Efficiency Puzzle of Stock and Mutual Fund Markets

(A Comprehensive Evaluation of the Weak Form in Egypt)

By

Dr. Ahmed Hassan Elgayar

Lecturer of Business Administration

Business Administration Department, Faculty of Commerce, Tanta University

ahmed_elgayar@commerce.tanta.edu.eg

Scientific Journal for Financial and Commercial Studies and Research (SJFCSR)

Faculty of Commerce – Damietta University

Vol.6, No.2, Part 1., July 2025

APA Citation

Elgayar, A. H. (2025). Efficiency Puzzle of Stock and Mutual Fund Markets: A Comprehensive Evaluation of the Weak Form in Egypt, ***Scientific Journal for Financial and Commercial Studies and Research***, Faculty of Commerce, Damietta University, 6(2)1, 183-213.

Website: https://cfdj.journals.ekb.eg/

Efficiency Puzzle of Stock and Mutual Fund Markets

(A Comprehensive Evaluation of the Weak Form in Egypt)

Dr. Ahmed Hassan Elgayar

Abstract

This study examines the weak-form efficiency of Egypt's stock and mutual fund markets, evaluating whether historical price movements influence future returns. The Efficient Market Hypothesis (EMH) posits that in weak-form efficient markets, stock prices fully reflect past information, making it impossible for investors to earn abnormal returns through technical analysis. To test this hypothesis, the study employs four statistical methodologies: the Durbin-Watson test for serial correlation, the Runs test for randomness, the KPSS unit root test for stationarity, and the Variance Ratio test to assess the random walk hypothesis. The research utilizes monthly return data spanning from January 2003 to December 2022, covering both the Egyptian stock market (EGX30 index) and a sample of Egyptian mutual funds.

The empirical findings indicate mixed results regarding market efficiency. The Durbin-Watson test and KPSS unit root test reject weak-form efficiency in both markets, as return series exhibit stationarity and significant serial correlation, suggesting price predictability. The Runs test also contradicts the random walk hypothesis, reinforcing evidence of inefficiency. However, the Variance Ratio test provides partial support for weak-form efficiency in the Egyptian mutual fund market under the heteroskedastic assumption, while rejecting it for all other cases. These results highlight structural inefficiencies in Egypt's financial markets, indicating that investors may be able to exploit historical price patterns for abnormal returns.

The findings align with previous research on emerging markets, where weak-form inefficiency is often observed due to factors such as regulatory shortcomings, information asymmetry, and market manipulation. As Egypt continues its economic reforms, improving market efficiency remains crucial for attracting foreign investment and fostering financial stability. The study's results offer valuable insights for policymakers, investors, and financial regulators, emphasizing the need for enhanced transparency and regulatory measures to promote efficient market functioning.

Keywords: *Efficient Market Hypothesis, Weak-Form Efficiency, Egypt, Emerging Markets, Random Walk Theory, Stock Market, Mutual Funds.*

Paper Type/ Research paper

1. Introduction

Stock markets play a crucial role in the economic development of nations by efficiently allocating capital and ownership. Ideally, market prices should fully and instantaneously incorporate all available information, enabling firms to make informed investment decisions and allowing investors to evaluate securities based on fair value (Fama, 1970). This principle underpins the Efficient Market Hypothesis (EMH), first introduced by Fama (1965), which asserts that asset prices reflect all relevant information, preventing investors from consistently earning abnormal returns. EMH, a cornerstone of modern financial theory, is categorized into three forms: strong, semi-strong, and weak, each varying in the degree to which information is incorporated into prices (Fama, 1991).

The weak form of EMH, particularly relevant to equity markets, posits that past price movements do not provide predictive value, as stock returns follow a random walk process (Fama, 1965). While numerous studies support this hypothesis, empirical findings remain mixed, especially in emerging markets, where structural inefficiencies, regulatory challenges, and information asymmetries may hinder market efficiency. Research on developing markets has produced conflicting results, with some studies rejecting weak-form efficiency (Akbar & Bhutto, 2023; Mearaj-ud-Din & Butt, 2023), while others find partial evidence supporting it (Ehiedu & Obi, 2022).

