more perfect information is presumed to move prices more quickly toward an inherent value. And well it might, absent the investor psyche.

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