

Weak-Form Market Efficiency in the Dhaka Stock Exchange: Evidence from a Multi-Test Approach Around the 2024 Political Transition

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Abstract

This study tests the weak-form efficient market hypothesis (EMH) on the Dhaka Stock Exchange (DSE), examining whether the DSE30 Index and its 30 constituent stocks follow a random walk and whether their behaviour changed following Bangladesh's August 2024 political transition. Daily log returns for the DSE30 Index and its 30 constituents from January 2016 to August 2025 are analysed using the Ljung-Box Q-test, the runs test, the Lo-MacKinlay variance ratio test, augmented Dickey-Fuller unit-root tests and AR(1) regressions with Newey-West HAC standard errors, over the full sample and a post-transition subsample beginning 11 August 2024. Chow tests assess whether return dynamics changed at the transition. The empirical findings show prices are integrated and returns stationary but Ljung-Box tests reject zero autocorrelation for 84–97% of series, the runs test rejects randomness for 94%, and AR(1) and variance ratio tests detect short-horizon predictability for 42%, indicating weak-form inefficiency over the full sample. Post-transition rejection rates are below 30%, but AR(1) coefficients do not fall and Chow tests detect no systematic structural break, indicating the decline reflects lower test power rather than improved efficiency. Liquidity and avoiding interventions such as floor prices that suspend price discovery can improve the efficiency of DSE. This is the first DSE efficiency study covering the post-August 2024 period and the first to test formally for a structural break at the transition. Using five complementary tests at index and firm level, it also shows that a change in government alone has not improved price efficiency.

1 Introduction

The Efficient Market Hypothesis (EMH), one of the most influential frameworks in financial economics, holds that security prices fully and rapidly reflect all available information so that investors cannot earn consistent abnormal returns by trading on it. Fama (1970) distinguishes weak, semi-strong, and strong forms of efficiency by the information set prices are assumed to reflect: past prices, all public information, or all public and private information, respectively. Weak-form efficiency implies that stock prices follow a random walk and a market that is not weak-form efficient cannot be efficient in the semi-strong or strong form. In emerging markets, characteristics such as thin trading, asymmetric information and weak regulation often mean stock market efficiency is less assured.

Since its founding in 1954, the Dhaka Stock Exchange has had a long history of volatility, notably the crashes of 1996 and 2010-11, and subsequently a series of structural reforms aimed at modernising Bangladesh's capital market. These range from automated trading and demutualisation to the introduction of internationally benchmarked indices, positioning DSE as an increasingly significant emerging market. On 5th August 2024, On 5 August 2024, the government in office since 2009 resigned following mass protests, and an interim government took office. The change came during a prolonged market slump: the DSEX saw a 16.49% decline in 2024 to close near 5,216 points, on historically low turnover (The Business Standard 2024), but the change was followed by a sharp but short-lived rally.

The DSE, despite its modern infrastructural conditions that in theory would promote informational efficiency, has an unresolved question of whether it is weak-form efficient. No published study has examined weak-form efficiency using post-transition data alone. Most existing DSE studies rely on only one statistical test or index level data. This limits confidence in their conclusions because linear dependence, sign-based dependence, and short- versus long-horizon patterns require different detection tools. This paper investigates whether DSE has a random walk behavior and whether it has changed after the 5th August political transition.

The specific objectives are: (i) testing weak-form efficiency using a variety of complementary statistical techniques; (ii) examining the randomness of stock price movements; (iii) assessing the independence of successive returns and price changes; and (iv) testing whether the return dynamics changed following the August 2024 political transition. Accordingly, the study examines daily closing prices for the DSE30 Index and its thirty constituent companies, chosen for their market weight, liquidity, sectoral breadth, and unbroken price histories, over a period spanning January 2016 to August 2025, which captures both several pre-transition market regimes and the post-August-2024 period itself.

This study finds that the DSE exhibits weak-form inefficiency across the full 2016–2025 sample period, consistent with the broader pattern reported in prior emerging-market research. When the analysis is extended to cover the period after Bangladesh's political transition in August 2024, rejection rates decline sharply. The AR(1) coefficients do not decrease, however, and formal structural break tests do not detect any systematic change in the return dynamics, suggesting that the lower rejection rates reflect the lower power of a shorter sample, rather than an improvement in efficiency. The results therefore suggest that the frictions causing DSE inefficiency are institutional and behavioral rather than political and that a change in government alone has not changed the market's informational efficiency.

The rest of the paper is organized as follows. Section 2. Literature review and development of hypotheses and conceptual framework Literature review is made to develop the hypotheses and conceptual framework. The data and methods are presented in Section 3. Section 4 reports and discusses the empirical results and Section 5 concludes the study.

2 Literature Review

2.1 Literature Review and Hypothesis Development

Empirical tests of the weak-form Efficient Market Hypothesis have generally supported the hypothesis in developed markets where continuous quotation, deep liquidity and close regulatory oversight leave little room for exploitable price patterns (Fama 1970, 1991). The evidence, however, is not unanimous. Lo and MacKinlay (1988) tested a large sample of NYSE-AMEX stocks using a variance ratio method and rejected the random walk model, finding that weekly returns were positively autocorrelated to a degree that was inconsistent with pure randomness. Lo (2004) proposed the adaptive markets hypothesis which states that market efficiency varies over time as market conditions, participant behavior and institutional structures change. This finding exemplifies a

recurring theme in the literature: conclusions about weak-form efficiency are highly sensitive to the test applied, a consideration that motivates the multi-test design adopted in this study.

Evidence from emerging markets is considerably more mixed, and on balance less favorable to the EMH. Using a multiple variance ratio test across a set of Asian and Latin American markets, Al-Khazali, Ding, and Pyun (2007) rejected the random walk hypothesis for most markets in their sample. Alagidede and Panagiotidis (2009) reported comparable rejections across African equity markets, and Abdmoulah (2010) found similar evidence of inefficiency in Arab stock markets using a GARCH-based approach. On the West African Economic and Monetary Union's regional exchange, Toe, Toe and Zoungrana (2023) similarly rejected weak-form efficiency using returns predictability tests, while finding that macroeconomic factors such as money supply had explanatory power at the semi-strong level. More recent work has refined rather than overturned this picture: applying a non-linear Fourier unit root test to five African markets, Abakah *et al.*, (2018) found that accounting for structural breaks and thin trading reversed earlier inefficiency findings for some markets, such as South Africa, underscoring how sensitive conclusions are to test choice. Most recently, Alrabadi and Al-Qadi (2024) tested fifteen Arab stock markets in the period following the COVID-19 pandemic and found a split outcome where both the variance ratio and runs tests supported weak-form efficiency in four markets while rejecting it in the rest. Similar test batteries have recently confirmed weak-form inefficiency elsewhere in South Asia; Elangovan *et al.* (2022), examining nine Bombay Stock Exchange broad market indices using unit root, autocorrelation, and runs tests, found that Indian equity indices do not follow a random walk. Emerging-market evidence, in short, does not point to one answer: the same market can appear efficient or inefficient depending on the period, index, and test applied.