Egypt, as an emerging market, presents a compelling case for evaluating weak-form efficiency. The Egyptian stock market, one of the oldest in the region, has undergone significant reforms to enhance transparency and attract foreign investment (World Bank, 2022). However, the mutual fund sector, established relatively recently in 1994, remains underexplored in terms of efficiency. While previous studies have assessed stock market efficiency in Egypt (Faris, 2015; Peon et al., 2019), research on mutual funds' efficiency remains scarce.

This study aims to bridge this gap by conducting a comprehensive evaluation of weak-form efficiency in Egypt’s stock and mutual fund markets. By extending the sampling period and incorporating recent data, the research provides insights into investment strategies, market efficiency dynamics, and the implications for investors. The remainder of this paper is structured as follows: Section 2 reviews the literature on weak-form efficiency and the Egyptian equity market, Section 3 outlines the data and methodology, Section 4 presents the results, and Section 5 concludes the study.

2. Literature Review

The concept of "efficient markets" was initially introduced as a way to describe stock markets (Beechey and Vickery, 2000) and later evolved into a broader framework of market efficiency. The efficiency of capital markets is fundamentally assessed by how rapidly and accurately security prices incorporate newly available information. According to the Efficient Market Hypothesis (EMH), "the prices of securities at any given time reflect all currently available information in an unbiased manner, ensuring that returns are fully aligned with their perceived risk" (Naseer and Bin Tarek, 2020). In an efficiently functioning market, stock prices serve as reliable indicators that guide capital allocation, ultimately fostering economic growth and stability. As Claesson (1987) emphasized, market efficiency is a critical component of a well-functioning public economy, ensuring that financial resources are optimally distributed to their most productive uses.

2.1 Controversial Evidence of Weak Form of EMH in Equity Markets

The weak form of the Efficient Market Hypothesis (EMH) has been a subject of extensive empirical investigation, with research spanning multiple decades and diverse financial markets. While some studies provide strong support for weak-form efficiency, others present compelling evidence of inefficiency, leading to an ongoing debate about the extent to which past stock prices influence future returns. This divergence in findings underscores the complex and context-dependent nature of market efficiency across different regions, economic conditions, and time periods.

Supporters of weak-form EMH argue that stock prices fully reflect all historical trading information, rendering technical analysis ineffective in predicting future price movements. Fama (1965), a pioneering advocate of the Random Walk Model, asserted that stock price movements follow an unpredictable pattern, implying that any attempt to forecast future prices using past data is futile. He further emphasized that empirical evidence overwhelmingly supports weak-form efficiency, making stock market chart reading a redundant practice for investors. More recent studies reinforce this perspective, such as Mahmood and Rehman (2007), who examined the Karachi Stock Exchange (KSE) 100 Index and concluded that stock prices conform to the Random Walk Theory, validating the efficiency of the market. Similarly, Asiri (2008) and Alkhazali (2011) provided additional support for weak-form efficiency in their respective studies, affirming that stock price movements in various financial markets are largely unpredictable.

However, a substantial body of research challenges this notion, presenting evidence that stock markets do not always exhibit weak-form efficiency. Nisar and Hanif (2012) conducted an in-depth analysis of four leading South Asian stock exchanges using a combination of statistical tests, including the variance-ratio test, runs test, unit root analysis, and serial correlation examination. Their findings indicated that stock price movements in these markets deviate from the Random Walk Theory, suggesting inefficiencies that investors could potentially exploit. Similarly, Dias et al. (2020) examined sixteen developed and emerging stock markets between January 2002 and July 2019, investigating the presence of mean reversion in stock prices. Their study concluded that none of the tested markets adhered to weak-form efficiency, highlighting the persistence of price patterns that could be used for predictive trading strategies.

