Jahangirnagar University Journal of Business Research (JUJBR), Vol. 25, No. 01, June, 2025
ISSN 1681-9748

Predictability of Stock Returns: A Weak Form Efficiency Test of Dhaka Stock Exchange

JUJBR

Nusrat Jahan Benozir[*]
Tanvir Rahman[**]

Abstract: *This study investigates the weak-form market efficiency of Dhaka Stock Exchange (DSE). The study has uncovered valuable insights that drive informed investment decisions by leveraging daily closing price data from the DSEX, DSE30, and DSES indices from 2015 to 2023. The findings reveal significant deviations from weak-form efficiency employing both parametric and non-parametric tests, with evidence of autocorrelation, non-stationarity in returns, and predictable price patterns. The results suggest that past price records can predict future stock movements, offering opportunities for investors to achieve abnormal returns as well as posing challenges for market stability. These inefficiencies are attributed to structural factors such as low liquidity, limited regulatory frameworks, and behavioral biases prevalent in emerging markets. The study underscored the need for regulatory reforms, improved market transparency, and enhanced investor education to foster market efficiency, highlighting the complex dynamics of market behavior in emerging economies like Bangladesh.*

Keywords: *Weak-Form Market Efficiency, Random Walk Theory, Dhaka Stock Exchange (DSE), Stock Price Predictability.*

Introduction

The stock market stands as a pillar of modern economic life and a bustling marketplace where fortunes are made, companies fuel their ambitions, and economies find their momentum. By connecting savers with businesses in need of capital, the stock market transforms idle funds into engines of growth, innovation, and job creation. Demirguc-Kunt and Levine (1999) have called it one of the most dynamic forces shaping today's financial landscape.

One intriguing area that has captured the attention of academics and practitioners is the concept of weak-form market efficiency**.** First introduced by Eugene Fama in 1970 and later popularized by Burton Malkiel's classic, *A Random Walk Down Wall Street*, weak-form efficiency represents the most basic level of the Efficient Market Hypothesis (EMH). A weak-form efficient market is one where the price of a particular stock fully and fairly reflects all past trading information, specifying that it is quite difficult to consistently outperform the market by analyzing historical price movements (ACCA, n.d.). Inherently, if a market is

[*] Assistant Professor, Department of Finance and Banking, University of Barishal, Email: nusratbenozir@gmail.com

[**] Independent Researcher, Email: tanvir18048@gmail.com

DOI: https://doi.org/10.53461/jujbr.v25i01.91

weak-form efficient, investors cannot gain an excess profit simply by studying price charts or historical trends.

This research aims to conduct a weak-form efficiency test of the DSE by examining the predictability of stock returns. Dhaka Stock Exchange has a rich and eventful history. The Dhaka Stock Exchange (DSE), founded in 1954, is Bangladesh's primary stock exchange and one of the oldest in South Asia. Initially a small, informal market, the DSE has evolved significantly over the decades. The introduction of automated trading systems and the Central Depository Bangladesh Limited (CDBL) in 2004 further modernized the DSE, with a view to enhancing efficiency and reducing transaction risks. But how efficient is the DSE? The answer is still far from straightforward. Because research shows that emerging markets often lag behind their developed counterparts in terms of weak-form efficiency, with significant variation from one country to another. For instance, studies reveal that Turkey and Israel exhibit relatively high levels of weak-form efficiency, making technical analysis less useful for investors there. In contrast, markets like Lebanon and Morocco are less efficient, with more predictable price patterns (Hasan, 2015; Alrabadi & Al-Qadi, 2024). Similarly, research on the Egyptian and Moroccan exchanges suggests that these markets do not always conform to the Random Walk Hypothesis, a key feature of weak-form efficiency, meaning that past trends might still offer clues about future prices (Youssef et al., 2013).

Against this backdrop, examining the efficiency of the Dhaka Stock Exchange becomes both timely and essential. This research seeks to rigorously test the weak-form efficiency of the DSE by analyzing historical price data and applying robust statistical methods. The goal is to determine whether past stock prices can predict future returns, shedding light on the practical realities faced by investors. The results will offer valuable insights-not only for investors seeking to refine their strategies and manage risks, but also for policymakers and regulators aiming to foster a more efficient and stable market environment. Moreover, this study contributes to the broader academic conversation on market efficiency, offering a fresh perspective from one of Asia’s most dynamic emerging markets.