Two regional studies are especially relevant to this study's approach. Omran and Farrar (2006) tested the random walk hypothesis across five major Middle Eastern markets using a battery of statistical and econometric techniques and rejected weak-form efficiency for all but the Israeli Tel100 index. Asiri (2008) tested all the companies listed in Bahrain Stock Exchange for a period of eleven years through five complementary methods including unit root, Dickey Fuller test, ARIMA, autocorrelation and exponential smoothing. The results consistently supported the weak form efficiency in all the methods.

The DSE has followed the broader emerging-market pattern of reported inefficiency in research, although the empirical approaches used have changed significantly over time. Islam and Khaled (2005) were among the first to test the DSE formally, finding significant serial dependence in returns using autocorrelation-based methods. Similar conclusion was reached by Mobarek and Mollah (2005) using regression based determinants of share returns. Beyond formal efficiency testing, Islam, Sikder, Hossain *et al.* (2021) showed that machine learning methods can forecast DSE share prices with useful accuracy, noting that economic and political shocks contribute to the market's volatility; the present study addresses the market's efficiency directly, rather than its predictability through such methods. Zaman (2019) expanded the toolkit and used both parametric and non-parametric tests on the DSE and the Chittagong Stock Exchange over 2013–2017, and again rejected weak-form efficiency for both exchanges. Most recently, Benozir (2025) investigated the DSEX, DSE30, and DSES indices for the period 2015–2023 using six parametric and non-parametric tests and found that autocorrelation, non-stationarity, and predictable price patterns are present across all three indices, although the inefficiency was comparatively weaker in the more liquid, broad-based DSEX index. The works of Çınar and Lima (2025) are most relevant to this study as they tested DSE and DSE30 indices for random walk behavior during the period of 2013–2025 using ADF, Phillips-Perron, autocorrelation, Ljung-Box, runs and BDS tests. They found consistent rejection of the random walk hypothesis in daily and weekly data. That study, however, examines index-level series only and does not distinguish between pre- and post-transition subperiods. Taken together, the existing evidence on DSE consistently suggests that the market does not satisfy weak-form efficiency. However, all existing studies, including the most comprehensive and methodologically rigorous investigations, rely exclusively on data collected prior to Bangladesh's political transition of August 2024. Consequently, little is known about whether the market's weak-form efficiency has been altered by the institutional and regulatory changes associated with this unprecedented political event.

This leads to an open empirical question that this study is designed to answer: does the DSE remain weak-form inefficient when tested over the post-transition period, and does the evidence converge or diverge across methods, as it has in prior regional studies? This study extends the closest prior work, Çınar and Lima's (2026) index-level analysis, to firm-level granularity across all 30 DSE30 constituents, comparing the full sample with a post-August 2024 transition subsample and testing formally for a structural break in return dynamics.

Thus, we developed the following hypotheses:

H0: The DSE is weak-form efficient; daily stock returns follow a random walk, and past returns carry no predictive power for future returns.

H1: The DSE is not weak-form efficient; daily stock returns deviate from a random walk, and past returns contain predictive information.

Specifically, we tested the following sub-hypotheses:

H0₁: There is no autocorrelation ($\rho_k = 0$ for all lags k).

H1₁: There is significant autocorrelation at one or more lags ($\rho_k \neq 0$).

H0₂: The sequence of return signs is random.

H1₂: The sequence of return signs shows a pattern (too few or too many runs).

H0_{3a}: The price series contains a unit root (is non-stationary).

H1_{3a}: The price series does not contain a unit root (is stationary).

H0_{3b}: The return series contains a unit root (is non-stationary).

H1_{3b}: The return series does not contain a unit root (is stationary).

H0₄: $\beta = 0$ returns are not linearly predictable from their own first lag.

H1₄: $\beta \neq 0$ returns show statistically significant first-order predictability.

H0₅: $VR(q) = 1$; return variance scales proportionally with the holding period.

H1₅: $VR(q) \neq 1$; return variance does not scale proportionally with the holding period.

H0₆: The parameters of the AR(1) return process are stable across 11 August 2024.

H1₆: The parameters of the AR(1) return process change after 11 August 2024.

2.2 Conceptual Framework

In this paper the independent variable is historical returns and the dependent variable is future returns. If past returns predictably predict future returns, this is evidence against weak-form efficiency, and if no such relationship exists, evidence for weak-form efficiency. This relationship is assessed by several statistical tests and not by one method. This rationale is drawn from the literature reviewed above: Lo and MacKinlay (1988) rejected the random walk for US weekly returns using a variance ratio test, although conventional tests had suggested otherwise. They showed that conclusions about efficiency are sensitive to the test used. A single test might miss linear and nonlinear dependence, as well as short- versus long-horizon patterns. The following tests are then applied:

1. Autocorrelation (Ljung-Box Q) test: this test is utilized for identifying linear serial dependence in returns.
2. Runs test: A nonparametric test for the randomness of the sign of returns.
3. Variance ratio test: tests whether the return variance is proportional to the time span, thereby capturing dependence at both short and longer horizons.
4. Unit root (ADF) test: tests whether price series are non-stationary consistent with a random walk in levels and whether returns are stationary.
5. AR(1) Regression: Tests for first-order linear predictability in returns directly.
6. Chow structural break test: tests whether the parameters of the return process changed after the August 2024 political transition.

The combination of these tests provides a greater robustness to the findings than previous studies of the DSE which typically relied on a single technique.

3 Data and Methodology

3.1 Data

The DSE30 is comprised of the thirty largest and most liquid companies listed on DSE selected according to the SandP Down Jones Indices methodology based on float adjusted market capitalization and turnover and reviewed semi-annually. The study is an analysis of the price behavior of stocks using only secondary quantitative data from DSE. Data was mainly sourced from the DSE website¹, which provides historical daily closing prices, market indices (DSEX, DSE30, DSES), sectoral summaries, and turnover statistics for all listed securities. However, we cross-checked with Bloomberg and investing.com for consistency, particularly in cases of missing or adjusted price entries.

In this study, we use the DSE30 index and its thirty constituent firms. This choice is justified on four grounds. The first ground is Market capitalization, as the DSE30 firms are the largest by market value, so their price behavior is representative of aggregate market movements. The second reason is the liquidity of the stocks. These are among the most actively traded securities on the exchange, which limits the data gaps and stale-price problems common among thinly traded smaller firms. Thirdly, we choose the members of this index because of the sectoral representation. This index spans a wide variety of sectors, including banking, pharmaceuticals, energy, telecommunications, cement, and consumer goods, allowing sector-level patterns in efficiency to be observed. A summary of the sectoral distribution of the 30 listed firms is presented in Appendix A. Finally, the fourth reason is that these stocks maintain continuous histories of price data, which is essential for time-series testing. Our dataset contains daily stock prices of the thirty stocks listed in DSE30, as on 14th August 2025, and the index from 4th January 2016 to 14 August 2025, with no missing values. We calculate logarithmic returns from the historical prices using the following formula.

$$R_{it} = \ln(P_{it} / P_{it-1}) \text{ Eq. 1}$$

where P_{it} is the closing price of stock i at time t , and P_{it-1} is the closing price of stock i on the preceding trading day. We use logarithmic returns, rather than simple returns, as they are approximately additive over time and are the standard input for the autocorrelation, unit-root, and regression tests applied in this study.

