

Efficient Market Hypothesis: An Exploratory Study of FTSE-100 Stock Market

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Abstract

The weak form of the efficient market hypothesis posits that stock prices reflect all publicly available information in the market but not undisclosed or private information. To empirically validate the weak form of an efficient market hypothesis, ten years of data from 2012 to 2020 was collected for the (FTSE) Financial Times Stock Exchange Group -100 index. Ordinary least square (OLS) regression was used through SPSS software for statistical tests. The regression tests' findings reveal that the beta coefficient's value is greater than or less than 0 for the lag value of t-1, t-2, t-3, t-4, t-5, t-6, t-7, t-8, t-9, and t-10. Since the value of beta coefficients for all lagged returns of t-1 to t-10 periods is not equal to 0, the efficient market hypothesis is rejected. Thus, this invalidates the efficient market hypothesis. Hence, it can be determined that investors can beat the market by analyzing and evaluating past securities or market index trends. Since past trends predict the future, it can be assumed that stocks or indices will perform similarly.

Keywords: *Weak Form of an Efficient Market Hypothesis, Weak EMH, Market Efficiency, (FTSE) -100*

Introduction

Over the past three decades, market efficiency has attracted significant importance in financial literature, focusing mainly on the equity market (Ustaoğlu, 2021). Although, there is a long debate among researchers, academicians, and investors regarding the validity of the efficient market hypothesis. It has been argued that past information can predict current and future stock prices (Ghazani and Ebrahimi, 2019; Ying et al., 2019). At the same time, some researchers argued that prevailing information in the market and movement in prices are insufficient to predict the outcome in the equity market due to undervaluation or overvaluation (Machmuddah et al., 2020). Additionally, some investors argued that stock returns could follow a similar path as in the past and can be used to predict the current or future outcome (Ustaoğlu, 2021). Further, increasing uncertainties and unprecedented changes in the market have also raised a question on the validity of EMH, indicating that technical analysis based on past performance cannot be used as an accurate measure.

Although various studies have been conducted to confirm the validity of EMH in both individual markets and regional markets such as Latin America, Asia, Africa, Europe, and even globally worldwide (Ahmed, 2021; Dias et al., 2020), findings are inconsistent. In addition, many

researchers, academicians, and investors also believe that EMH leaves too many unexplained phenomena in behavioural theories that require an alternative explanation (Bersalli, Menanteau, and El-Methni, 2020; Ahmed, 2021). Recently, mounting evidence has led to increased uncertainty regarding the validity of the efficient market hypothesis. This is due to different methods for valuing and analyzing stocks, which ultimately creates problems for the hypothesis's validity. As a result, the main objective of this research is to specifically focus on the (FTSE) Financial Times Stock Exchange Group -100 stock index to investigate the validity of the efficient market hypothesis using recent data and information.

The findings in the current research would significantly contribute to the literature, as it covers the most recent information on the (FTSE) (FTSE) FINANCIAL TIMES STOCK EXCHANGE GROUP -100 post-Covid-19 scenario that has yet to be covered in previous studies. Additionally, this will aid in assessing the accuracy of the efficient market theory. This evaluation will benefit researchers, academics, and investors in maximizing their investment returns while navigating market fluctuations caused by various factors.

Literature Review

The Efficient Market Hypothesis (EMH) is a well-known theory in the financial market. It suggests that the market operates efficiently and reflects accurate security prices, returns, and risks. Similarly, Dias et al. (2020) indicated that gain in a particular security is reflected in its trading price; therefore, prevailing prices and price movement can be used as an accurate measure for EMH. The author further evaluated that in an efficient market, price changes occur only when new information is available. Additionally, Boya (2019) stated in their research that the concept of the efficient market hypothesis is founded on three fundamental principles. The notion of weak EMH assumes that past information cannot be used to predict the current stock prices, as it does not reflect all available information. Therefore, it suggested that technical analysis cannot be used to determine the future outcome. Secondly, the semi-strong tenets indicated that all information is publicly available (Boya, 2019). Therefore, stock prices can be used for technical analysis rather than for making significant gains. Lastly, a potent form of EMH theory suggests that no one has an advantage of information availability, whether from outside or inside. Therefore, it indicated that the market is perfect, which makes it impossible to make an excessive profit.