Literature Review

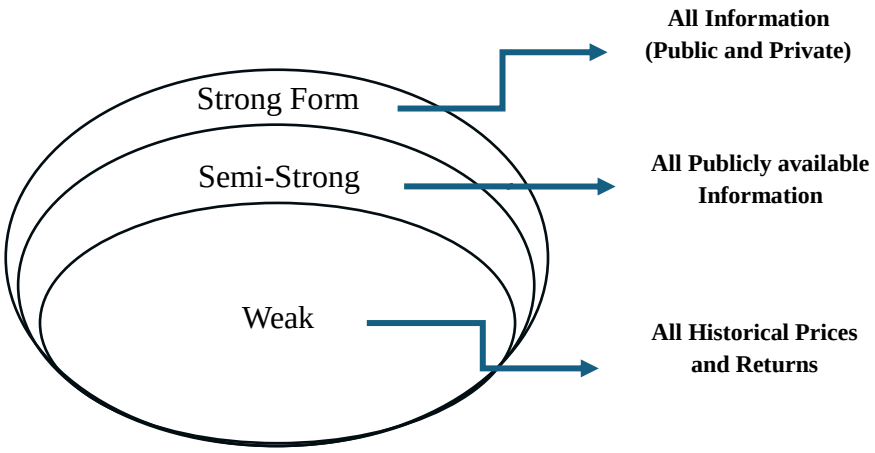
2.1 Theoretical Overview

The Efficient Market Hypothesis (EMH) is a cornerstone of modern finance, suggesting that a financial market is denoted as "efficient" if it can reflect all currently accessible information about the financial instruments. The theory posits that asset prices at any given time will fully incorporate all relevant information so that the investors are not able to attain abnormal profit through stock selection or market timing. EMH is categorized into three forms based on the type of information reflected in asset prices:

1. **Weak form**: Historical prices reflected in current prices → Technical analysis is ineffective.

DOI: https://doi.org/10.53461/jujbr.v25i01.91

2. **Semi-Strong form**: All public information (financials, news) priced in → Fundamental analysis cannot generate excess returns.
3. **Strong form**: All public and private information reflected → Insider trading fails to yield abnormal profits.



Despite its theoretical appeal, EMH faces criticism. Behavioral finance studies, for example, highlight that investor psychology, such as overreactions and herding behavior, often leads to irrational decision-making. Moreover, anomalies like the January effect and momentum strategies challenge the notion of absolute market efficiency.

Nonetheless, EMH remains a foundational concept in finance, shaping the understanding of market dynamics and the development of passive investment strategies. Thus, the weak form of EMH suggests that stock prices follow an unpredictable path and past prices do not provide actionable signals (Malkiel, 1973).

2.2 Empirical Review

This literature review synthesizes various studies that have tested the weak form of market efficiency across different markets and contexts, highlighting the methodologies employed and the findings derived from these analyses.

The term "efficiency" was initially used by Fama (1970) who proposed market efficiency within a few restrictive conditions. Several initial studies have supported that stock price movement is unpredictable and past price change patterns cannot forecast future price direction, particularly when transaction costs are considered (Kendall and Hill, 1953; Barnes, 1986; Chan et al., 1992). Inversely, many studies argued on the presence of predictable price patterns in stock market along with their incomplete argument about profitable trading rules (Fama and French, 1988).

Capital markets of developed economies were the popular field of study for most of the pioneer researchers who examined the weak-form efficiency of the market.

DOI: https://doi.org/10.53461/jujbr.v25i01.91

A study on the UK market by Hudson et al. (1996) and the Australian market by Groenewold (1997) revealed that technical analysis has analytical power as well as the past returns have the power of forecasting future returns but neither of those are strong enough to generate excess return. The developed market shows the experiential evidence that supports the efficiency in the weak form (Pervez, et al., 2008). But developing and less developed countries are more diverse in market efficiency, showing the mixed results. African markets reflect diverse financial development levels. Bonga-Bonga (2012) demonstrated weak-form efficiency in South Africa's JSE using a GARCH model, attributing it to regulatory improvements. In contrast, Saliha & Ati (2020) found inefficiency in Tunisia, while Alagidede & Panagiotidis (2009) rejected the random walk hypothesis across multiple African markets, underscoring regulatory gaps. While Obalade & Muzindutsi (2021) linked calendar anomalies to inefficiency, supporting the adaptive market hypothesis and integrating behavioral economics with market efficiency. Middle Eastern markets illustrate weak-form efficiency challenges. Hailu & Vural (2020) found mixed results for Borsa Istanbul's banking sector, while Abdmoulah (2010) confirmed inefficiencies in Arab stock markets using a GARCH-M (1,1) approach. Similarly, Syed & Bajwa (2018) demonstrated inefficiency in the Saudi stock market, emphasizing the limitations of past price data for predictions.

With the advancement of the research, different methods have been applied to shed light brighter than before. The methodologies employed in testing weak form efficiency often include unit root tests, such as the Augmented Dickey-Fuller (ADF) test, which assesses whether a time series is stationary or follows a random walk (Konak & Şeker, 2014). The results from these tests have shown that many stock markets, particularly in developing economies, exhibit non-stationarity, indicating potential predictability in stock returns (Abakah et al., 2018). For instance, studies conducted in the Egyptian stock market revealed inefficiencies, (Abdelzaher, 2021) whereas research in the Turkish market demonstrated mixed results, (Kilic & Bugan, 2016). The variance ratio test, used to evaluate random walk compliance in stock index returns, often reveals contrasting results between emerging and developed markets. For instance, Al-Khazali et al. (2007) found weak-form efficiency largely rejected in MENA markets (except Bahrain and Saudi Arabia). Similarly, run tests and variance ratio analyses in the Indian market yielded mixed outcomes, with some studies supporting weak-form efficiency (Bodla, 2005) and others highlighting inefficiencies in monthly returns (Mehla & Goyal, 2012). These inconsistencies underscore how market conditions, investor behavior, and temporal factors influence efficiency test results, emphasizing the need for context-specific analyses.