Further empirical evidence against weak-form efficiency emerges from studies focusing on African financial markets. Kelikum et al. (2020) assessed the efficiency of fifteen major African stock exchanges, including the Egyptian Exchange (EGX), by applying wavelet unit root analysis to monthly data from January 2010 to June 2018. Their results found no evidence supporting weak-form efficiency across the sampled markets, indicating that past price movements contained valuable information for predicting future returns. Khan et al. (2021) extended this investigation to specialized indices, including the U.S. Dow Jones Environmental Socially Responsible Index (SRI) and the Shariah Compliance Index (SCI). Using a battery of econometric tests such as the Augmented Dickey-Fuller test, Phillips-Perron test, runs test, and variance-ratio test, they found that both indices failed to exhibit weak-form efficiency, further challenging the validity of the Random Walk Theory.

The complexity of market efficiency is further illustrated by studies that yield mixed conclusions even within the same region or financial market. Xiang et al. (2015) explored ten emerging Asian equity markets and five developed markets, uncovering a blend of weak-form efficient and inefficient markets. This highlights the intricate and non-uniform nature of market efficiency across different economic environments. Similarly, research on Indian stock markets has produced conflicting results. Chavannavar and Patel (2016) examined the National Stock Exchange (NSE) between April 2013 and March 2016, employing autocorrelation and runs tests. Their study found evidence

supporting weak and semi-strong efficiency. However, Rahul (2019) later conducted a study on both the Bombay Stock Exchange (BSE) and NSE, analyzing data from January 2014 to December 2018 using the Kolmogorov-Smirnov Goodness of Fit Test. This research contradicted earlier findings, suggesting that Indian stock markets lack weak-form efficiency, as historical price information does not adjust immediately, allowing investors to earn abnormal returns.

The persistent divergence in research findings underscores the necessity of adopting diverse methodologies, statistical techniques, and extended time frames when evaluating market efficiency. The presence of market anomalies, varying levels of liquidity, differences in investor behavior, and the impact of external shocks such as political instability and economic crises further complicate assessments of weak-form efficiency. Given the evolving nature of financial markets, continuous empirical research remains essential to gaining a deeper understanding of whether stock prices truly follow a random walk or if exploitable patterns exist, offering opportunities for informed investment decisions.

2.2 Weak-Form Market Efficiency in the Egyptian Stock and Mutual Fund Markets

The Egyptian stock and mutual fund markets present a unique and evolving landscape for assessing weak-form market efficiency. As an emerging market, Egypt has undergone significant economic reforms, financial liberalization, and structural adjustments, making it a compelling case for evaluating the validity of the Efficient Market Hypothesis (EMH). Scholars such as Albannan and Farooq (2019) highlight the distinctive characteristics of the Egyptian market, emphasizing its relevance in market efficiency studies.

The Egyptian Exchange (EGX), one of the oldest stock markets in the region, has developed into a modern financial hub with various performance-tracking indices, including the EGX 30, EGX 70, EGX 100, Dow Jones EGX Egypt Titan 20, and the S&P/ESG indices. Among these, the EGX 30 index, a free-float capitalization-weighted benchmark, is the most widely used indicator of market performance. Established in 1998 with a base value of 1000, it reflects the movements of the 30 most liquid and highly capitalized stocks (Al-Jafari & Altaee, 2011).

The Egyptian government has played a pivotal role in transforming its financial markets through economic reforms. Over the past two decades, Egypt has pursued privatization, financial liberalization, and regulatory restructuring to enhance market efficiency (Metawa et al., 2019). Key reforms between 2015 and 2018 included fiscal policies to reduce budget deficits, subsidy rationalization, and the liberalization of exchange rate policies, including the flotation of the Egyptian Pound (Kamal, 2018). These reforms had a direct impact on stock market behavior, influencing trading volumes, market size, and investor sentiment.