To examine whether market efficiency changed following the political transition of August 2024, the analysis is repeated on a post-transition subsample beginning 11 August 2024, the first trading session following the swearing-in of the interim government on 8 August 2024. Trading on the DSE resumed on 6 August after a general holiday, and the three sessions of 6–8 August saw the DSEX rise 13.3%, as reported by The Business Standard (Babu 2024), in an extraordinary repricing following the resignation of the previous government. Excluding these sessions ensures that subsample results reflect the post-transition regime rather than the transition shock itself. The resulting subsample comprises approximately 240 trading days, one year of post-transition trading.

3.2 Methodology

This study examines the weak form efficiency of the DSE by testing whether stock prices follow a random walk and whether historical price information has predictive content. The weak form efficient market means the independence and identical distribution of the consecutive returns based on the Efficient Market Hypothesis (Fama 1970), which means the previous price movements are not informative to predict the future returns. Nguyen and Parsons (2022) apply a wide range of traditional and advanced statistical techniques on twelve emerging markets and argue that the reliance on isolated tests has led to inconsistent conclusions about the efficiency of emerging markets in the past.

To achieve a thorough assessment of market efficiency, the study uses a set of complementary statistical tests, each of which tests a different implication of the random walk hypothesis. Six complementary tests are employed to test the random walk hypothesis: (i) autocorrelation (Ljung–Box Q) tests to detect serial dependence in the return series; (ii) the runs test (Wald–Wolfowitz) to test the randomness of return sequences; (iii) the variance ratio test (Lo and MacKinlay, 1988) to assess to what extent dependence accumulates across holding periods; (iv) the augmented Dickey–Fuller (ADF) unit root test to analyze the stationarity properties of stock prices and returns; (v) first-order autoregressive [AR(1)] models to analyze return predictability; and (vi) the Chow (1960) test to examine to what extent return dynamics changed following the August 2024 political transition. All these tests combined provide strong evidence on weak form market efficiency by testing for linear dependence, dependence on direction and horizon, stochastic trends, short-run return persistence and parameter stability.

i. Autocorrelation (Ljung-Box Q) Test

This test checks whether current returns are linearly correlated with their own past values. If the autocorrelation coefficients (ρ_k) are significantly different from zero then returns are predictable from their history, which is inconsistent with weak-form efficiency.

The Ljung-Box Q-statistic (Ljung and Box 1978) was used to test for zero autocorrelation of the first 5, 10 and 20 lags jointly for each series, as is standard in weak-form efficiency literature (Fama 1965).

ii. Runs Test

The runs test (Wald-Wolfowitz) is a non-parametric test of randomness that examines the sequence of consecutive positive and negative returns (“runs”) rather than their magnitude. Under a random walk, the observed number of runs should not differ significantly from the number expected under randomness.

This test complements the Ljung-Box test by capturing non-linear dependence in the direction of price changes that a purely linear correlation test may miss (Lo and MacKinlay 1988).

iii. Variance Ratio Test

This test examines whether the variance of returns grows proportionally with the holding period, as the random walk hypothesis implies. The variance ratio $VR(q)$ compares the variance of q -period returns with q times the variance of one-period returns; under a random walk, $VR(q)$ equals one. Values above one indicate positive autocorrelation and values below one indicate negative autocorrelation, either of which contradicts weak-form efficiency.

The heteroskedasticity-robust test statistic of Lo and MacKinlay (1988) was computed at holding periods $q = 2, 5$ and 10 , which allows for the time-varying volatility typical of emerging-market returns.

iv. Augmented Dickey-Fuller Unit-Root Test

The Augmented Dickey-Fuller (ADF) test was applied separately to price levels and to returns for each series. A random walk on prices implies that price levels contain a unit root (are non-stationary, or $I(1)$) while returns, as first differences of (log) prices, should be stationary ($I(0)$).

For prices, failing to reject H_0 is consistent with a random-walk component in the price level. For returns, rejecting H_0 (i.e., finding stationarity) is consistent with the random-walk model, since it implies that returns do not accumulate a persistent trend.

v. First-Order Autoregressive [AR(1)] Model

To directly test for linear predictability at the daily horizon, a first-order autoregressive model was estimated for each return series with Newey-West HAC standard errors used for inference to account for residual heteroskedasticity and autocorrelation. The first order autoregressive model is as follows.

$$r_t = \alpha + \beta r_{t-1} + \varepsilon_t \quad \text{Eq. 2}$$

where r indicates return and t represents time.

vi. Chow Structural Break Test

This test examines whether the parameters of the AR(1) return process differ significantly before and after a specified date. If the coefficients are stable across the break, any change in test outcomes between the full sample and the post-transition subsample cannot be attributed to a shift in return dynamics. The break date is set at 11 August 2024, consistent with the post-transition subsample definition above, with 4 August 2024, the last trading session before the transition, used as a robustness check.

Taken together, the six tests distinguish between different forms and degrees of predictability: the Ljung–Box and runs tests detect general serial dependence (linear and directional, respectively); the variance ratio test assesses whether dependence accumulates across holding periods; the ADF test evaluates the order of integration of prices and returns; the AR(1) regression isolates the simplest and most economically interpretable form of linear predictability; and the Chow test assesses whether that predictability changed following the political transition.

4 Empirical Findings and Discussion

4.1 Empirical Findings

4.1.1 Descriptive Statistics

Table 1 reports descriptive statistics for daily log returns of the DSE30 Index and its 30 constituent stocks. Mean returns are small and close to zero for all series, consistent with the behaviour of daily equity returns in most markets. Median returns are zero for all series except the DSE30 Index, Heidelberg Cement, LafargeHolcim and Olympic Industries, reflecting the high frequency of zero-return days among DSE stocks. Standard deviations range from 0.87 for the DSE30 Index to 4.86 for BATB, with the index showing the lowest volatility owing to diversification.