Studies focusing on weak-form efficiency in Asian markets provide mixed results, reflecting the complexity and diversity of financial systems in this region. For instance, Luo et al. (2023) analyzed daily closing prices and yields of the Shanghai and Shenzhen Composite Indices in China. While both indices

DOI: https://doi.org/10.53461/jujbr.v25i01.91

exhibited weak-form efficiency individually, they failed to demonstrate joint efficiency, highlighting the nuanced market dynamics in one of the world's largest economies. Similarly, Dangol, (2016) assessed the Nepalese stock market, revealing inefficiencies in unadjusted data. However, after accounting for thin trading, the market aligned with weak-form efficiency, underscoring the importance of methodological precision in such studies. In contrast, findings from the Dhaka Stock Exchange (DSE) consistently point to inefficiency. The authors, Mobarek & Mollah, (2005) and Ahmed & Hossain, (2018) both demonstrated significant autocorrelation in stock returns, contradicting the random walk hypothesis and suggesting predictability in stock prices. Additionally, Islam & Khaled, (2005) emphasized that traditional tests may yield conflicting results due to structural market changes.

The most recent addition to this field of study is the behavioral finance which challenges EMH by highlighting how psychological biases create market anomalies (Gu, 2023; Gupta et al., 2014). This interplay suggests that efficiency is often disrupted by investor irrationality. The COVID-19 pandemic provided further insights into efficiency under extreme conditions. Markets showed delayed reactions to new information, contradicting EMH (Vasileiou, 2021; Scherf et al., 2022). The adaptive market hypothesis (AMH) reconciles the efficient market hypothesis (EMH) with behavioral finance by proposing that market efficiency is dynamic, changing with market conditions and investor behavior (Enow, 2022). This nuanced view recognizes that markets can be efficient at times but are also prone to inefficiencies influenced by psychological factors. Moreover, the impact of market volatility on efficiency has been a focal point in various studies. For example, Borges (2010) analyzed European stock markets and found that daily and weekly returns were not normally distributed, exhibiting characteristics of conditional heteroscedasticity, which further complicates the assessment of market efficiency. This suggests that periods of high volatility may lead to inefficiencies, as prices may not adjust instantaneously to new information. Similarly, Worthington & Higgs (2009) found Australian stock markets inefficient daily but nearing efficiency in monthly data, underscoring the impact of data granularity. In contrast, Santos et al. (2020) identified long-memory patterns in Latin American markets, indicating inefficiencies.

In conclusion, the literature on weak-form market efficiency presents a complex and multifaceted picture. While the foundational principles of the EMH suggest that historical price information should not provide predictive power for future prices, empirical evidence from various markets indicates that inefficiencies persist, particularly in emerging economies. The interplay between market dynamics, investor behavior, and external shocks further complicates the assessment of market efficiency.

Significant gaps remain despite extensive research on the weak-form market efficiency (WFME) of the Dhaka Stock Exchange (DSE). Previous studies have primarily focused on DSE30 and DSEGEN (now replaced by DSEX), neglecting

DOI: https://doi.org/10.53461/jujbr.v25i01.91

other critical indices like DSES, which represents Sharia-compliant stocks. These studies also relied on outdated datasets, failing to capture recent developments in the market from 2015 onward. By incorporating all three indices (DSE30, DSES, and DSEX), analyzing recent data, and employing diverse parametric and non-parametric methods, this study provides a more comprehensive understanding of market efficiency in Bangladesh.

2.3 Research Hypothesis

The research hypotheses were developed based on theoretical insights from the Efficient Market Hypothesis (EMH) and prior empirical findings in emerging markets.

H1: The daily return series of DSE indices do not follow a random walk, indicating return predictability.

H1a: The daily return series of DSE30 index do not follow a random walk, indicating return predictability.

H1b: The daily return series of DSES index do not follow a random walk, indicating return predictability.

H1c: The daily return series of DSEX index do not follow a random walk, indicating return predictability.

Methodology

3.1 Research Design

This study implements a quantitative research approach to assess the weak-form efficiency of the Dhaka Stock Exchange (DSE) as this approach is suitable for analyzing large datasets of historical stock prices and applying statistical tests that objectively evaluate the predictability of stock returns.

3.2 Data collection

The study utilized daily closing price data for the DSE30, DSES, and DSEX indices of the Dhaka Stock Exchange, covering the period from 2015 to 2023. The data was collected from the DSE website.