According to the EMH theory, stock returns cannot be predicted and must be separate from one another if a market has inadequate form efficiency. On the contrary, independent traders might benefit abnormally if stock values are unpredictable and unexpected (Ṫiřan, 2015). In 2014, Konak and Seker researched to investigate if the development of the Financial Times Stock Exchange (FTSE) Group 100 aligns with the Efficient Market Theory. Their findings indicate that the FTSE Group 100 index, from 2001 to 2009, supported the weak version of EMH and adhered to the Random Walk Hypothesis. Technical analysis of past data on volume and prices may be used to take advantage of technical abnormalities that make fluctuations in stock prices predictable and provide unusual returns on investment. By examining historical data, these anomalies enable price alterations in the future to be predicted.

According to Kumar and Jawa's (2017) study, investor inattention could play a role in the market's inefficiency or delayed response to event reports. In reality, market efficiency differs

between marketplaces and between nations. Although excellent market efficiency is practically unheard of, it has been demonstrated that anomalies prevent markets from exhibiting even poor market efficiency. These inconsistencies have been attributed to several factors, including intense competition and open entry rules. These arguments suggest that even though markets can exhibit varying degrees of efficiency, anomalies distort effectiveness and generate valuable enterprises for participants.

Numerous studies have been conducted to scrutinize the validity of EMH and its ability to forecast current stock prices, as pointed out by Ying et al. in 2019. Meanwhile, Bersalli, Menanteau, and El-Methni (2020) indicated that random fluctuations in security prices of the stock market are found to be successive runs to validate the efficient market hypothesis. Several other studies have also examined the efficient market hypothesis by measuring the security prices in weak-form inefficiency (Miloş et al., 2020; Ehiedu and Obi, 2022). Findings revealed that EMH could be used as a successive factor in validating the EMH. Moreover, Miloş et al. (2020) researched 36 empirical studies on stock market index returns while considering interest rates, stock prices, spot equities, and foreign exchange rates. Hence, most findings have revealed a negative first-order autocorrelation between stock returns and other variables.

Further, some researchers have also focused on randomness (which implies that changes are uncorrelated with past changes) of the security prices, and findings revealed a mixed results (Ying et al., 2019). Meanwhile, Dias et al. (2020), in their study focusing on the South Asian market, found that security prices do not follow the random walk process. Similarly, Bersalli, Menanteau, and El-Methni (2020), in their study of the stock market, reported that there is no random walk process in the Indian market. On the contrary, Ying et al. (2019) found random walking behaviour in the Brazilian market but non-random walking in the Mexican market. Furthermore, in their study, Ghazani and Ebrahimi (2019) examine EMH using the four Stock Exchange markets of New Zealand using Granger causality. According to the research, small businesses exhibit semi-strong efficiency, whereas large businesses only display weak form efficiency under the efficient hypothesis. The study suggests several hypotheses to test the validity of the efficient market hypothesis.

H1: The (FTSE) financial times stock exchange group 100 market efficiently reflects security prices, returns, and risk associated with securities.

H0: (FTSE) (financial times stock exchange group 100 market is inefficient in reflecting actual security prices, returns, and risk associated with securities.

Methodology

The method used to gather and evaluate data is known as the study design. It was done using a quantitative research design. The quantitative research design was chosen for its objectivity because it relies more on the financial data of publicly listed stocks. It also helps remove study prejudices and delivers more accurate findings and conclusions. Through the quantitative methodology, data from the numerous research conducted on a related issue have been gathered, and statistical analysis has also been taken into consideration to provide a better understanding and assessment. As a researcher, you have two options for collecting data: primary data collection

and secondary data collection. This study chose the secondary data collection approach due to the ease of accessing secondary data sources.

