

# Empirical evidence for the efficient market hypothesis



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Outline various versions of Efficient Market Hypotheses. Discuss whether there is sufficient empirical support for each of these hypotheses. The efficiency of financial markets has long been a contentious issue, and as financial markets have evolved both in their breadth and complexity the question whether financial markets can effectively and efficiency allocate resources has never been more relevant.

In this essay I intend to investigate the validity of the various forms of the Efficient Market Hypothesis (EMH) using empirical evidence from various studies; and attempt to determine whether any of these forms of the EMH are accurate in describing the workings of international financial markets. Traditional finance textbooks have long offered three 'versions' of informational efficiency of financial markets: Weak, Semi-Strong and Strong, with the definitions of these 'versions' relatively settled.

I will firstly outline these versions and then evaluate the evidence to determine their validity. The Weak form of the EMH asserts that financial markets efficiently process all past prices of a financial asset which are reflected in its current price. Furthermore, it implies that asset prices follow a random walk process. This renders technical analysis futile as all information contained in previous prices has been efficiently priced in. Formally: ( ) ( )

The weak form of the EMH has had a substantial amount of research into testing its validity, in particular using econometric analysis. In addition, several observable phenomena have been presented as evidence against the weak form of the EMH. The 'December Effect' is an empirical observation that during the month of December stocks generally outperform

when compared to the rest of the year, this effect has been long observed and appears to have continued to persist (Since 1950 December has been the best performing month for the S&P 500 with an average return of 1.2%). This poses a contradiction to the Weak form of EMH; this is as any past price information should have been already processed by the market eliminating this trend. Explanations for the 'December Effect' vary, in my opinion the most convincing is that of Tax gain selling, concluded by Chen & Singal (2003), investors are reluctant to sell winner stocks in December in order to avoid crystallising their capital gain in the current financial year, they hence hold until January to sell their outperforming shares.

Also, what also must be considered is that given there are 12 months in the year, by the Weak EMH the average returns of all these months should also follow a normal distribution, making it inevitable that there would be a month that appears to 'outperform' the rest. Similar to 'December Effect' is the less prevalent 'Monday Effect' which claims that market returns on Mondays are statistically significantly less than that of other days of the week, by the same logic as above this also violates the Weak EMH. Another observation that appears to violate the EMH occurs weekly in Options markets.

As option prices decay each day (*ceteris paribus*), on Fridays the implied volatility (the most often quoted 'price' of options) drops significantly in order to cater for the two weekend days that the option cannot be traded on, the implied volatility level will then rebound back on Monday. This creates an easily arbitrageable weekly pattern of a sell-off in option implied volatility on Fridays and the consequent rebound on Monday. Arguably the easiest way to <https://assignbuster.com/empirical-evidence-for-the-efficient-market-hypothesis/>

test the validity of the Weak EMH is to check whether asset prices truly follow a random walk.

Enniful & Dowling (2013) investigates both large and small capitalisation 1008922 European stocks for the period 2000-2012, finding evidence of negative serial correlation for large capitalisation stocks and positive for smaller stocks, this supports the hypothesis of random walk efficiency for large, liquid stocks. Nisar & Hanif (2011) studied stock markets in South-Asia and found them to not be Weak form efficient when looking at daily returns using the runs test, Durbin Watson test for serial correlation, unit root test and variance ration test.

These results are similar to those of Hamid et al. (2010) who investigated 14 different stock exchanges in the Asia-Pacific area, who found that not one market was weak form efficient and “strongly rejects the null hypothesis” of a random walk. One of the key implications of the Weak form EMH is that technical analysis (the analysis of past price movements to predict future prices) should be ineffective. Park & Irwin (2007) gathered evidence of 95 modern studies into technical analysis and found that the majority (56 of the 95) displayed positive results.

Technical analysis was also found to be more effective in foreign exchange and futures markets as opposed to stock markets. The success of technical analysis has led to numerous funds to be set up using exclusively technical trading methods. The evidence for the weak version of the EMH is inconclusive; it appears that some asset markets do follow a random walk,

but there is often evidence of serial correlation in particular in trending markets which suggests that markets may not fully be weak form efficient.

This allows for technical analysis, as mentioned earlier, being sometimes effective. The Semi-Strong version of the EMH assumes that the weak form of the EMH is true, in addition it states that all public information is calculated into a stock's (or other financial assets) price, this renders both technical and fundamental analysis as futile. This view is supported by Malkiel (1973) who argues that asset prices typically follow a random walk and generating "alpha" (excess risk-adjusted returns) is not possible on a consistent basis.