Table 1
Descriptive Statistics

Stock	N	Mean	Median	Std Dev	Min	Max	Skewness	Kurtosis
DSE30	2165	0.008	-0.002	0.866	-6.39	9.68	0.81	16.49
ACI Formulation	2260	-0.012	0.000	1.994	-9.93	9.84	0.71	8.21
BATB	2262	-0.100	0.000	4.858	-111.13	109.86	-10.23	465.14
BD Submarine Cable	2261	0.015	0.000	2.183	-10.49	16.29	0.88	8.10
BRAC Bank	2271	0.048	0.000	2.068	-24.06	25.94	0.62	31.74
BSRM	2175	-0.005	0.000	2.034	-10.41	22.87	1.68	21.09
BSRM Steel	2247	-0.013	0.000	1.618	-8.48	11.21	0.98	10.85
Bata Shoe	2253	-0.018	0.000	1.267	-13.87	14.94	1.13	30.11
Beximco	2183	0.069	0.000	2.484	-39.05	40.98	0.94	66.97
Beximco Pharma	2269	0.014	0.000	2.667	-62.95	61.06	-0.27	260.44
City Bank	2271	0.019	0.000	1.944	-24.41	18.94	0.08	22.90
Delta Life Insurance	2269	-0.022	0.000	2.239	-10.37	14.07	0.85	7.51
GP	2267	0.008	0.000	1.306	-9.13	8.39	0.88	13.05
Heidelberg Cement	2232	-0.036	-0.051	2.145	-17.98	20.37	0.93	13.47
IDLC Finance	2241	-0.006	0.000	1.852	-10.51	15.22	0.84	10.04
Islami Bank	2241	0.022	0.000	1.921	-13.25	9.53	0.93	11.57
Jamuna Bank	2274	0.009	0.000	1.143	-10.52	8.65	0.07	17.78
LafargeHolcim	2267	-0.011	-0.145	2.068	-10.17	10.99	0.89	7.82
MJL BD	2271	0.008	0.000	1.454	-9.89	9.37	0.78	9.85
Meghna Petroleum	2274	0.015	0.000	1.146	-8.44	8.74	0.39	15.04
National Bank	2203	-0.017	0.000	1.956	-18.72	21.11	0.76	18.03
Olympic Industries	2274	-0.018	-0.108	1.792	-10.33	15.06	0.86	10.16
Orion Pharma	2270	-0.008	0.000	2.365	-12.66	9.53	0.65	7.08
RAK Ceramics	2226	-0.040	0.000	1.903	-10.30	14.60	0.99	10.46
Renata	2253	-0.010	0.000	1.220	-16.51	19.06	0.83	75.07
Singer BD	2261	-0.010	0.000	1.520	-22.25	10.01	-1.02	28.29
Square Pharma	2275	0.007	0.000	0.966	-7.73	8.01	0.52	17.05
Summit Power	2223	-0.041	0.000	1.599	-10.54	9.53	0.30	11.82
Titas Gas	2212	-0.036	0.000	1.717	-10.29	10.61	0.98	11.29
UCB	2259	-0.017	0.000	1.854	-20.09	20.86	0.44	20.02
Unique Hotel	2247	-0.011	0.000	1.995	-10.40	9.52	0.67	6.21

Note: Returns are daily log returns, $\ln(P_t/P_{t-1}) \times 100$. Extreme values for BATB, Beximco Pharma, Beximco, BRAC Bank and UCB exceed the DSE's $\pm 10\%$ daily price limit and likely reflect corporate-action days (e.g. bonus or rights issues) not adjusted in the source price series; these observations are retained. Beximco and Islami Bank were subject to floor-price restrictions during parts of the sample period. DSE30 has fewer observations than its constituent stocks owing to differences in data availability for the index series.

The return distributions depart markedly from normality. Skewness is positive for 28 of the 31 series, ranging up to 1.68 (BSRM), while BATB (-10.23), Singer BD (-1.02) and Beximco Pharma (-0.27) are negatively skewed. Kurtosis exceeds the normal value of three for every series, ranging from 6.21 (Unique Hotel) to 465.14 (BATB), with the DSE30 Index at 16.49, confirming the fat-tailed behaviour of daily returns documented since Fama (1965). The most extreme values, for BATB, Beximco Pharma, Beximco, BRAC Bank and UCB, exceed the DSE's daily price limit and likely reflect unadjusted corporate-action days (see the note to Table 1). Fat tails and asymmetry of this kind are characteristic of emerging equity markets (Bekaert et al. 1998) and are consistent with thin trading, market frictions and heterogeneous investor behaviour.

4.1.2 Full-Sample Findings (January 2016-August 2025)

To examine weak-form market efficiency, five tests were applied to the DSE30 Index and each of its 30 constituent stocks over the full sample period: the Ljung-Box autocorrelation test at 5-, 10- and 20-day lags, the runs test, the Lo and MacKinlay (1988) variance ratio test at holding periods $q = 2, 5$ and 10 , the augmented Dickey-Fuller (ADF) unit-root test on both price levels and returns, and a first-order autoregressive AR(1) regression with Newey-West HAC standard errors. Table 2 reports the resulting p-values.

The autocorrelation results show significant serial dependence in daily returns. The null hypothesis of no autocorrelation is rejected at the 5% level for 83.9% of series (26 of 31) at 5-day lag, 96.8% (30 of 31) at 10-day lag and 90.3% (28 of 31) at 20-day lag. National Bank does not reject at all three lags. Other exceptions are BRAC Bank, BSRM, Singer BD and Summit Power at 5-day lag and Bata Shoe and Meghna Petroleum at 20-day lag. This pattern is confirmed by the runs test that rejects randomness for 93.5% of series (29 out of 31). The only exceptions are Bata Shoe and Jamuna Bank. The agreement with the Ljung-Box results provides two independent lines of evidence that DSE return sequences are not random. The runs test is distribution free and depends only on the sign of the returns. The AR(1) regressions add a third: a significant first-order coefficient is found for 41.9% of series (13 of 31), including the DSE30 Index, suggesting a detectable, if usually small, linear relation between lagged and current returns for a substantial minority of stocks after Newey-West correction. Rejections for BATB and Beximco Pharma should be treated with caution as the days of extreme-return reported in Table 1 may induce spurious negative autocorrelation.

The variance ratio results indicate that this dependence is concentrated at short horizons. The random-walk null is rejected for 41.9% of series (13 of 31) at $q = 2$ (the same 13 series with significant AR(1) coefficients, as expected given that $VR(2) \approx 1 + \rho_1$) but for only 9.7% (3 of 31) at $q = 5$ and $q = 10$. The three series rejecting at all horizons (the DSE30 Index, GP and Heidelberg Cement) have variance ratios above one, rising to 1.46 at $q = 10$ for the index, indicating positive autocorrelation that accumulates over longer holding periods. Stronger dependence at the index level than in most constituents is consistent with nonsynchronous trading among thinly traded stocks (Lo and MacKinlay, 1990).

The ADF tests present a more supportive picture for the random-walk hypothesis, but only for price levels. The unit-root null cannot be rejected for 93.5% of price series (29 of 31), consistent with prices following an integrated $I(1)$ process; only Meghna Petroleum and UCB show evidence of stationary price levels. Applied to returns, the null is rejected for all 31 series, confirming that returns are stationary, $I(0)$, which is the pattern implied by a random walk in prices. Taken in isolation, the ADF evidence would support weak-form efficiency. Price-level integration and return unpredictability are, however, distinct properties, and over the full sample the DSE satisfies only the former: the autocorrelation, runs, variance ratio and AR(1) tests jointly indicate that historical returns retain explanatory power for future returns, which is inconsistent with weak-form efficiency.

