1 Introduction

A market is said to be efficient with respect to an information set if the price 'fully reflects' that information set (Fama, 1970), i.e. if the price would be unaffected by revealing the information set to all market participants (Malkiel, 1992). The efficient market hypothesis (EMH) asserts that financial markets are efficient. Starting in the 16th century, this note gives a chronological review of the notable literature relating to the EMH.

2 History of the Efficient Market Hypothesis

Back in the 16th century the prominent Italian mathematician, Girolamo Cardano, in *Liber de Ludo Aleae* (The Book of Games of Chance) (Cardano, c. 1564) wrote: 'The most fundamental principle of all in gambling is simply equal conditions, e.g. of opponents, of bystanders, of money, of situation, of the dice box, and of the die itself. To the extent to which you depart from that equality, if it is in your opponents favour, you are a fool, and if in your own, you are unjust'.

In 1828 the Scottish botanist, Robert Brown, noticed that grains of pollen suspended in water had a rapid oscillatory motion when viewed under a microscope (Brown, 1828). Then in 1863 a French stockbroker, Jules Regnault, observed that the longer you hold a security, the more you can win or lose on its price variations: the price deviation is directly proportional to the square root of time (Regnault, 1863). As far back as 1880 the British physicist, Lord Rayleigh, (through his work on sound vibrations) was aware of the notion of a random walk (Rayleigh, 1880). Whilst in 1888 John Venn, the British logician and philosopher, had a clear concept of both a random walk and Brownian motion (Venn, 1888). Even in 1889 efficient markets were clearly mentioned in a book by George Gibson entitled *The Stock Markets of London, Paris and New York*. Gibson wrote that when 'shares become publicly known in an open market, the value which they acquire may be regarded as the judgment of the best intelligence concerning them' (Gibson, 1889). The following year Alfred Marshall wrote *Principles of Economics* (Marshall, 1890).

In 1900 a French mathematician, Louis Bachelier, published his PhD thesis, *Théorie de la Spéculation* (Bachelier, 1900). He developed the mathematics and statistics of Brownian motion five years before Einstein (1905). He also deduced that 'The mathematical expectation of the speculator is zero' 65 years before Samuelson (1965) explained efficient markets in terms of a martingale. Bachelier's work was way ahead of his time and was ignored until it was rediscovered by Savage in 1955. Five years later Karl Pearson, a professor and Fellow of the Royal Society, introduced the term *random walk* in the letters pages of Nature (Pearson, 1905). Unaware of Bachelier's work in 1900, Albert Einstein developed the equations for Brownian motion (Einstein, 1905). The following year a Polish scientist, Marian Smoluchowski, described Brownian motion (von Smoluchowski, 1906). Bachelier's arguments can also be found in André Barriol's book on financial transactions (Barriol, 1908). In the same year, De Montessus published a book on probability and its applications (de Montessus, 1908), which contains a chapter on finance based on Bachelier's thesis. Meanwhile, Langevin developed the stochastic differential equation of Brownian motion (Langevin, 1908).

In 1912 George Binney Dibblee published *The Laws of Supply and Demand* (Dibblee, 1912). Two years later Bachelier published the book, *Le Jeu, la Chance et le Hasard* (The Game, the Chance and the Hazard) (Bachelier, 1914), which sold over six thousand copies. According to Benoit Mandelbrot (Mandelbrot, 1963) the first to note that distributions of price changes are too 'peaked' to be relative to samples from Gaussian populations was Wesley C. Mitchell (Mitchell, 1915).

F. W. Taussig published a paper under the title, 'Is market price determinate?' (Taussig, 1921). In 1923 the English economist John Maynard Keynes clearly stated that investors on financial markets are rewarded not for knowing better than the market what the future has in store, but rather for risk baring, this is a consequence of the EMH (Keynes, 1923). Frederick MacCauley, an economist, observed that there was a striking similarity between the fluctuations of the stock market and those of a chance curve which may be obtained by throwing a dice (MacCauley, 1925). Unquestionable proof of the leptokurtic nature of the distribution of returns was given by Maurice Olivier in his Paris doctoral dissertation (Olivier, 1926). Frederick C. Mills, in *The Behavior of Prices* (Mills, 1927), proved the leptokurtosis of returns. The Wall Street Crash occurred in late October 1929 which, taking into account the full extent and duration of its fallout, was the most devastating stock market crash in the history of the US.