This is shown by the fact that over the 30 years preceding the publication of his book, two-thirds of professional portfolio managers were outperformed by the S&P 500 index. Since Malkiel there has been much evidence on both sides for the Semi-Strong form of the EMH. Behavioural economics has provided much of this evidence against the EMH; this blames cognitive biases in investors leading to phenomena such as overbuying growth stocks and avoiding value stocks. This has resulted in the trend observed in Shiller (2005) showing that the returns of low P/E ratio stocks are consistently higher than those of higher P/E ratio stocks in the long run.

Ball (1978) argued that this is due to a higher beta whereas it was also proposed that this could be due to differences in interest rates, whilst both explanations have some merit it is widely agreed that they do not fully explain the discrepancy under the framework of the Semi-Strong EMH. Stock market bubbles are frequently referenced as an example of stock market

inefficiency (specifically being non Semi-Strong form efficient as firm's fundamentals no longer reflect prices). This has been observed repeatedly in the past decade and as suggested by Summers (1986) signifies the inefficiency of financial markets.

The ever increasing complexity of financial products in recent years has also posed problems for supporters of Semi-Strong form efficiency across markets. As was seen in the recent financial crisis and documented in Simkovic (2009) when market participants no longer understand the fundamentals of the products that they are trading the opportunity for excess returns by merely understanding the products dynamics arises.

1008922 There has been some econometric analysis into the accuracy of the Semi-Strong EMH.

Khan (1986) suggests that grain markets are efficient in the semi-strong form as the use of publicly available information does not appear to generate abnormal returns. Firth (1979) investigated the EMH in the context of mergers and takeovers; he hypothesised that if markets were efficient there would be no gains resulting in the mispricing of takeovers. This was supported by the data of recent (at time of publication) takeovers and mergers which found that 24 months after the bid announcement there was no evidence of excess returns.

What also must be considered, according to Samuleson's dictum, is the distinction between evaluating markets as a whole or as individual stocks. He hypothesised that individual stocks should show considerable semi-strong efficiency as mispricing's in individual stocks can be easily arbitrated,

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whereas markets as a whole do not have this feature making them less efficient. Jung & Shiller (2002) found that there was evidence to suggest that there is truth in Samuelson's dictum by evaluating data from all US firms from 1926.

Similarly to the weak form EMH the evidence is not definitive, but factors brought up, in particular in the behavioural economics field does appear to disprove that markets are completely semi-strong form efficient.

Samuelson's dictum, also supports the thesis that stock markets aren't fully semi-strong efficient, but the underlying stocks in the most part are. In addition, as seen by the recent financial crisis, financial products with a high degree of complexity often don't follow Semi-strong efficiency.

The final popularly referenced version of the EMH is the Strong form; this builds on all of the assumptions of the semi-strong version and adds the additional claim that all private information is accounted for in an asset's price; this implies that even insider information cannot be used in order to earn excess returns. The evidence against the strongest of the forms of the EMH has mainly focussed on proving that insider information can produce excess returns. Jaffee (1974) investigated SEC insider transaction findings, comparing to stock market performance, finding that when insiders sell they generally outperform the market.

Jagolinzer (2005) examined managers who invested using 10b5-1 protection for trades and found that insider trading using these plans outperforms the market by 5.6% over six-month periods. Both these papers, and several other pieces based on similar methods of gathering insider trading data,

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strictly contradicts the Strong form of the EMH. However, much of this evidence is conditional on the fact that investors are trading solely on inside information rather than publically available data.

However, Potocki & Swist (2012) does provide some evidence to support the Strong form EMH, investigating institutional recommendations as a proxy for insider information (the firm writing the recommendations would obviously have the “ inside information” before its available to the market). The study into the efficiency of WIG 20 shares found that in the latter half of the last decade that markets processed information in a Strong form efficient way, i. e. there could be no excess return made on trading the information in the recommendations before their release.

On balance, the strength of argument against the “ Strong form of the EMH” is significant and there does appear to be enough evidence that insider trading can produce excess returns. But what must be considered is that financial markets would most likely be strong form efficient should insider trading not be illegal. So, it is not necessarily financial markets that are intrinsically Strong form inefficient, but the restrictions that we place upon them that causes these inefficiencies. 1008922

In summary, I feel there is sufficient evidence to support the claim that markets are at least weak form efficient with econometric analysis generally supporting this hypothesis, with semi-strong form efficiency being a characteristic of some markets and generally individual stocks as suggested by Samuelson’s Dictum. I do not believe there is proof to say that markets are strong form efficient and this is shown by the consistent effectiveness of



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