4.1.3 Post-Transition Subsample Findings (11 August 2024-14 August 2025)

To evaluate whether return dynamics on the DSE shifted following the political transition, the same test battery was re-estimated on the subsample from 11 August 2024 to 14 August 2025, approximately twelve months against the nine-year full sample. A Chow (1960) test was additionally applied to assess whether the AR(1) return process exhibits a structural break at 11 August 2024. Table 3 reports the corresponding p-values.

Rejection rates fall markedly relative to the full sample. The autocorrelation null is rejected for only 29.0% of series (9 of 31) at the 5-day lag, 22.6% (7 of 31) at the 10-day lag and 9.7% (3 of 31) at the 20-day lag, down from 84–97% over the full sample. The runs test rejects randomness for only 6.5% of series (2 of 31), the DSE30 Index and LafargeHolcim, compared with 93.5% previously. A significant AR(1) coefficient is found for 9.7% of series (3 of 31: BATB, Beximco and Heidelberg Cement), down from 41.9%; for the DSE30 Index, the coefficient is significant only at the 10% level ($p = 0.090$). The variance ratio test rejects the random-walk null for at most 12.9% of series at any holding period (2 of 31 at $q = 2$, 4 at $q = 5$ and 3 at $q = 10$), and no longer rejects for the DSE30 Index at any horizon.

The ADF results are essentially unchanged. The unit-root null on price levels cannot be rejected for 96.8% of series (30 of 31; MJL BD is the exception, $p = 0.032$), and returns remain stationary for 30 of 31 series, with IDLC Finance narrowly failing to reject ($p = 0.061$), likely reflecting the limited power of the ADF test in a short sample.

Read in isolation, these results suggest that short-horizon return predictability is less pervasive after the transition. Two pieces of evidence, however, indicate that the decline in rejection rates largely reflects the reduced power of tests applied to a series of roughly 240 observations rather than a structural improvement in efficiency. First, AR(1) coefficients do not decline: estimated separately before and after the break (not tabulated), the median coefficient rises from 0.055 to 0.080, and 18 of 31 series exhibit a larger coefficient after the transition. Second, the Chow test rejects parameter stability for only 4 of 31 series under the joint test (ACI Formulation, BATB, Beximco and National Bank) and 3 of 31 for the AR(1) slope (ACI Formulation, BATB and Beximco Pharma), and does not reject for the DSE30 Index ($p = 0.713$ and 0.412 , respectively). Several of the rejecting series are those affected by extreme-return days or floor-price restrictions (see the notes to Tables 1 and 3). Results are similar at an alternative break date of 4 August 2024, which includes the 6–8 August trading sessions (3 of 31 joint rejections). The evidence therefore does not support a systematic shift in DSE return dynamics following the transition. The persistence of a runs-test rejection for the DSE30 Index nonetheless suggests that non-random clustering in the sign of returns survived the transition, a pattern that warrants re-examination as a longer post-transition series accumulates.

Table 2
Full sample (January 2016 - August 2025)

		Serial Dependence Test				Variance Ratio Test			Unit Root Test		Linear Predictability
		Autocorrelations test			Run test	Lo-MacKinlay			ADF test		AR(1)
		5-day lag	10-day lag	20-day lag		2-day lag	5-day lag	10-day lag			First order
Series	N	(on return)	(on return)	(on return)	(on return)	(on return)	(on return)	(on return)	(on price)	(on return)	(on return)
DSE30	2165	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003	0.002	0.581	< 0.001	< 0.001
ACI Formulation	2260	< 0.001	< 0.001	< 0.001	< 0.001	0.276	0.592	0.200	0.480	< 0.001	0.256
BATB	2262	< 0.001	< 0.001	< 0.001	< 0.001	0.346	0.332	0.321	0.438	< 0.001	0.155
BD Submarine Cable	2261	< 0.001	< 0.001	< 0.001	< 0.001	0.007	0.206	0.175	0.541	< 0.001	0.001
BRAC Bank	2271	0.690	0.017	< 0.001	< 0.001	0.952	0.921	0.971	0.604	< 0.001	0.944
BSRM	2175	0.139	0.046	0.009	< 0.001	0.513	0.779	0.586	0.547	< 0.001	0.481
BSRM Steel	2247	0.004	0.005	< 0.001	< 0.001	0.930	0.539	0.273	0.845	< 0.001	0.874
Bata Shoe	2253	0.009	0.012	0.097	0.206	0.235	0.125	0.153	0.679	< 0.001	0.342
Beximco	2183	< 0.001	< 0.001	< 0.001	< 0.001	0.942	0.907	0.497	0.748	< 0.001	0.929
Beximco Pharma	2269	< 0.001	< 0.001	< 0.001	< 0.001	0.374	0.378	0.428	0.788	< 0.001	0.153
City Bank	2271	0.018	0.002	0.008	< 0.001	0.647	0.597	0.618	0.311	< 0.001	0.624
Delta Life Insurance	2269	< 0.001	< 0.001	< 0.001	0.018	0.033	0.720	0.798	0.828	< 0.001	0.031
GP	2267	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.030	0.380	< 0.001	< 0.001
Heidelberg Cement	2232	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003	0.686	< 0.001	< 0.001
IDLC Finance	2241	< 0.001	< 0.001	< 0.001	< 0.001	0.015	0.351	0.373	0.386	< 0.001	0.005
Islami Bank	2241	< 0.001	< 0.001	< 0.001	< 0.001	0.008	0.059	0.118	0.490	< 0.001	0.010
Jamuna Bank	2274	0.002	0.002	0.014	0.977	0.375	0.681	0.924	0.094	< 0.001	0.340
LafargeHolcim	2267	< 0.001	< 0.001	< 0.001	< 0.001	0.007	0.192	0.138	0.519	< 0.001	0.001
MJL BD	2271	0.006	0.024	0.011	< 0.001	0.269	0.653	0.455	0.138	< 0.001	0.171
Meghna Petroleum	2274	0.048	0.025	0.058	0.031	0.173	0.820	0.872	0.004	< 0.001	0.088
National Bank	2203	0.433	0.314	0.252	0.004	0.898	0.722	0.674	0.746	< 0.001	0.893
Olympic Industries	2274	< 0.001	< 0.001	< 0.001	0.021	0.036	0.607	0.615	0.143	< 0.001	0.016
Orion Pharma	2270	< 0.001	< 0.001	< 0.001	< 0.001	0.003	0.057	0.084	0.937	< 0.001	0.004
RAK Ceramics	2226	0.007	0.024	0.038	< 0.001	0.193	0.818	0.472	0.756	< 0.001	0.104

