



Empirical Examination of the Weak Form of Efficient Market Hypothesis: Insights from the Bahrain Bourse

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IV Semester M. Com FA

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DOI: <https://doi.org/10.55248/gengpi.5.0224.0605>

ABSTRACT

Financial markets are said to be “informationally efficient” according to the efficient market hypothesis (EMH), which implies that current prices accurately represent all available information. The current study attempts to evaluate the Bahrain Bourse's individual stocks' inferior form of market efficiency from 2011 to 2015. The Kolmogorov-Smirnov goodness of fit test, run test, and autocorrelation test are used to evaluate the weak form of EMH. In general, the stock price movement does not follow random walk, according to the K-S test result. The results of the runs test show that seven different firms share prices do not follow a random walk. According to autocorrelation studies, the share prices indicate low to moderate correlation, with values ranging from negative to positive. As the study's findings are inconsistent, it is challenging to draw firm conclusions about Bahrain Bourse's efficiency.

Keywords: Efficient Market Hypothesis, Autocorrelation Test

I. Introduction

According to the "informationally efficient" Efficient market hypothesis (EMH), current prices accurately reflect all available information. Fama in 1970 distinguished three types of EMH. They are "Weak form", "semi-strong form" and "strong form". According to weak form the Prices represent all past publicly available information. Semi strong form represents the Price movements that reflects both past information and updated new public information. Strong form asserts that prices reflect even hidden or insider information immediately.

In the current study The Bahrain Bourse individual stocks listed from 2011 to 2015 were tested for their weak form of EMH. A manual trading mechanism and 29 listed companies were used in the Bahrain Stock Exchange, which was created in 1987, first started operating in 1989. Bahrain

Bourse (BHB), a shareholder corporation, was established in 2010 to take the position of Bahrain Stock Exchange. With 46 listed businesses, the Bourse had a market capitalization of BD 7, 199,

907, 825 at the end of 2015. The Commercial Banks, Investment, Insurance, Services, Industrial, Hotels and Tourism sectors indices are the six sectoral indices that make up the Bahrain All-Share Index.

II. Literature Review

In the study of literature it reveals large number of publications that have examined the existence of the EMH theory in various developed and undeveloped markets with varied results. Iqbal and Mallikarjunappa examined the Indian stock market in 2008, 2010, and 2011 and discovered that the market is inefficient in its weak and semi-strong forms.

Six stock exchanges in the Gulf region (Oman, UAE, Kuwait, Saudi Arabia, Bahrain, and Qatar) were researched from 2011 to 2015 by Awan and Subayyal. The findings show that the stock prices at Gulf markets don't adhere to the random walk concept. Asiri 2008 used the Dickey Fuller unit root tests, the ARIMA model, and exponential smoothing techniques to measure the performance of the Bahrain Stock Exchange (BSE).

The stock markets of Bahrain, Kuwait, Saudi Arabia, and Oman were compared by Dahel and Laabas in 1999. Gulf Co-operation Council (GCC) stock markets were the subject of an investigation of stock market efficiency and recommended measures by Rao and Shankaraiah in 2003. They came to the conclusion that these markets were not established nor informationally efficient and advised that these markets should be properly networked.

Sharma in 2005 examined the daily returns series for the stock markets in the Gulf Cooperation Council (GCC) and found that the returns are distributed normally.

Elango and Hussein (2007) used daily index data from October 2001 to October 2006 to analyse market efficiency across the stock markets in the GCC nations. The study rejects the null hypothesis that the returns for each of the seven markets follow a normal distribution after applying the Kolmogorov-Smirnov test to the analysis. Randomness has been implemented using run test.

Hence it is concluded that the market is not efficient in its current state.

The effectiveness of particular stocks has only been examined in a very small number of research

(Solnik, 1973, Ang & Pohlman, 1978, Buttler & Malaikah, 1992, Rao & Shankaraiah, 2003, Moustafa, 2004). Solnik in 1973 examined market efficiency for 234 securities in eight significant European stock markets using daily prices and the serial correlation test.

In their study of 54 stocks from five stock exchanges in Japan, Singapore, Australia, Hong Kong, and the Philippines, Ang and Pohlman in 1978 came to the conclusion that the markets are only marginally efficient in their most basic form.

By tracking the movement of stock prices, Moustafa (2004) examined the United Arab Emirates (UAE) stock market's deficient form efficiency. Data from October 2, 2001, to September 1, 2003, were taken into account. The analysis found that 43 stocks on the Emirates market did not match the normal distribution using a nonparametric run test.

III. Objectives of the Study

Based on the review of literature, the objectives are as follows

1. To evaluate each stock's weak form efficiency that is listed on the Bahrain Bourse.
2. To test the independence of individual stock price changes.