According to Johnston's (2014) research, secondary data is highly beneficial in Economics. One significant advantage is the time, effort, and resources saved in data collection, as it has already been done. This study extracted data from the Financial Times Stock Exchange Group (FTSE) 100 index. In particular, the market efficiency analysis utilized price data from the FTSE. Data covering ten years, from 2012 to 2020, was collected for the FTSE 100 index to test the weak form of the efficient market hypothesis. The statistical tests were conducted using the Ordinary Least Square (OLS) regression through SPSS software. These tests enabled us to determine the empirical validity of the efficient market hypothesis.

Model/Equation

The study employed a linear regression model to test the weak form of the efficient market hypothesis. The model is expressed as:

$$R_t = \alpha + \beta R_{(t-1)} + \varepsilon_t$$

Where R_t represents the daily returns of the FTSE 100 index, α represents the intercept, β represents the slope coefficient of the lagged returns, and ε_t represents the error term.

Variables: Dependent variable: The dependent variable used in the study was the daily returns of the FTSE 100 index. R_t represents it in the model.

Independent variable: The independent variable used in the study was the lagged daily returns of the FTSE 100 index. It is represented by $R_{(t-1)}$ in the model.

Error term: In the model, the error term (represented by ε_t) accounts for any unobserved or omitted factors that could affect the daily returns of the FTSE 100 index but are not considered in the model. The model aimed to test the weak form of the efficient market hypothesis by analyzing the connection between current and lagged daily returns of the FTSE 100 index while considering any unobserved or omitted factors that could impact the returns.

Findings

In this section, we present the findings of the statistical analysis of the efficient market hypothesis, which includes a visual assessment of the data, descriptive analysis, and regression analysis. The primary focus of our research is regression analysis, which determines the presence or absence of weak form market efficiency.