		Serial Dependence Test				Variance Ratio Test			Unit Root Test		Linear Predictability
		Autocorrelations test			Run test	Lo-MacKinlay			ADF test		AR(1)
Renata	2253	< 0.001	< 0.001	< 0.001	< 0.001	0.416	0.338	0.512	0.997	< 0.001	0.292
Singer BD	2261	0.218	0.041	0.018	< 0.001	0.681	0.369	0.312	0.771	< 0.001	0.515
Square Pharma	2275	< 0.001	< 0.001	< 0.001	< 0.001	0.008	0.128	0.254	0.225	< 0.001	0.001
Summit Power	2223	0.051	0.026	0.015	< 0.001	0.666	0.621	0.567	0.931	< 0.001	0.632
Titas Gas	2212	< 0.001	< 0.001	< 0.001	< 0.001	0.014	0.079	0.293	0.580	< 0.001	0.022
UCB	2259	0.025	0.018	0.043	< 0.001	0.751	0.880	0.808	0.019	< 0.001	0.672
Unique Hotel	2247	0.010	0.003	< 0.001	0.012	0.037	0.454	0.979	0.607	< 0.001	0.026

Note: Entries are p-values. Autocorrelation is assessed using the Ljung–Box Q-test at 5, 10 and 20 lags; randomness using the runs test; the Lo–MacKinlay heteroskedasticity-robust variance ratio test at $q = 2, 5, 10$; stationarity using the ADF unit root test on returns and prices; and return predictability using AR(1) with Newey–West HAC standard errors. Bold indicates rejection at the 5% significance level. Beximco and Islami Bank were subject to floor-price restrictions during parts of the sample period

Table 3
Post-transition subsample (11 August 2024-14 August 2025)

		Serial Dependence Test				Variance Ratio Test			Unit Root Test		Linear Predictability	Structural Test
		Autocorrelations test			Run test	Lo-MacKinlay			ADF test		AR(1)	Chow test
		5-day lag	10-day lag	20-day lag		2-day lag	5-day lag	10-day lag			First order	Joint
Series	N	(on return)	(on return)	(on return)	(on return)	(on return)	(on return)	(on return)	(on price)	(on return)	(on return)	(on return)
DSE30	218	0.451	0.515	0.598	0.007	0.151	0.104	0.089	0.677	0.032	0.090	0.713
ACI Formulation	239	0.003	0.007	0.062	0.400	0.187	0.094	0.179	0.294	0.018	0.059	0.043
BATB	238	< 0.001	< 0.001	0.007	0.119	0.030	0.975	0.695	0.341	< 0.001	0.022	0.041
BD Submarine Cable	239	0.121	0.288	0.192	0.219	0.214	0.376	0.676	0.628	0.017	0.138	0.910
BRAC Bank	239	0.356	0.219	0.327	0.985	0.509	0.492	0.108	0.972	0.009	0.488	0.489
BSRM	239	0.118	0.214	0.247	0.080	0.131	0.037	0.301	0.934	< 0.001	0.247	0.841
BSRM Steel	239	0.558	0.553	0.462	0.323	0.493	0.548	0.432	0.959	0.003	0.466	0.648
Bata Shoe	237	0.029	0.003	0.099	0.845	0.888	0.252	0.275	0.850	< 0.001	0.696	0.659
Beximco	165	0.002	0.041	< 0.001	0.912	0.326	0.334	0.358	0.937	0.002	0.025	0.044
Beximco Pharma	239	0.648	0.655	0.821	0.650	0.183	0.174	0.173	0.250	< 0.001	0.151	0.095
City Bank	239	0.032	0.054	0.177	0.521	0.069	0.004	0.015	0.585	0.003	0.086	0.313
Delta Life Insurance	238	0.244	0.250	0.071	0.194	0.264	0.958	0.642	0.430	0.013	0.354	0.560
GP	237	0.010	0.037	0.216	0.845	0.067	0.206	0.558	0.565	< 0.001	0.103	0.598
Heidelberg Cement	239	0.003	0.006	0.069	0.746	0.036	0.267	0.545	0.564	< 0.001	0.012	0.845
IDLC Finance	239	0.896	0.783	0.866	0.746	0.620	0.630	0.170	0.429	0.061	0.701	0.896
Islami Bank	240	0.421	0.507	0.742	0.796	0.529	0.103	0.035	0.309	< 0.001	0.649	0.809
Jamuna Bank	239	0.131	0.222	0.395	0.550	0.056	0.006	0.017	0.236	0.003	0.151	0.428
LafargeHolcim	238	0.021	0.004	0.080	< 0.001	0.075	0.130	0.205	0.981	0.012	0.052	0.627
MJL BD	239	0.253	0.315	0.170	0.331	0.281	0.916	0.982	0.032	< 0.001	0.177	0.776
Meghna Petroleum	239	0.341	0.290	0.466	0.142	0.374	0.807	0.287	0.110	< 0.001	0.371	0.202
National Bank	238	0.369	0.418	0.668	0.843	0.636	0.833	0.502	0.732	< 0.001	0.747	0.017
Olympic Industries	239	0.063	0.078	< 0.001	0.136	0.421	0.689	0.342	0.733	< 0.001	0.372	0.711
Orion Pharma	239	0.047	0.129	0.078	0.060	0.202	0.022	0.091	0.604	< 0.001	0.251	0.306

Note: Entries are p-values. Autocorrelation is assessed using the Ljung–Box Q-test at 5, 10 and 20 lags; randomness using the runs test; the Lo–MacKinlay heteroskedasticity-robust variance ratio test at $q = 2, 5, 10$; stationarity using the ADF unit root test on returns and prices; and return predictability using the slope with Newey–West HAC standard errors. Bold indicates rejection at the 5% significance level. Beximco Ltd and Islami Bank Bangladesh PLC remained BSEC-imposed floor price throughout the post-transition subsample; the restrictions were withdrawn on 9 June 2026. Beximco's lower observation count reflects non-trading days at the floor. Results for these two stocks should therefore be interpreted accordingly. Chow-test p-values are based on F-tests for a structural break on 11 August 2024. The joint test assesses stability of both the intercept and AR(1) coefficient, whereas the AR(1) slope test assesses stability of the coefficient only.

	Serial Dependence Test					Variance Ratio Test			Unit Root Test		Linear Predictability	Structural Test
	Autocorrelations test				Run test	Lo-MacKinlay			ADF test		AR(1)	Chow test
RAK Ceramics	239	0.763	0.680	0.727	0.137	0.919	0.715	0.513	0.470	0.002	0.770	0.322
Renata	238	0.413	0.573	0.585	1.000	0.115	0.233	0.067	0.763	0.002	0.232	0.067
Singer BD	239	0.856	0.983	0.976	0.331	0.876	0.684	0.698	0.645	< 0.001	0.704	0.565
Square Pharma	239	0.550	0.866	0.890	0.846	0.318	0.649	0.596	0.729	< 0.001	0.355	0.592
Summit Power	239	0.641	0.777	0.948	0.961	0.416	0.293	0.544	0.542	0.007	0.422	0.427
Titas Gas	239	0.131	0.439	0.563	0.103	0.714	0.734	0.468	0.936	0.002	0.836	0.419
UCB	239	0.102	0.212	0.061	0.391	0.467	0.916	0.818	0.204	< 0.001	0.394	0.328
Unique Hotel	239	0.891	0.837	0.808	0.948	0.316	0.258	0.383	0.612	0.011	0.310	0.338
Note: Entries are p-values. Autocorrelation is assessed using the Ljung–Box Q-test at 5, 10 and 20 lags; randomness using the runs test; the Lo–MacKinlay heteroskedasticity-robust variance ratio test at $q = 2, 5, 10$; stationarity using the ADF unit root test on returns and prices; and return predictability using the slope with Newey–West HAC standard errors. Bold indicates rejection at the 5% significance level. Beximco Ltd and Islami Bank Bangladesh PLC remained BSEC-imposed floor price throughout the post-transition subsample; the restrictions were withdrawn on 9 June 2026. Beximco's lower observation count reflects non-trading days at the floor. Results for these two stocks should therefore be interpreted accordingly. Chow-test p-values are based on F-tests for a structural break on 11 August 2024. The joint test assesses stability of both the intercept and AR(1) coefficient, whereas the AR(1) slope test assesses stability of the coefficient only.												