In 1930 Alfred Cowles, 3rd, the American economist and businessman, founded and funded both the Econometric Society and its journal, *Econometrica*. Two years later, Cowles set up the Cowles Commission for Economic Research. Cowles (1933) analysed the performance of investment professionals and concluded that stock market forecasters cannot forecast. Holbrook Working concluded that stock returns behave like numbers from a lottery (Working, 1934). In 1936 Keynes had *General Theory of Employment, Interest, and Money* (Keynes, 1936) published. He famously compared the stock market with a beauty contest, and also claimed that most investors' decisions can only be as a

result of 'animal spirits'. The following year, Eugen Slutzky showed that sums of independent random variables may be the source of cyclic processes (Slutzky, 1937). In the only paper published before 1960 which found significant inefficiencies, Cowles and Jones found significant evidence of serial correlation in averaged time series indices of stock prices (Cowles and Jones, 1937).

In 1944, in a continuation of his 1933 publication, Cowles again reported that investment professionals do not beat the market (Cowles, 1944). Holbrook Working showed that in an ideal futures market it would be impossible for any professional forecaster to predict price changes successfully (Working, 1949).

In 1953 Milton Friedman pointed out that, due to arbitrage, the case for the EMH can be made even in situations where the trading strategies of investors are correlated (Friedman, 1953). Kendall (1953) analysed 22 price-series at weekly intervals and found to his surprise that they were essentially random. Also, he was the first to note the time dependence of the empirical variance (nonstationarity). Around 1955, Leonard Jimmie Savage, who had discovered Bachelier's 1914 publication in the Chicago or Yale library sent half a dozen 'blue ditto' postcards to colleagues, asking 'does any one of you know him?' Paul Samuelson was one of the recipients. He couldn't find the book in the MIT library, but he did discover a copy of Bachelier's PhD thesis (Bernstein, 1992; Taqqu, 2001). In 1956 Bachelier's name reappeared in economics, this time, as an acknowledged forerunner, in a thesis on options-like pricing by a student of MIT, economist Paul A. Samuelson (Mandelbrot and Hudson, 2004). Working (1958) built an anticipatory market model. The following year, Harry Roberts demonstrated that a random walk will look very much like an actual stock series (Harry, 1959). Meanwhile, M. F. M. Osborne showed that the logarithm of common-stock prices follows Brownian motion; and also found evidence of the square root of time rule. Regarding the distribution of returns, he finds 'a larger "tangential dispersion" in the data at these limits' (Osborne, 1959).

Larson (1960) presented the results of an application of a new method of time series analysis. He notes that the distribution of price changes is 'very nearly normally distributed for the central 80 per cent of the data, but there is an excessive number of extreme values.' Cowles (1960) revisited the results in Cowles and Jones (1937), correcting an error introduced by averaging, and still finds mixed temporal dependence results. Working (1960) showed that the use of averages can introduce autocorrelations not present in the original series.

Houthakker (1961) used stop-loss sell orders and finds patterns. He also found leptokurtosis, nonstationarity and suspected non-linearity. Independently of Working (1960), Alexander (1961) realised that spurious autocorrelation could be introduced by averaging; or if the probability of a rise is not 0.5. He concluded that the random walk model best fits the data, but found leptokurtosis in the distribution of returns. Also, this paper was the first to test for non-linear dependence. In the same year, John F. Muth introduced the rational expectations hypothesis in economics (Muth, 1961).

In 1962 Mandelbrot first proposed that the tails of the distribution of returns follow a power law, in IBM Research Note NC-87 (Mandelbrot, 1962). Meanwhile, Paul H. Cootner concluded that the stock market is not a random walk (Cootner, 1962). Osborne (1962) investigated deviations of stock prices from a simple random walk, and his results include the fact that stocks tend to be traded in concentrated bursts. Arnold B. Moore found insignificant negative serial correlation of the returns of individual stocks, but a slight positive serial correlation for the index (Moore, 1962). Jack Treynor wrote his unpublished manuscript 'Toward a theory of market value of risky assets', the first paper on the Capital Asset Pricing Model (CAPM), yet rarely cited and often incorrectly referred to as 'Treynor (1961)' (Treynor, 1962).

