

Market Efficiency Dynamics and Chaotic Behavior of Dhaka Stock Exchange: Evidence from Mutual Information and Lyapunov Exponents Models

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Abstract This study investigates the evidence of market efficiency dynamics and chaotic behavior of the Dhaka Stock Exchange benchmark index (DSEX) over the 2000-2020 period. We employed the newly developed model of mutual informational and global correlation coefficient in addition to the traditional linear and nonlinear techniques. Results suggest there is evidence of serial dependence in the DSEX returns. We attempted the Lyapunov exponent model to evaluate the possibility of chaos and nonlinear dynamics in the market. The results conspicuously represent the existence of chaotic behavior—a nonlinearity-based profitability pattern revealed in the DSEX return series in its short run behavior. By applying two technical trading indicators, we justify the predicting trend of the Bangladesh stock market and conclude that investors active in the Dhaka Stock Exchange can earn abnormal returns. Findings have practical implications for general investors and professional fund managers to exploit the profitable opportunities and reshuffle the investment decisions. Results also convey the message to the regulatory body to initiate the strategies for intervening in the operating mechanisms to reduce the market inefficiency.

Keywords Market Efficiency, Chaotic Behavior, Mutual Information, Global Correlation, Lyapunov Exponents

1. Introduction

Stock market efficiency is treated as a puzzling issue for academic research in corporate finance to validate the random walk model in equity returns behavior. It has become imperative for academicians to develop theories and models that explain how stock market prices behave. This theory became popular in early 1970s with the understanding that equity price movements can be modeled [1]. Random walk theory enables to develop the pattern of shocks that drive stock prices to predict successive price changes. If a random walk process follows, there should not be any mean-reversion tendency of equity price changes and, hence, market will gradually lead to the equilibrium in the long-run. But if price changes follow random walk, it is possible to predict the future security movements based on past prices. According to efficient market hypothesis (EMH), investors in the market act rationally and security prices will instantly reflect all the information about the particular investment. Therefore, random walk theory justifies that market movement cannot be predicted capitalizing any historical information. Stock market efficiency represents important implications for the equity