The choice of 2015 to 2023 period for studying the Dhaka Stock Exchange (DSE) is justified by structural and analytical rationale. This period is a post-demutualization era after the passing of the Stock Exchanges (Demutualization) Act, 2013, that changed the nature of DSE's governance with the distinction of ownership and management to provide a better and more stable regulatory framework. This suggests that the data serves to represent a modernized and institutionally enhanced market devoid of several of the distortions and anomalies that characterized past periods, specifically the excesses of speculation and collapse of 2010–11.

3.3 Data Processing

Daily prices were transformed into log returns to meet the assumptions and requirements of statistical analysis in financial research. Log returns are preferred because they help achieve stationarity, a critical property in data analysis.

DOI: https://doi.org/10.53461/jujbr.v25i01.91

Log returns mitigate price data trends/volatility, enhancing time-series analysis suitability. It approximates a normal distribution (notably for short intervals), which is critical for statistical models. Its additive nature simplifies multi-period returns aggregation vs. multiplicative simple returns. Log returns also enable consistent cross-asset comparisons via proportional (not absolute) changes, ensuring robust financial statistical analysis.

3.4 Statistical Methods

This study employed multiple tests to evaluate weak-form efficiency, each designed to detect randomness in stock returns. Both parametric and non-parametric tests are important in analyzing stock market efficiency as they provide complementary approaches to evaluating the randomness of stock returns.

Parametric tests analyze data assuming that data streams a specific distribution, often normal. They use parameters like mean and variance to derive conclusions. When assumptions are met, they provide powerful and precise results. For this study three parametric tests were performed: 1) Autocorrelation test; 2) Ljung-Box Q test and 3) Augmented Dickey-Fuller (ADF) test.

Non-parametric tests, unlike their parametric counterparts, don't rely on strict assumptions about data distribution, making them ideal for assessing market efficiency when returns deviate from normality—a common occurrence in financial markets. The key advantage of non-parametric tests lies in their flexibility and broader applicability, ensuring reliable results even when parametric assumptions are not met. Three non-parametric tests were conducted for this: 1) Phillips-Perron (PP) test, 2) Run test, and 3) Variance ratio test

Together, parametric and non-parametric tests provided a comprehensive framework for testing weak-form efficiency by addressing both distribution-dependent and distribution-independent perspectives. This combination ensured a robust and nuanced understanding of market behavior.

Analysis and Results

4.1 Descriptive Statistics

Table 1: Descriptive Statistics

Index	DSE30	DSES	DSEX
Observations	2147	2144	2146
Minimum	-6.39	-7.24	-11.35
Mean	0.0059	0.0070	0.011
Maximum	9.68	9.66	11.65
Std. Dev.	0.821	0.759	0.886
Skewness	0.800	0.704	0.503
Kurtosis	18.62	24.38	41.48
Jarque-Bera	22041.38	41006.75	132546.8

Source: Compiled by author using E-views 11 *Appendix 01*

DOI: https://doi.org/10.53461/jujbr.v25i01.91

The table provides descriptive statistics for the log-normal returns of three indices: DSE30, DSES, and DSEX. All three indices have a mean return near zero. Volatility of return is evaluated by standard deviation. The larger the standard deviation, the higher the risk, and the higher the price will fluctuate. DSEX is most volatile here, DSE30 and DSES are next. The three indices exhibit positive skewness, indicating a higher probability of positive extreme returns than negative ones. Their high kurtosis (fat-tailed distributions) implies frequent extreme events, both gains and losses, compared to a normal distribution. Jarque-Bera tests yield exceptionally high values, confirming non-normality in returns. This deviation challenges traditional financial models assuming normality, particularly in risk management and portfolio construction.

Both parametric and non-parametric tests are applied to get a comprehensive result to assess the weak-form efficiency of the selected three indices.

4.2 Autocorrelation tests for DSE30, DSES & DSEX Index return:

Table 2: Autocorrelation Test

	DSE30			DSES			DSEX		
Lag	**Auto Correlation**	**Box-Ljung Statistic**	**Sig. Level**	**Auto Correlation**	**Box-Ljung Statistic**	**Sig. Level**	**Auto Correlation**	**Box-Ljung Statistic**	**Sig. Level**
1	9.931	59.52	**0.002**	15.56	51.19	**0.00**	4.76	0.76/0.38	**0.03**
2	18.25	62.735	**0.00**	24.092	58.98	**0.00**	4.77	4.54/0.103	**0.09**
3	24.75	66.38	**0.00**	26.52	61.48	**0.00**	6.27	5.97/0.112	**0.09**
4	26.53	77.45	**0.00**	26.90	69.83	**0.00**	15.60	16.34/0.00	**0.00**
5	32.91	92.18	**0.00**	40.38	87.00	**0.00**	22.73	23.42/0.00	**0.00**
6	38.76	98.79	**0.00**	45.38	92.07	**0.00**	26.66	26.51/0.00	**0.00**
7	40.39	100.18	**0.00**	49.50	97.10	**0.00**	29.40	29.42/0.00	**0.00**
8	41.80	101.24	**0.00**	50.49	98.84	**0.00**	31.07	30.65/0.00	**0.00**
9	43.02	104.17	**0.00**	50.69	98.90	**0.00**	31.24	30.69/0.00	**0.00**
10	43.02	105.12	**0.00**	50.99	98.96	**0.00**	31.26	31.04/0.00	**0.00**
11	45.23	107.25	**0.00**	54.46	102.36	**0.00**	32.10	31.75/0.00	**0.00**
12	45.24	107.33	**0.00**	54.47	102.36	**0.00**	32.48	31.86/0.00	**0.00**