Berger and Mandelbrot (1963) proposed a new model for error clustering in telephone circuits, and if their argument is applicable to stock trading, it might afford justification for the Pareto-Levy distribution of stock price changes claimed by Mandelbrot. Granger and Morgenstern (1963) perform spectral analysis on market prices and found that short-run movements of the series obey the simple random walk hypothesis, but that long-run movements do not, and that 'business cycles' were of little or no importance. Mandelbrot (1963) presented and tested a new model of price behaviour. Unlike Bachelier, he used natural logarithms of prices and also replaced the Gaussian distributions with the more general stable Paretian. Fama (1963) discussed Mandelbrot's 'stable Paretian hypothesis' and concluded that the tested market data conforms to the distribution.

Alexander (1964) answered the critics of his 1961 paper and concluded that the S&P industrials does not follow a random walk. Cootner (1964) edited his classic book, *The Random Character of Stock Market Prices*, a collection of papers by Roberts, Bachelier, Cootner, Kendall, Osborne, Working, Cowles, Moore, Granger and Morgenstern, Alexander, Larson, Steiger, Fama, Mandelbrot and others. Godfrey et al. (1964) published 'The random walk hypothesis of stock market behavior'. Steiger (1964) tested for nonrandomness and concluded that stock prices do not follow a random walk. Sharpe (1964) published his Nobel prize-winning work on the CAPM.

Fama (1965b) defined an "efficient" market for the first time, in his landmark empirical analysis of stock market prices

that concluded that they follow a random walk. Meanwhile, Samuelson (1965) provided the first formal economic argument for 'efficient markets'. His contribution is neatly summarized by the title of his article: 'Proof that properly anticipated prices fluctuate randomly'. He (correctly) focussed on the concept of a martingale, rather than a random walk (as in Fama (1965b)). Fama (1965a) explained how the theory of random walks in stock market prices presents important challenges to the proponents of both technical analysis and fundamental analysis.

Fama and Blume (1966) concluded that for measuring the direction and degree of dependence in price changes, serial correlation is probably as powerful as the Alexandrian filter rules (Alexander, 1961, 1964). Mandelbrot (1966) proved some of the first theorems showing how, in competitive markets with rational risk-neutral investors, returns are unpredictable—security values and prices follow a martingale.

Harry Roberts (Roberts, 1967) coined the term *efficient markets hypothesis* and made the distinction between weak and strong form tests, which became the classic taxonomy in Fama (1970).

In 1968 Michael C. Jensen evaluated the performance of mutual funds and concluded that 'on average the funds apparently were not quite successful enough in their trading activities to recoup even their brokerage expenses' (Jensen, 1968). Ball and Brown (1968) were the first to publish an 'event study'.

Fama et al. (1969) undertook the first ever event study (although they were not the first to publish), and their results lend considerable support to the conclusion that the stock market is efficient.

Published in 1970, the definitive paper on the efficient markets hypothesis is Eugene F. Fama's first of three review papers: 'Efficient capital markets: A review of theory and empirical work' (Fama, 1970). He defines an efficient market thus: 'A market in which prices always "fully reflect" available information is called "efficient."' He was also the first to consider the 'joint hypothesis problem'. Granger and Morgenstern (1970) published the book *Predictability of Stock Market Prices*.

Kemp and Reid (1971) concluded that share price movements were 'conspicuously non-random'. In the same year Jack L. Treynor published 'The only game in town' under the pseudonym 'Walter Bagehot' (Bagehot, 1971), and Hirshleifer (1971) first noted that the expected revelation of information can prevent risk sharing.

A secondary offering is the issuance of new stock for public sale from a company that has already made its initial public offering (IPO). Scholes (1972) studied the price effects of secondary offerings and found that the market is efficient except for some indication of post-event price drift.

Samuelson (1973a) wrote his survey paper, 'Mathematics of speculative price'. LeRoy (1973) showed that under risk-aversion, there is no theoretical justification for the martingale property. Lorie and Hamilton (1973) published the book *The Stock Market: Theories and Evidence*. Also in 1973 Burton G. Malkiel first published the classic *A Random Walk Down Wall Street* (Malkiel, 1973), now in its tenth edition. Samuelson (1973b) generalized his earlier (1965) work to include stocks that pay dividends.

Cox and Ross (1976) authored 'The valuation of options for alternative stochastic processes'. Sanford Grossman described a model which shows that 'informationally efficient price systems aggregate diverse information perfectly, but in doing this the price system eliminates the private incentive for collecting the information' (Grossman, 1976). Fama (1976) published the book *Foundations of Finance*.