Graphical Assessment

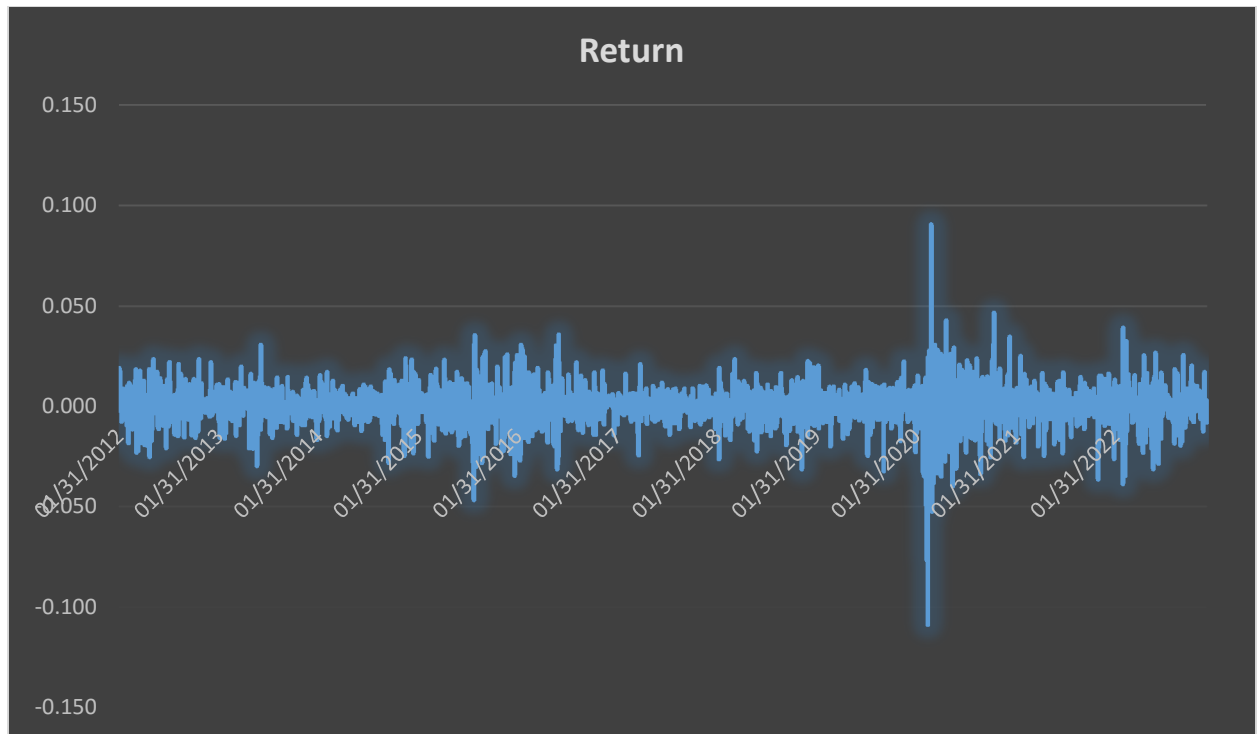


Figure 1 Graphical Assessment for Returns

Figure 1 shows the visual assessment of the returns from 2012 to 2022. It indicates the daily trend over the years for summarizing and presenting the volatility of the returns in the (FTSE) (FTSE) FINANCIAL TIMES STOCK EXCHANGE GROUP -100 stock market. It is indicated from the figure above that the returns of the (FTSE) (FTSE) FINANCIAL TIMES STOCK EXCHANGE GROUP 100 are volatile, presenting continuous fluctuation over the period. It shows the continued increase and decrease; one day, it shows the return to increase, while the other day, it shows the increase. The primary volatile position is observed in 2021, showing a major decline and significant increase. Overall, the returns of the (FTSE) (FTSE) FINANCIAL TIMES STOCK EXCHANGE GROUP -100 index are pretty volatile from the above analysis.

Descriptive Statistics

Table 1 Descriptive Statistics

	N	Mean	Std. Deviation	Skewness	Kurtosis
Return	2759	0.0002	0.0099	-0.602	11.163
t-1	2758	0.0002	0.0099	-0.603	11.165
t-2	2757	0.0002	0.0099	-0.603	11.16

t-3	2756	0.0002	0.0099	-0.602	11.156
t-4	2755	0.0002	0.00991	-0.602	11.15
t-5	2754	0.0002	0.00991	-0.603	11.147
t-6	2753	0.0001	0.0099	-0.603	11.168
t-7	2752	0.0001	0.0099	-0.603	11.162
t-8	2751	0.0001	0.00991	-0.603	11.158
t-9	2750	0.0002	0.00991	-0.604	11.172
t-10	2749	0.0002	0.00991	-0.605	11.176

Table 1 shows the descriptive statistics of the returns and the lags considered for the analysis. The table above shows the mean return from 2010 to 2020 to 0.0002 with a standard deviation of 0.0099. It shows lower daily security returns, around 0.002% average, deviating above or below by 0.099%, reflecting the lower variance. The Skewness and Kurtosis values represent that the data for the returns in these years are not normally distributed.

Regression Analysis

Table 2 Regression analysis

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0	0		0.772	0.44
t-1	-0.015	0.019	-0.015	-0.762	0.446
t-2	-0.022	0.019	-0.022	-1.153	0.249
t-3	0.009	0.019	0.009	0.465	0.642
t-4	-0.033	0.019	-0.033	-1.71	0.087
t-5	0.019	0.019	0.019	0.995	0.32
t-6	-0.042	0.019	-0.042	-2.214	0.027
t-7	0.067	0.019	0.067	3.541	0
t-8	-0.052	0.019	-0.052	-2.733	0.006
t-9	0.015	0.019	0.015	0.784	0.433
t-10	-0.009	0.019	-0.009	-0.449	0.654
R-Squared	0.011				
F-significant	0.00				

Table 2 shows the regression estimation at various lags. Based on the data presented, the coefficient value for each of the lags displayed is either higher or lower than 0. This suggests that the weak form of the efficient market hypothesis is not apparent in the (FTSE) FINANCIAL TIMES STOCK EXCHANGE GROUP -100 index. The research findings indicated the negative coefficient for 1-day lag, 2-day lag, 4-day lag, 6-day lag, 8-day, and 10-day lag.

Therefore, it shows that the effect is reversed, implying that the positive returns and vice versa would follow the negative ones. It can also be reflected in the visual and regression assessments above, showing the negative returns followed by the positive ones. Hence, it can be concluded from the assessment that the weak form of EMH does not exist in the (FTSE) (FTSE) FINANCIAL TIMES STOCK EXCHANGE GROUP -100, and it has a reversal effect. The F-significant value shows that the overall model explaining EMH is significant.