Source: Compiled by author using E-views 11 *Appendix 02*

The results of the autocorrelation test and the Ljung-Box Q test for the DSE30, DSES, and DSEX indices, based on the daily log-normal returns from 2015 to 2023, revealed significant autocorrelation across most lags. For DSE30 and DSES, high autocorrelation values and significant p-values (0.00) in the Ljung-Box test indicated strong return predictability, suggesting inefficiencies in these markets. While the DSEX index showed weaker autocorrelation, it also exhibited significant p-values at most lags, implying few inefficiencies. These findings contrast with the Efficient Market Hypothesis (EMH), which posits that returns should be unpredictable if markets are efficient. The results align with empirical

DOI: https://doi.org/10.53461/jujbr.v25i01.91

evidence from emerging markets (Parvez et al., 2018; Awiagah and Choi, 2018 and Dhungana, 2020). This implies that historical price trends in the DSE may provide opportunities for investors to predict future returns and generate abnormal profits, though such patterns may reflect structural market weaknesses.

4.3 Result of Unit Root Tests

Table 3: Unit Root Tests result

Augmented Dicky-Fuler Unit Root Test									
	DSE30			DSES			DSEX		
	Without Trend and Intercept	With Trend and Intercept	Without Intercept	Without Trend and Intercept	With Trend and Intercept	Without Intercept	Without Trend and Intercept	With Trend and Intercept	Without Intercept
Test Statistics	-15.060	-15.596	-15.599	-16.040	-16.04	-16.04	-16.040	-16.04	-16.04
1% level	-2.566	-3.962	-3.433	-2.566	-3.962	-3.433	-2.566	-3.962	-3.433
5% level	-1.941	-3.412	-2.863	-1.941	-3.412	-2.863	-1.941	-3.412	-2.863
10% level	-1.617	-3.128	-2.567	-1.617	-3.128	-2.567	-1.617	-3.128	-2.567

Phillips- Perron Test						
	DSE30		DSES		DSEX	
	Without Trend and Intercept	With Trend and Intercept	Without Trend and Intercept	With Trend and Intercept	Without Trend and Intercept	With Trend and Intercept
Test Statistics	-39.81	-39.79	-39.83	-39.81	-45.60	-45.58
1% level	-2.57	-3.96	-2.57	-3.96	-2.57	-3.96
5% level	-1.94	-3.41	-1.94	-3.41	-1.94	-3.41
10% level	-1.62	-3.13	-1.62	-3.13	-1.62	-3.13

Source: Compiled by author using E-views 11 *Appendix 03*

The results of the ADF and the non-parametric Phillip-Perron (PP) tests for daily return show that the test statistics were significantly lower than the critical values at all levels (1%, 5%, and 10%). This suggests that the time series is stationary. Since the log returns of the Dhaka Stock Exchange indices (DSE30, DSES, and DSEX) do not exhibit a unit root, the series is predictable to some extent and doesn't follow a random walk. In other words, past price patterns can be used to predict future price movements, indicating the inadequacy of weak-form efficiency. This again adds insights on the violation of weak form efficiency in DSE (Rahman & Hossain, 2006; Dhungana, 2020).

DOI: https://doi.org/10.53461/jujbr.v25i01.91

4.4 Run test of DSE30, DSES and DSEX Index Return

Table 4: Runs Test

DSE30		DSES		DSEX	
Test Value	-0.00473	**Test Value**	0.0132	**Test Value**	0.0237
Cases < Test Value	1073	**Cases < Test Value**	1072	**Cases < Test Value**	1073
Cases >= Test Value	1073	**Cases >= Test Value**	1072	**Cases >= Test Value**	1073
Total Cases	2146	**Total Cases**	2144	**Total Cases**	2146
Number of Runs	915	**Number of Runs**	920	**Number of Runs**	926
Z	-6.87	**Z**	-6.61	**Z**	-6.39
Sig. (2-tailed)	0.00	**Sig. (2-tailed)**	0.00	**Sig. (2-tailed)**	0.00

Source: Compiled by author using E-views 11 *Appendix 04*

The results of the run tests on all three indices, the Z-values are highly negative with the p-values of 0.00, indicating statistical significance at conventional levels (e.g., 1% or 5%), clearly rejecting the null hypothesis. The non-randomness suggests the presence of patterns or dependencies in the price movements, which may arise from market inefficiencies, behavioral biases, or predictable trends. This aligns with empirical evidence from emerging markets, where inefficiencies are more prevalent than in developed markets. Islam & Khaled (2005) investigated the efficiency of the Dhaka Stock Exchange and found deviations from the Efficient Market Hypothesis (EMH), suggesting non-random price movements. Similarly**,** Mobarek et al. (2000) showed that the DSE returns exhibit predictable patterns, supporting the notion of inefficiencies. These inefficiencies can be exploited by investors for excess returns, particularly through strategies like momentum trading or mean-reversion strategies.