In 1977 M. F. M. Osborne published *The Stock Market and Finance From a Physicist's Viewpoint*, a collection of lecture notes, in which he discusses market-making, random walks, statistical methods and sequential analysis of stock market data (Osborne, 1977). Beja (1977) showed that the efficiency of a real market is impossible.

Ball (1978) wrote a survey paper which revealed consistent excess returns after public announcements of firms' earnings. Jensen (1978) famously wrote, 'I believe there is no other proposition in economics which has more solid empirical evidence supporting it than the Efficient Market Hypothesis.' He defines efficiency thus: 'A market is efficient with respect to information set θ_t if it is impossible to make economic profits by trading on the basis of information set θ_t.' Robert E. Lucas, Jr. built a theoretical model of rational agents which shows that the martingale property need not hold under risk aversion (Lucas, 1978).

With a theoretical model of asset trading Radner (1979) showed that if the number of alternative states of initial information is finite then, generically, 'rational expectations equilibria' exist that reveal to all traders all of their initial information. Dimson (1979) reviewed the problems of risk measurement (estimating beta) when shares are subject to infrequent trading. Harrison and Kreps (1979) published 'Martingales and arbitrage in multiperiod securities markets'. Robert J. Shiller showed that the volatility of long-term interest rates is greater than predicted by expectations models (Shiller, 1979).

Sanford J. Grossman and Joseph E. Stiglitz (Grossman and Stiglitz, 1980) showed that it is impossible for a market to be perfectly informationally efficient. Because information is costly, prices cannot perfectly reflect the information which is available, since if it did, investors who spent resources on obtaining and analysing it would receive no compensation. Thus, a sensible model of market equilibrium must leave some incentive for information-gathering (security analysis).

LeRoy and Porter (1981) showed that stock markets exhibit 'excess volatility' and they reject market efficiency. Stiglitz (1981) showed that even with apparently competitive and 'efficient' markets, resource allocations may not be Pareto efficient. Shiller (1981) showed that stock prices move too much to be justified by subsequent changes in dividends, i.e. exhibit excess volatility.

Milgrom and Stokey (1982) showed that under certain conditions, the receipt of private information cannot create any incentives to trade. Tirole (1982) showed that unless traders have different priors or are able to obtain insurance in the market, speculation relies on inconsistent plans, and thus is ruled out by rational expectations.

Osborne and Murphy (1984) found evidence of the square root of time rule in earnings. Roll (1984) examined US orange juice futures prices and the effect of the weather. He found excess volatility.

In 1985 Werner F. M. De Bondt and Richard Thaler (De Bondt and Thaler, 1985) discovered that stock prices overreact, evidencing substantial weak form market inefficiencies. This paper marked the start of behavioural finance.

Marsh and Merton (1986) analysed the variance-bound methodology used by Shiller and conclude that this approach cannot be used to test the hypothesis of stock market rationality. They also highlight the practical consequences of rejecting the EMH. Fischer Black (Black, 1986) introduced the concept of 'noise traders', those who trade on anything other than information, and showed that noise trading is essential to the existence of liquid markets. Lawrence H. Summers (Summers, 1986) argued that many statistical tests of market efficiency have very low power in discriminating against plausible forms of inefficiency. French and Roll (1986) found that asset prices are much more volatile during exchange trading hours than during non-trading hours; and they deduced that this is due to trading on private information—the market generates its own news.

On Black Monday, 19 October 1987, stock markets around the world crashed. The crash began in Hong Kong, spread west to Europe, then hit the United States causing the largest daily percentage loss in the history of the Dow Jones Industrial Average, -22.61%.

Fama and French (1988) found large negative autocorrelations for stock portfolio return horizons beyond a year. Lo and MacKinlay (1988) strongly rejected the random walk hypothesis for weekly stock market returns using the variance-ratio test. Poterba and Summers (1988) showed that stock returns show positive autocorrelation over short periods and negative autocorrelation over longer horizons. Conrad and Kaul (1988) characterized the stochastic behaviour of expected returns on common stock.

Cutler et al. (1989) found that news does not adequately explain market movement. Eun and Shim (1989) found that a substantial amount of interdependence exists among national stock markets, and the results are consistent with informationally efficient international stock markets. Ball (1989) discusses the specification of stock market efficiency. Guimarães et al. (1989) edited the book *A Reappraisal of the Efficiency of Financial Markets*. Shiller (1989) published *Market Volatility*, a book about the sources of volatility which challenges the EMH. LeRoy (1989) published his survey paper, 'Efficient capital markets and martingales'. He makes it clear that the transition between the intuitive idea of market efficiency and the martingale is far from direct.