4.1.4 Comparisons of Results and Verdict on Hypotheses

Table 4 summarises the proportion of series for which each test rejects its null hypothesis in the two periods, and Table 5 restates the comparison in terms of support for the efficient market hypothesis. Rejection rates for the Ljung-Box test at all three lag lengths, the runs test, the variance ratio test at $q = 2$ and the AR(1) regression fall sharply in the post-transition subsample, in several cases by an order of magnitude. The variance ratio test at longer horizons does not follow this pattern: rejections rise slightly at $q = 5$ (from 3 to 4 series) and are unchanged at $q = 10$. The ADF results on both price levels and returns remain essentially stable.

Table 4
Rejection Rates at the 5% Level, Full Sample vs. Post-Transition Subsample

Test	Full sample	Post-transition subsample
Autocorrelation, 5-day lag	83.9% (26/31)	29.0% (9/31)
Autocorrelation, 10-day lag	96.8% (30/31)	22.6% (7/31)
Autocorrelation, 20-day lag	90.3% (28/31)	9.7% (3/31)
Runs test	93.5% (29/31)	6.5% (2/31)
Variance ratio, $q = 2$	41.9% (13/31)	6.5% (2/31)
Variance ratio, $q = 5$	9.7% (3/31)	12.9% (4/31)
Variance ratio, $q = 10$	9.7% (3/31)	9.7% (3/31)
ADF, price level (stationary)	6.5% (2/31)	3.2% (1/31)
ADF, return series (stationary)	100.0% (31/31)	96.8% (30/31)
AR(1), first order	41.9% (13/31)	9.7% (3/31)
Note: Percentage (and number) of the 31 series with $p < 0.05$. Full sample: 4 January 2016–14 August 2025; post-transition subsample: 11 August 2024–14 August 2025.		

This comparison bears directly on how the study's central claim should be framed. The full 2016–2025 sample, which spans several distinct regulatory and macroeconomic regimes, including the BSEC reforms of 2017–2018, the COVID-19 period and the post-pandemic recovery, is dominated in trading days by the pre-transition era, and its results are best read as a long-run characterisation of DSE return dynamics. The post-transition subsample is the more direct test of whether the political transition altered those dynamics. Taken at face value, the fall in rejection rates suggests a shift toward weak-form efficiency. The evidence in Section 4.1.3, however, indicates that this shift is not robust: AR(1) coefficients do not decline after the transition, and the Chow test detects no systematic structural break, including for the DSE30 Index. The lower rejection rates are therefore more plausibly attributable to the reduced power of tests applied to approximately 240 observations than to a change in the return-generating process. The study's central finding is accordingly that the DSE

departs from weak-form efficiency over the long run, and that the post-transition evidence, while showing fewer rejections, does not yet establish an improvement in efficiency.

Table 5
Synthesis of Testing Approaches, Full Sample vs. Post-Transition Subsample

Test category	Full sample	Post-transition	Interpretation
Price-level stationarity (ADF)	Supports EMH	Supports EMH	Prices behave as a random walk in both periods
Return stationarity (ADF)	Supports EMH	Supports EMH	Returns are stationary, as required for I(1) prices
Autocorrelation (Ljung-Box)	Rejects EMH	Mostly fails to reject	Fewer rejections, partly reflecting the shorter sample
Runs test	Rejects EMH	Mostly fails to reject	Index-level non-randomness persists
Variance ratio	Rejects at short horizon	Mostly fails to reject	Dependence concentrated at short horizons
AR(1) regression	Partly rejects EMH	Mostly fails to reject	Coefficients do not decline; fewer rejections reflect lower test power
Chow structural break	n/a	No systematic break (4/31; not rejected for DSE30)	No evidence of a shift in return dynamics

The hypothesis verdicts follow directly. Over the full sample, H01 is rejected for 26 to 30 of 31 series depending on lag length, H02 for 29 of 31, H04 for 13 of 31 and H05 for 13 of 31 at $q = 2$, including the DSE30 Index on every test; H03a cannot be rejected for 29 of 31 price series, while H03b is rejected for all 31 return series. The overall null of weak-form efficiency (H0) is therefore rejected in favour of H1 for the full sample. In the post-transition subsample, H01, H02, H04 and H05 cannot be rejected for most series, and the ADF verdicts are unchanged. However, H06 cannot be rejected for 27 of 31 series under the joint test, including the DSE30 Index, indicating no systematic structural break. Non-rejection of H0 in the post-transition subsample therefore reflects limited test power rather than positive evidence of efficiency, and the study does not conclude that the DSE became weak-form efficient after the transition.

4.2 Discussion

The departures from weak-form efficiency documented above, particularly over the full sample, are not unusual for a market at this stage of development, and the literature on emerging and frontier markets points to several structural and behavioural explanations for why such predictability persists.

First, thin trading and low liquidity are features of markets with a narrow base of active investors and a high number of infrequently traded securities. The closing price of a stock that does not trade on a given day is stale, and therefore the observed return series contains delayed price adjustment rather than true day-to-day information flow. This is consistent with the high frequency of zero median returns in Table 1. Second, and related, nonsynchronous trading among constituents causes positive autocorrelation in index returns even if individual prices are efficiently determined (Lo and MacKinlay 1990). This is also confirmed by the variance ratio results. The DSE30 Index rejects the random walk for all holding periods with variance ratios exceeding one, whereas the majority of individual constituents reject the random walk only at the shortest horizon, if at all. Third, information asymmetry between informed and uninformed traders can delay the incorporation of news into prices, leading to gradual, multi-day adjustment that mimics short-horizon serial dependence. Fourth, DSE-specific institutional frictions impede price discovery. The clustering of maximum returns at the $\pm 10\%$ bound in Table 1 is symptomatic of daily price limits, which operate to delay the adjustment to new information, and to carry it forward to subsequent sessions (Kim and Rhee 1997). Settlement lags and restrictions on short-selling limit the mechanisms through which mispricing is corrected. Fifth, a large retail base with relatively few sophisticated arbitrageurs is associated with herding (Bikhchandani and Sharma 2000) and with under- or overreaction to news (De Bondt and Thaler 1985) both of which can generate the sign clustering and momentum-like patterns captured by the runs test and AR(1) results.