4.5 Variance Ratio Test of DSE30, DSES & DSEX Index

Table 5: Variance Ratio Test

Period	DSE30		DSES		DSEX	
	Variance	**Z-Statistics**	**Variance**	**Z-Statistics**	**Variance**	**Z-Statistics**
2	0.623	-5.284	0.627	-4.673	0.531	-3.760
4	0.279	-6.352	0.278	-5.711	0.238	-3.948
8	0.154	-5.595	0.153	-5.036	0.131	-3.691
16	0.077	-4.499	0.077	-4.022	0.065	-3.448

Source: Compiled by author using E-views 11 *Appendix 05*

The Variance Ratio (VR) test results for the DSE30, DSES, and DSEX indices, calculated based on log-normal returns of daily closing prices from 2015 to 2023, revealed significant deviations from randomness. The Z-statistics for all indices

DOI: https://doi.org/10.53461/jujbr.v25i01.91

across all periods are negative and statistically significant, indicating mean-reverting behavior rather than random walk dynamics. This suggested that the returns exhibit serial correlation, implying the lack of existence of weak-form efficiency in the market. Similar findings were reported by Hossain and Uddin (2011), who found an absence of weak-form efficiency in DSE using variance ratio tests (Habibour et al., 2016). The significantly negative Z-statistics (ranging from -3.448 to -6.352) across all periods for all indices provide strong statistical evidence rejecting the random walk hypothesis, similar to findings by Hasan, (2015) who also documented the absence of weak-form efficiency in Bangladesh stock exchanges

For investors, this means that past price information may hold predictive value for future returns, encouraging strategies such as technical analysis or contrarian trading. However, it also signals inefficiencies that might deter foreign institutional investors seeking developed, efficient markets.

Conclusion

This study analyzed the weak-form market efficiency of the Dhaka Stock Exchange using daily closing prices of the DSE30, DSES, and DESX indices from 2015 to 2023. Employing both parametric and non-parametric tests, the research found significant evidence of inefficiency in the DSE.

The results showed that returns deviated from a normal distribution, displaying positive skewness and high kurtosis, indicating a higher likelihood of extreme price movements and non-random behavior in stock returns. Predictability in price patterns, detected through autocorrelation and unit root analyses, further challenged the hypothesis of randomness in stock price movements. Variance ratio and run tests confirmed these findings, suggesting that the DSE does not exhibit weak-form efficiency.

The inefficiencies are attributed to structural and behavioral factors, including low liquidity, inadequate regulatory frameworks, and behavioral biases common in developing markets. The findings of this study also reinforce patterns observed in other emerging markets, where anomalies like autocorrelation, clustering of volatility, and price momentum are more common. For instance, research on other markets, such as the Karachi Stock Exchange (Naseer & Bin Tariq, 2015) and Bombay Stock Exchange (Nikunj Patel et al., 2011), has shown similar findings of non-random returns due to structural and behavioral factors.

This study can be a way to further analysis for researcher and investors. Positive skewness, high kurtosis, and non-random price movements highlight the influence of behavioral biases, which can be studied further to understand investor decision-making processes in similar markets. Again, autocorrelation and stationarity in returns suggest potentials for generating abnormal profits for investors through technical analysis and momentum strategies.

The research recognizes the existence of calendar anomalies, such as the January effect and the end of the month effect, but any specific impact on performance

DOI: https://doi.org/10.53461/jujbr.v25i01.91

was not studied. Again, there were no contributions that employed behavioral finance perspectives that would explain deviations from efficiency. These limitations ought to be addressed in future studies with the aim of improving the understanding of market behavior.

References

A. Obalade, A., & Muzindutsi, P.-F. (2021). Are African Stock Markets Inefficient or Adaptive? Empirical Literature. In *Emerging Markets*. IntechOpen. https://doi.org/10.5772/intechopen.94438

Abakah, E. J. A., Alagidede, P., Mensah, Lord, & Ohene-Asare, K. (2018). Non-linear approach to random walk test in selected African countries. *International Journal of Managerial Finance*, *14*(3), 362–376. https://doi.org/10.1108/IJMF-10-2017-0235

Abdelzaher, M. A. (2021). Study The Efficiency Hypothesis In The Egyptian Stock Market. *International Journal of Economics and Financial Issues*, *11*(1), 18–25. https://doi.org/10.32479/ijefi.10634

Abdmoulah, W. (2010). Testing the evolving efficiency of Arab stock markets. *International Review of Financial Analysis*, *19*(1), 25–34. https://doi.org/10.1016/j.irfa.2009.11.004