Laffont and Maskin (1990) show that the efficient market hypothesis may well fail if there is imperfect competition. Lehmann (1990) found reversals in weekly security returns and rejects the efficient market hypothesis. Jegadeesh (1990) documented strong evidence of predictable behaviour of security returns and rejects the random walk hypothesis.

Kim et al. (1991) re-examined the empirical evidence for mean-reverting behaviour in stock prices and found that mean reversion is entirely a pre-World War II phenomenon. Matthew Jackson (Jackson, 1991) explicitly modelled the price formation process and shows that if agents are not price-takers, then it is possible to have an equilibrium with fully revealing prices and costly information acquisition. Andrew W. Lo (Lo, 1991) developed a test for long-run memory that is robust to short-range dependence, and concludes that there is no evidence of long-range dependence in any of the stock returns indices tested. Fama (1991) wrote the second of his three review papers. Instead of weak-form tests, the first category now covers the more general area of tests for return predictability.

Chopra et al. (1992) found that stocks overreact. Bekaert and Hodrick (1992) characterized predictable components in excess returns on equity and foreign exchange markets. Peter L. Bernstein published the book *Capital Ideas* (Bern-

stein, 1992), an engaging account of the history of the ideas that shaped modern finance and laced with anecdotes. Malkiel (1992) contributed an essay 'Efficient market hypothesis' in the *New Palgrave Dictionary of Money and Finance*.

Jegadeesh and Titman (1993) found that trading strategies that bought past winners and sold past losers realized significant abnormal returns. Richardson (1993) showed that the patterns in serial-correlation estimates and their magnitude observed in previous studies should be expected under the null hypothesis of serial independence.

Roll (1994) observed that in practice it is hard to profit from even the strongest market inefficiencies. Huang and Stoll (1994) provided new evidence concerning market microstructure and stock return predictions. Metcalf and Malkiel (1994) found that portfolios of stocks chosen by experts do not consistently beat the market. Lakonishok et al. (1994) provide evidence that value strategies yield higher returns because these strategies exploit the suboptimal behaviour of the typical investor and not because these strategies are fundamentally riskier.

In 1995 Robert Haugen published the book *The New Finance: The Case Against Efficient Markets*. He emphasizes that short-run overreaction (which causes momentum in prices) may lead to long-term reversals (when the market recognizes its past error) (Haugen, 1995).

Campbell et al. (1996) published their seminal book on empirical finance, *The Econometrics of Financial Markets*. Chan et al. (1996) looked at momentum strategies and their results suggest a market that responds only gradually to new information.

In 1997 Andrew Lo edited two volumes that bring together the most influential articles on the EMH (Lo, 1997). Chan et al. (1997) conclude that the world equity markets are weak-form efficient. Dow and Gorton (1997) investigated the connection between stock market efficiency and economic efficiency. W. Brian Arthur, *et al.* proposed a theory of asset pricing by creating an artificial stock market with heterogeneous agents with endogenous expectations (Arthur et al., 1997).

In 1998 Elroy Dimson and Massoud Mussavian gave a brief history of market efficiency (Dimson and Mussavian, 1998). In his third of three reviews, Fama (1998) concluded that, '[m]arket efficiency survives the challenge from the literature on long-term return anomalies.'

Lo and MacKinlay (1999) published *A Non-Random Walk Down Wall Street*. Haugen (1999) published the second edition of his book, which makes the case for the inefficient market, positioning the efficient market paradigm at the extreme end of a spectrum of possible states. Bernstein (1999) criticized the EMH and claims that the marginal benefits of investors acting on information exceed the marginal costs. Zhang (1999) presented a theory of marginally efficient markets. Farmer and Lo (1999) published an excellent but brief review article.

Shleifer (2000) published *Inefficient Markets: An Introduction to Behavioral Finance*, which questions the assumptions of investor rationality and perfect arbitrage. Lo (2000) published a selective survey of finance, and Beechey et al. (2000) published a survey paper on the EMH. Shiller (2000) published the first edition of *Irrational Exuberance*, which challenges the EMH, demonstrating that markets cannot be explained historically by the movement of company earnings or dividends.