Floor prices are a further, DSE-specific friction. The BSEC first introduced floor prices on 19 March 2020 to shield the market from the COVID-19 shock (The Business Standard 2026) and reintroduced them on 28 July 2022 amid market declines following the outbreak of the Russia-Ukraine war, subsequently lifting them in phases until only Beximco and Islami Bank remained under the restriction (New Age 2026). While a floor binds, a stock cannot trade below a set price, so recorded prices remain unchanged for extended periods and returns cluster at zero. This mechanically generates the serial dependence and non-random runs detected by the tests, and both floor-price episodes fall within the full sample. Beximco and Islami Bank remained under floor prices throughout the post-transition subsample, until their withdrawal on 9 June 2026 (New Age 2026), so their post-transition results reflect a regulatory constraint on price discovery rather than market behaviour.

These frictions also inform the interpretation of the post-transition results. Rejection rates fall markedly in the subsample, but the evidence in Section 4.1.3 indicates that this does not reflect a structural change in return dynamics: AR(1) coefficients do not decline, and the Chow test detects no systematic break. The more parsimonious explanation is that a sample of approximately 240 trading days lacks the power to detect dependence of the magnitude present over the full sample. The frictions described above, which are institutional and behavioural rather than political in origin, are unlikely to have changed materially within a year of the transition, and the persistence of a runs-test rejection for the DSE30 Index is consistent with this.

Statistical predictability is not synonymous with an exploitable profit opportunity. The AR(1) coefficients identified in the full sample, significant for 13 of 31 series, are economically small, and any strategy seeking to exploit them would need to overcome transaction costs, bid-ask spreads, price-limit constraints and the illiquidity that characterises much of the market. The finding that the DSE departs from weak-form efficiency should therefore be interpreted as

evidence of structural and behavioural frictions typical of an emerging market, rather than as a claim that abnormal risk-adjusted returns are readily attainable.

5 Conclusions

This study examined whether DSE stock prices follow a random walk and satisfy weak-form market efficiency, and whether that behaviour changed following Bangladesh's political transition of August 2024. A battery of complementary tests (the Ljung-Box autocorrelation test, the non-parametric runs test, the Lo and MacKinlay variance ratio test, augmented Dickey-Fuller unit-root tests and AR(1) predictability regressions) was applied to daily returns for the DSE30 Index and its 30 constituents over the full January 2016-August 2025 sample and a post-transition subsample beginning 11 August 2024, supplemented by a Chow test for a structural break at the transition. The design addresses the single-test and single-period limitations of much of the prior DSE literature.

Over the full sample, the evidence weighs against weak-form efficiency. The Ljung-Box test rejects the null of no serial correlation for 84–97% of series across the 5-, 10- and 20-day lags, the runs test rejects randomness for 93.5%, the variance ratio test rejects the random walk for 41.9% at $q = 2$, and AR(1) regressions detect significant predictability for 41.9%. The DSE30 Index rejects on every test of serial dependence, with variance ratios above one at all horizons. Only the ADF tests on price levels are consistent with the EMH. In the post-transition subsample, rejection rates fall to 10–29% for the Ljung-Box test, 6.5% for the runs test, at most 12.9% for the variance ratio test and 9.7% for the AR(1) regression. This decline does not, however, reflect a change in return dynamics: AR(1) coefficients do not decline after the transition, and the Chow test rejects parameter stability for only 4 of 31 series and not for the DSE30 Index. The lower rejection rates are more plausibly attributable to the reduced power of tests applied to approximately 240 trading days.

The full-sample departures from efficiency are consistent with structural and behavioural frictions common to emerging markets: thin trading and stale prices, nonsynchronous trading among index constituents, information asymmetry, daily price limits, and herding and under- or overreaction among a retail-heavy investor base. Floor prices, imposed on most listed securities in 2020 and again from 2022, are a further DSE-specific friction that mechanically induces stale prices and serial dependence. These frictions are institutional and behavioural rather than political in origin, which is consistent with the absence of a structural break following the transition. Statistical predictability, moreover, is not the same as an exploitable trading opportunity: the AR(1) coefficients are economically small, and transaction costs, bid-ask spreads and illiquidity would likely erode any prospective abnormal returns.

For investors, evidence of short horizon predictability suggests that past returns may still contain some information, but should be approached with caution due to the small effect sizes and trading frictions. For regulators, particularly the BSEC, the findings suggest that a change of government alone has not improved informational efficiency, but improvements are more likely to come from measures that deepen liquidity, increase transparency and avoid interventions such as floor prices that suspend price discovery. The scrapping of the last remaining floor prices in June 2026 is a step in this direction. This study extends recent index-level work such as Çınar and Lima (2026) to firm-level granularity for all 30 DSE30 constituents for academic literature. It also provides the first systematic, multi-test assessment of DSE weak-form efficiency comparing a long-run sample with a post-transition subsample and formally testing for a structural break.

There are a number of limitations to these conclusions. Firstly, the sample is limited to DSE30 constituents. While these are among the most liquid and heavily capitalized firms in the market, this may understate inefficiency among smaller and more thinly traded securities. Testing the robustness of the findings would involve extending the analysis to the wider DSEX universe. Second, the post-transition subsample of about one year limits the statistical power and the comparison should be revisited once more post-transition data are available. Third, we calculate returns from raw closing prices and keep a small number of outliers that are likely to be corporate-action days not adjusted in the source data (see note to Table 1). Repeating the tests on adjusted price series would confirm that the results for the affected stocks are not due to these observations. Future research could also explore nonlinear dependence, whether predictability is concentrated in specific sectors or related to firm size and trading frequency, and whether the removal of the remaining floor prices in June 2026 affected the efficiency of the stocks involved.

Overall, the Dhaka Stock Exchange, at least as far as its most important constituents are concerned, does not satisfy weak-form efficiency in the long run and the evidence available does not show that the August 2024 political transition changed this. In some segments of the market, lagged returns continue to have statistically significant but economically small predictive power for future returns. This is in line with the broad pattern observed in emerging and frontier markets, and emphasizes the need for institutional and regulatory reforms to deepen liquidity and enhance price discovery on the DSE.

Declarations

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Competing interests

The authors have no relevant financial or non-financial interests to disclose.

Author contributions

M.S.Sar.: Conceptualization, supervision, methodology, software, formal analysis, validation, and writing-review and editing.

S.M.S.: Conceptualization, methodology, formal analysis, interpretation of results, writing-original draft, and writing-review and editing.

N.S.P.: Investigation, data collection, data curation, and preliminary analysis.

M.A.C.R.: Investigation, data collection, data curation, and preliminary analysis.

All authors read and approved the final manuscript.

Data availability

The data used in this study were obtained from publicly accessible online financial-market sources, including the Dhaka Stock Exchange. The processed dataset supporting the findings of this study is available from the corresponding author upon reasonable request.

Ethics approval

Not applicable. This study uses publicly available secondary financial-market data and does not involve human participants or animals.

Consent to participate

Not applicable.

Consent for publication

All authors have read and approved the final manuscript and consent to its publication.

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