ACCA - https://www.accaglobal.com. (n.d.). *Market matters | ACCA Qualification | Students | ACCA Global*. https://www.accaglobal.com/gb/en/student/exam-support-resources/fundamentals-exams-study-resources/f9/technical-articles/market-matters.html

Ahmed, R., & Hossain, M. D. (2018). Testing Weak form Market Efficiency: Empirical Evidence from Selected Asian Stock Markets. *Asian Economic and Financial Review*, *8*(6), 790–798. https://doi.org/10.18488/journal.aefr.2018.86.790.798

Alagidede, P., & Panagiotidis, T. (2009). Modelling stock returns in Africa's emerging equity markets. *International Review of Financial Analysis*, *18*(1–2), 1–11. https://doi.org/10.1016/j.irfa.2009.02.001

Al- Khazali, O. M., Ding, D. K., & Pyun, C. S. (2007). A New Variance Ratio Test of Random Walk in Emerging Markets: A Revisit. *Financial Review*, *42*(2), 303–317. https://doi.org/10.1111/j.1540-6288.2007.00173.x

Alrabadi, H. W., & Al-Qadi, N. S. (2024). Testing the weak-form efficiency of Arab stock markets after the COVID-19 pandemic. *Investment Management and Financial Innovations*, *21*(2), 381–388. https://doi.org/10.21511/imfi.21(2).2024.31

Bodla, B. S. (2005). Efficiency of the Indian Capital Market: An Empirical Work. *Vision: The Journal of Business Perspective*, *9*(3), 55–63. https://doi.org/10.1177/097226290500900305

Bonga-Bonga, L. (2012). The Evolving Efficiency Of The South African Stock Exchange. *International Business & Economics Research Journal (IBER)*, *11*(9), 997. https://doi.org/10.19030/iber.v11i9.7183

Borges, M. R. (2010a). Efficient market hypothesis in European stock markets. *The European Journal of Finance*, *16*(7), 711–726. https://doi.org/10.1080/1351847X.2010.495477

Borges, M. R. (2010b). Efficient market hypothesis in European stock markets. *The European Journal of Finance*, *16*(7), 711–726. https://doi.org/10.1080/1351847X.2010.495477

DOI: https://doi.org/10.53461/jujbr.v25i01.91

Chow, K. V., & Denning, K. C. (1993). A simple multiple variance ratio test. *Journal of Econometrics*, *58*(3), 385–401. https://doi.org/10.1016/0304-4076(93)90051-6

Dangol, J. (2016). Testing Weak Form of Market Efficiency in Nepal. *International Research Journal of Management Science*, *1*. https://doi.org/10.3126 /irjms.v1i0. 28138

Dhungana, Y. R. (2020). Predictability of Stock Returns on the Dhaka Stock Exchange. *The Batuk*, *6*(2), 87–96. https://doi.org/10.3126/batuk.v6i2.34519

DSE STOCKS. (2023, January 1). *DSE CSV Data | Dhaka Stock Exchange | DSE Stocks*. https://dsestocks.com/dse-csv-data/

ENOW, S. T. (2022). Evidence of Adaptive Market Hypothesis in International Financial Markets. *Journal of Academic Finance*, *13*(2), 48–55. https://doi.org/10.59051/joaf.v13i2.578

Fama, E. F. (1965). The Behavior of Stock-Market Prices. *The Journal of Business*, *38*(1), 34. https://doi.org/10.1086/294743

Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, *25*(2), 383. https://doi.org/10.2307/2325486

Gu, G. (2023). The Dynamic Interplay of Market Forces and Human Behavior: A Critical Review of Efficient Market Hypothesis and Behavioral Finance. *Advances in Economics, Management and Political Sciences*, *31*(1), 54–59. https://doi.org/10.54254/2754-1169/31/20231498

Gupta, E., Preetibedi, P., & mlakra, P. (2014). Efficient Market Hypothesis V/S Behavioural Finance. *IOSR Journal of Business and Management*, *16*(4), 56–60. https://doi.org/10.9790/487X-16445660

Habibour, M., Ezazul, R. M., Sakhawat, I. M., Mahmud, H., & Naser, S. (2016). *Is the Capital Market of Bangladesh Efficient? CEU Is the Capital Market of Bangladesh Efficient?*

Hasan, Md. A. (2015). Testing Weak-Form Market Efficiency of Dhaka Stock Exchange. *Global Disclosure of Economics and Business*, *4*(2), 79–90. https://doi.org/10.18034/gdeb.v4i2.137

Islam, A., & Khaled, M. (2005a). Tests of Weak- Form Efficiency of the Dhaka Stock Exchange. *Journal of Business Finance & Accounting*, *32*(7–8), 1613–1624. https://doi.org/10.1111/j.0306-686X.2005.00642.x

Islam, A., & Khaled, M. (2005b). Tests of Weak- Form Efficiency of the Dhaka Stock Exchange. *Journal of Business Finance & Accounting*, *32*(7–8), 1613–1624. https://doi.org/10.1111/j.0306-686X.2005.00642.x