In 2001 Eugene Fama became the first elected fellow of the American Finance Association. In an excellent historical review paper, Andreou et al. (2001) traced the development of various statistical models proposed since Bachelier (1900) in an attempt to assess how well these models capture the empirical regularities exhibited by data on speculative prices.

Mark Rubinstein re-examined some of the most serious historical evidence against market rationality and concludes that markets are rational (Rubinstein, 2001). Shafer and Vovk (2001) published *Probability and Finance: It's Only a Game!* which shows how probability can be based on game theory; they then apply the framework to finance.

Lewellen and Shanken (2002) concluded that parameter uncertainty can be important for characterizing and testing market efficiency. Chen and Yeh (2002) investigated the emergent properties of artificial stock markets and show that the EMH can be satisfied with some portions of the artificial time series.

Malkiel (2003) examined the attacks on the EHM and concludes that stock markets are far more efficient and far less predictable than some recent academic papers would have us believe. G. William Schwert showed that when anomalies are published, practitioners implement strategies implied by the papers and the anomalies subsequently weaken or disappear. In other words, research findings cause the market to become more efficient (Schwert, 2003). In the third edition of his book, Haugen (2003) focuses on the evidence, causes and history of overreactive pricing in the stock market.

Timmermann and Granger (2004) discussed the EMH from the perspective of a modern forecasting approach.

Malkiel (2005) showed that professional investment managers do not outperform their index benchmarks and provides evidence that by and large market prices do seem to reflect all available information.

Blakey (2006) looked at some of the causes and consequences of random price behaviour, meanwhile Tóth and Kertész (2006) found evidence of increasing efficiency in the New York Stock Exchange.

Wilson and Marashdeh (2007) demonstrated that cointegrated stock prices are inconsistent with the EMH in the short run, but consistent with the EMH in the long run. The elimination of arbitrage opportunities means that stock market inefficiency in the short run ensures stock market efficiency in the long run.

McCauley et al. (2008) show that martingale stochastic processes generate uncorrelated, generally *non-stationary* increments; explain why martingales look Markovian at the level of both simple averages *and* 2-point correlations; and prove that arbitrary martingales are topologically inequivalent to Wiener processes. Andrew Lo wrote the 'Efficient Markets Hypothesis' article for the second edition of *The New Palgrave Dictionary of Economics* (Lo, 2008). Yen and Lee (2008) presented a survey article that gives a chronological account of empirical findings and conclude that the EMH is here to stay.

In a paper on the global financial crisis Ball (2009) argued that the collapse of Lehman Brothers and other large financial institutions, far from resulting from excessive faith in efficient markets, reflects a failure to heed the lessons of efficient markets.

Lee et al. (2010) investigated the stationarity of real stock prices for 32 developed and 26 developing countries covering the period January 1999 to May 2007 and conclude that stock markets are not efficient.

3 Conclusion

Just under half of the papers reviewed support market efficiency, with most of the attacks on the EMH coming in the 1980s and 1990s. Recall that a market is said to be efficient with respect to an information set if the price 'fully reflects' that information set (Fama, 1970). On the one hand, the definitional 'fully' is an exacting requirement, suggesting that no real market could ever be efficient, implying that the EMH is almost certainly false. On the other hand, economics is a social science, and a hypothesis that is asymptotically true puts the EMH in contention for one of the strongest hypothesis in the whole of the social sciences. Strictly speaking the EMH is false, but in spirit is profoundly true. Besides, science concerns seeking the best hypothesis, and until a flawed hypothesis is replaced by a better hypothesis, criticism is of limited value.

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The efficient market hypothesis (EMH) states that a market is efficient if security prices immediately and fully reflect all available relevant information. If the market fully reflects information, the knowledge of that information would not allow an investor to profit from the information because stock prices already incorporate the information. The weak form of the EMH asserts that stock prices reflect all the information that can be derived by examining market trading data such as the history of past prices and trading volume.Â A weakly efficient market is one where the market price reflects the market information in its own past history. It implies that there no longer exists any opportunity to profit by making use of past time series of prices alone. Subsequently, he focuses on the Efficient Markets Hypothesis. This theory states that markets efficiently incorporate all public information, which consequently renders beating the market impossible. For example, technical analysis fails to provide powerful, short-run profit opportunities. A consequence of the Efficient Markets Hypothesis is that stock prices follow a Random Walk, as innovations to the stock price must be solely attributable to news. Professor Shiller contrasts the behavior of a Random Walk with that of a First-Order Autoregressive Process, and concludes that the latter statis