Discussion

The study's primary objective was to assess the weak form of the efficient market hypothesis concerning the stock returns of the Financial Times Stock Exchange Group-100 market. The regression analysis revealed that the coefficient for each value was either greater or lesser than 0, implying that the weak form of the EMH is nonexistent. According to Leković's (2018) research, when the correlation coefficient is zero, it validates the existence of the weak form EMH since there is no correlation between the observed returns and future returns based on past returns. However, if the coefficient is more significant or lower than zero, the weak form of market efficiency is absent. Investors who invested in securities successfully in the previous period tend to experience the inertia effect, which shows a positive correlation between the return on securities, implying that the positive and negative returns would be repeated in the upcoming years.

Furthermore, the negative correlation indicates a reversal effect implying negative returns would follow positive returns on the securities. Hence, investors invested in securities with poor returns last year. Therefore, it is obtained that (FTSE) (FTSE) FINANCIAL TIMES STOCK EXCHANGE GROUP -100 has a reversal effect, and the investors would invest in the poor return securities to have positive returns in the later year.

In contrast to our research, Konak and Şeker (2014) found that the (FTSE) FINANCIAL TIMES STOCK EXCHANGE GROUP 100 index exhibited weak market efficiency. Their study evaluated the period from January 2001 to November 2009, which included the global financial crisis. However, it's important to note that their research was conducted during a crisis, whereas our study covers the years 2012-2022 and reveals that the current trend does not follow the weak form of market efficiency. Therefore, investors in securities of the (FTSE) FINANCIAL TIMES STOCK EXCHANGE GROUP 100 index should consider past poor performance to generate better returns potentially.

Conclusion

According to the weak form of the efficient market hypothesis, publicly available information is reflected in stock share prices. However, information that has not yet been made public is not reflected. To beat the market, an investor must have access to this information and make investment decisions accordingly. Additionally, the hypothesis suggests that investing in riskier assets is the only way to outperform the market index. This research aimed to test the weak form of the efficient market hypothesis in the Financial Times Stock Exchange Group-100 index by collecting ten years of data from 2012 to 2020. Statistical tests were conducted using Ordinary Least Square (OLS) regression through SPSS software, and the results showed that the beta coefficient's value was more excellent or less than zero for lag values t-1, t-2, t-3, t-4, t-5, t-6, t-7,

t-8, t-9, and t-10. Since the value of beta coefficients for all lagged returns of t-1 to t-10 periods is not equal to 0, the efficient market hypothesis is rejected. It is because if the value of coefficients is greater than or less than 0, the lagged returns of the stocks at period t-1 or t-10 could be used to predict the share prices of the stocks. Thus, this invalidates the efficient market hypothesis. Hence, it can be determined that investors can beat the market by analyzing and evaluating past securities or market index trends. Since past trends predict the future, it can be assumed that stocks or indices will perform similarly.

Suggestions/Recommendations

These are the following suggestions.

1. According to the research, the efficient market hypothesis isn't relevant to the FTSE 100 index. The reason is that the previous returns can be used to forecast stock prices. This finding has significant consequences for investors and policymakers. They must consider the likelihood of market inefficiencies while making investment choices or creating policies.
2. The study suggests investors can beat the market by analyzing past securities or market index trends. This implies that policymakers must encourage and promote research and analysis in finance and investments to enable investors to make informed decisions and achieve better returns.
3. The study highlights the importance of access to timely and accurate financial data, which is essential for analyzing past securities or market index trends. Policymakers need to ensure that financial data is easily accessible to investors and researchers and that it is reliable and up-to-date.
4. The study also suggests that investors may have opportunities to generate higher returns by investing in riskier assets. Policymakers need to consider the implications of this finding for national investment policies and strategies. They may need to encourage the development of riskier assets that can generate higher returns for investors.
5. Finally, the study highlights the importance of ongoing research and analysis in finance and investments, which can help policymakers and investors stay informed about market trends and identify opportunities for growth and development. Policymakers need to promote and support research in this area to enable the development of more effective policies and investment strategies.

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