KILIC, Y., & BUGAN, M. F. (2016). The Efficient Market Hypothesis: Evidence from Turkey. *International Journal of Academic Research in Business and Social Sciences*, *6*(10). https://doi.org/10.6007/IJARBSS/v6-i10/2356

Levine, R. (1999). Bank-Based and Market-Based Financial Systems: Cross-Country Comparisons. In *World Bank policy research working paper*. https://doi.org/10.1596/1813-9450-2143

Lo, A. W., & MacKinlay, A. C. (1988). Stock Market Prices Do Not Follow Random Walks: Evidence from a Simple Specification Test. *Review of Financial Studies*, *1*(1), 41–66. https://doi.org/10.1093/rfs/1.1.41

Luo, J., Zhang, M., & Zhang, Y. (2023). *An Empirical Study on the Efficiency of the Chinese Stock Market* (pp. 690–698). https://doi.org/10.2991/978-94-6463-042-8_99

DOI: https://doi.org/10.53461/jujbr.v25i01.91

Malkiel, B. G. (2003). The Efficient Market Hypothesis and Its Critics. *Journal of Economic Perspectives*, *17*(1), 59–82. https://doi.org/10.1257/08953300 3321164958

Mehla, S., & Goyal, S. K. (2012). Empirical Evidence on Weak Form of Efficiency in Indian Stock Market. *Asia-Pacific Journal of Management Research and Innovation*, *8*(1), 59–68. https://doi.org/10.1177/2319510X1200800107

Mishra, P. K. (2012). Efficient Market Hypothesis: The Case of India's Equity Market. *Abhigyan*, *30*(1), 35–43. https://doi.org/10.1177/0970238520120104

Mobarek, A., & Mollah, A. S. (2005). The General Determinants of Share Returns: An Empirical Investigation on the Dhaka Stock Exchange. *Review of Pacific Basin Financial Markets and Policies*, *08*(04), 593–612. https://doi.org/10.1142/S0219091505000518

Mobarek, A., Keasey, K., & Keasey, K. (n.d.). *Weak-form market efficiency of an emerging Market: Evidence from Dhaka Stock Market of Bangladesh. 1*.

Naseer, M., & Bin Tariq, Y. (2015). *The Efficient Market Hypothesis: A Critical Review of the Literature*. https://ssrn.com/abstract=2714844

Nikunj Patel, Bhavesh K Patel, & Darshan Ranpura. (2011). Testing Weak Form Market Efficiency of Indian Stock Markets. *Global Business and Management Research: An International Journal* , *1*(3).

Phillips, P. C. B., & Perron, P. (1988). Testing for a Unit Root in Time Series Regression. *Biometrika*, *75*(2), 335. https://doi.org/10.2307/2336182

Santos, H., Dias, R., Heliodoro, P., & Alexandre, P. (2020). *Testing The Empirics Of Weak Form Of Efficient Market Hypothesis: Evidence From Lac Region Markets*. 91–101. Https://Doi.Org/10.31410/Itema.2020.91

Scherf, M., Matschke, X., & Rieger, M. O. (2022). Stock market reactions to COVID-19 lockdown: A global analysis. *Finance Research Letters*, *45*, 102245. https://doi.org/10.1016/j.frl.2021.102245

Shofiqur Rahman, & Farhad Hossain. (n.d.). *Testing Weak-Form Market Efficiency of Dhaka Stock Exchange*. https://doi.org/10.18034

Syed, A. M., & Bajwa, I. A. (2018). Earnings announcements, stock price reaction and market efficiency – the case of Saudi Arabia. *International Journal of Islamic and Middle Eastern Finance and Management*, *11*(3), 416–431. https://doi.org/10.1108/IMEFM-02-2017-0044

Theiri, S., & Ati, A. (2020). Weak Form of Efficiency Hypotheses: Empirical Modeling With Box –Pierce, ADF and ARCH Tests. *International Journal of Financial Research*, *11*(5), 137. https://doi.org/10.5430/ijfr.v11n5p137

Vasileiou, E. (2021). Efficient Markets Hypothesis in the time of COVID-19. *Review of Economic Analysis*, *13*(1), 45–63. https://doi.org/10.15353/rea.v13i1.1799

Worthington, A. C., & Higgs, H. (2005). Weak-Form Market Efficiency in Asian Emerging and Developed Equity Markets: Comparative Tests of Random Walk Behaviour. Retrieved from https://hdl.handle.net/10779/uow.27775023.v1

Worthington, A. C., & Higgs, H. (2009). Efficiency in the Australian stock market, 1875–2006: a note on extreme long-run random walk behaviour. *Applied Economics Letters*, *16*(3), 301–306. https://doi.org/10.1080/13504850601018379

Xu, J. (2021). An Empirical Analysis of the Efficient Market Hypothesis in China's Stock Market. *Proceedings of Business and Economic Studies*, *4*(3), 1–5. https://doi.org/10.26689/pbes.v4i3.2179

DOI: https://doi.org/10.53461/jujbr.v25i01.91