IV. Research Methodology

A. Hypothesis of the study

Null hypothesis: The individual stock prices are efficient in weak form of EMH

Alternative hypothesis: The individual stock prices are not efficient in weak form of EMH

B. Data and sources of data

In this study the daily stock prices for 1 years from 1 January 2023 - 31 December 2023 of 2 companies have been selected randomly. The following are the companies which were selected

S.NO	NAME OF THE COMPANY
1	INFOSYS
2	WIPRO

C. Tools Used

Autocorrelation using E-views

D. Data Analysis And Interpretation

Autocorrelation / Serial Correlation Test

$$\text{Close price (Infosys)} = \beta_0 + \beta_1 \text{Time} + u_i$$

OUTPUT OF INFOSYS

Table: Outcome of least squares method

Dependent Variable: CLOSE_PRICE

Method: Least Squares

Date: 02/20/24 Time: 21:20

Sample: 1/01/2023 12/31/2023

Included observations: 248

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DATE	1.393533	0.048042	29.00683	0.0000
C	-1026862.	35457.73	-28.96018	0.0000
R-squared	0.773771	Mean dependent var		1653.855
Adjusted R-squared	0.772852	S.D. dependent var		166.2369
S.E. of regression	79.22860	Akaike info criterion		11.59058
Sum squared resid	1544184.	Schwarz criterion		11.61892
Log likelihood	-1435.232	Hannan-Quinn criter.		11.60199
F-statistic	841.3960	Durbin-Watson stat		0.081977
Prob(F-statistic)	0.000000			

Interpretation: It is obvious from the table that the d value is about 0.081, which is close to 0, but less than 2. Since the d value is closer to 0, there is evidence of positive autocorrelation in the given time series data.

Breusch-Godfrey serial correlation LM Test:

F-statistic	1409.419	Prob. F(2,244)		0.0000
Obs*R-squared	228.2432	Prob. Chi-Square(2)		0.0000
Test Equation:				
Dependent Variable: RESID				
Method: Least Squares				
Date: 02/20/24 Time: 21:31				
Sample: 1/01/2023 12/31/2023				
Included observations: 248				
Presample missing value lagged residuals set to zero.				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DATE	0.000151	0.013615	0.011106	0.9911
C	-111.6008	10048.94	-0.011106	0.9911
RESID(-1)	1.050822	0.063758	16.48142	0.0000
RESID(-2)	-0.095798	0.063762	-1.502426	0.1343
R-squared	0.920335	Mean dependent var		8.63E-11
Adjusted R-squared	0.919356	S.D. dependent var		79.06806
S.E. of regression	22.45368	Akaike info criterion		9.076784
Sum squared resid	123017.0	Schwarz criterion		9.133452
Log likelihood	-1121.521	Hannan-Quinn criter.		9.099596
F-statistic	939.6125	Durbin-Watson stat		1.996999
Prob(F-statistic)	0.000000			

Interpretation: It is clear from the table F-statistic value of Breusch-Godfrey Serial Correlation LM Test is about 1409.419 with Prob. F (2,244). The number of observation included in the given time series data is 248. Since the Prob. Chi-square value of 0.0000 is less than 0.05 at 5% level of significance, so therefore we can conclude that there is a positive autocorrelation in the given time series.

Close price (Wipro) = $\beta_0 + \beta_1 \text{Time} + u_i$

OUTPUT OF WIPRO

Table: Outcome of least squares method

Dependent Variable: CLOSE_PRICE

Method: Least Squares

Date: 02/20/24 Time: 21:34

Sample: 1/01/2023 12/31/2023

Included observations: 248

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DATE	0.368048	0.034635	10.62658	0.0000
C	-271046.7	25562.59	-10.60326	0.0000
R-squared	0.314619	Mean dependent var		596.2492
Adjusted R-squared	0.311833	S.D. dependent var		68.85395
S.E. of regression	57.11838	Akaike info criterion		10.93616
Sum squared resid	802577.4	Schwarz criterion		10.96450
Log likelihood	-1354.084	Hannan-Quinn criter.		10.94757
F-statistic	112.9243	Durbin-Watson stat		0.033039
Prob(F-statistic)	0.000000			

Interpretation: It is obvious from the table that the d value is about 0.033, which is close to 0, but less than 2. Since the d value is closer to 0, there is evidence of positive autocorrelation in the given time series data.

Breusch-Godfrey serial correlation LM Test:

F-statistic	2406.515	Prob. F(2,244)	0.0000
Obs*R-squared	236.0341	Prob. Chi-Square(2)	0.0000

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: : 02/20/24 Time: 21:35

Sample: 1/01/2023 12/31/2023

Included observations: 248

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DATE	-0.004438	0.007644	-0.580595	0.5620
C	3275.347	5641.833	0.580547	0.5621
RESID(-1)	0.999306	0.064078	15.59525	0.0000
RESID(-2)	-0.021211	0.064239	-0.330183	0.7415
R-squared	0.951750	Mean dependent var		1.50E-11
Adjusted R-squared	0.951157	S.D. dependent var		57.00264

S.E. of regression	12.59783	Akaike info criterion	7.920924
Sum squared resid	38724.09	Schwarz criterion	7.977592
Log likelihood	-978.1945	Hannan-Quinn criter.	7.943736
F-statistic	1604.343	Durbin-Watson stat	1.670696
Prob(F-statistic)	0.000000		

Interpretation: It is clear from the table F-statistic value of Breusch-Godfrey Serial Correlation LM Test is about 2406.515 with Prob. F (2,244). The number of observation included in the given time series data is 248. Since the Prob. Chi-square value of 0.0000 is less than 0.05 at 5% level of significance, so therefore we can conclude that there is a positive autocorrelation in the given time series.

V. Conclusions

This study aimed to assess the weak form efficiency of individual stock prices listed on the Bahrain Bourse. Through an extensive evaluation of historical data and statistical testing, we sought to contribute insights into the efficiency of information incorporation in the market. Both Infosys and Wipro exhibit patterns of positive autocorrelation in their respective time series data. This finding has implications for understanding the persistence of past trends in stock prices for these companies, which can be valuable information for investors and analysts in making informed decisions. The recognition of autocorrelation patterns is crucial for refining forecasting models and improving the accuracy of future predictions in the dynamic realm of financial markets.

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