However, Egypt's stock market has also been highly susceptible to political and economic shocks. The January 25th Revolution (2011) led to the longest market suspension in EGX history (55 days, from January 28 to March 22, 2011), significantly disrupting trading activity and investor confidence (El Masry & Badr, 2020). The revolution's aftermath negatively affected key macroeconomic indicators, including GDP growth, foreign direct investment (FDI), and interest rates, leading to increased market volatility. Despite these challenges, Egypt remains a crucial investment destination in the MENA region. As a lower-middle-income economy (World Bank classification), Egypt's capital market plays a strategic role in economic development, attracting both domestic and foreign investors (Albannan & Farooq, 2019). A key concern remains whether the EGX operates efficiently under the weak-form EMH, given its historical volatility and regulatory transitions.

Several empirical studies have assessed weak-form efficiency in the Egyptian stock market, employing statistical tests such as unit root tests, autocorrelation tests, variance ratio tests, and runs tests. The findings, however, have been inconsistent, with some studies supporting the weak-form EMH while others rejecting it. Simons and Leyea (2005) applied parametric and non-parametric tests, including the Box-Jenkins ARIMA model, to assess weak-form efficiency across four African stock markets (including Egypt) using weekly and monthly data from 1990 to 2003. Their findings suggested inefficiencies in the Egyptian market, contradicting weak-form efficiency. Similarly, Al-Jafari and Altaee (2011) tested the Random Walk Hypothesis (RWH) using unit root, runs, and variance ratio tests on daily EGX 30 data from 1998 to 2010. Their results indicated that past price movements were not fully reflected in stock prices, challenging weak-form efficiency. Zhang et al. (2012) employed the panel-SURKSS test with Fourier

function analysis to examine weak-form efficiency in five African markets (including Egypt) from 2000 to 2011. Their results rejected the weak-form efficiency hypothesis in Egypt. Kamal (2014) analyzed market efficiency using the EGARCH model, focusing on the impact of the 2011 revolution on stock price behavior. His findings showed that negative news exacerbated information asymmetry and disrupted investor expectations, reinforcing the notion of weak-form inefficiency.

While stock market efficiency has been widely studied, research on the mutual fund sector in Egypt remains limited. Mutual funds, introduced in 1994, have since grown into a critical component of Egypt's financial system. However, their ability to achieve market efficiency remains questionable. Faris (2015) examined the efficiency of Egyptian mutual funds and the EGX100 index from 2006 to 2010 using the ARMA model. The study found evidence of weak-form inefficiency, suggesting that mutual funds struggled to outperform passive investment strategies. Ansary and Elrashidy (2019) compared the performance of Islamic and conventional mutual funds in Egypt by analyzing weekly returns from 2008 to 2015. Their results indicated that conventional mutual funds and the EGX 30 index outperformed Islamic mutual funds, with the EGX 30 offering superior risk-adjusted returns despite higher systematic risks. Dias and Santos (2020) assessed weak-form efficiency across six African stock markets (including Egypt) during the COVID-19 pandemic from 2019 to 2020. Their findings rejected the Random Walk Hypothesis, further indicating weak-form inefficiency in Egypt's financial markets.

The relationship between weak-form efficiency and the performance of Egyptian stock and mutual fund markets has been further explored through various methodological approaches. Researchers have tested different asset classes, including mutual funds, blue-chip stocks, and smaller-cap stocks, to assess market behavior under different economic conditions. The literature also indicates that short-term anomalies, investor sentiment, and regulatory interventions significantly affect efficiency levels. Moreover, studies focusing on high-frequency trading, algorithmic trading, and behavioral finance have provided additional insights into how Egypt's financial markets deviate from the assumptions of weak-form efficiency.

The Egyptian stock and mutual fund markets have undergone significant transformations, shaped by economic reforms, regulatory changes, and macroeconomic shocks. While the weak-form EMH suggests that past price information should not be useful for predicting future prices, empirical studies in Egypt largely reject weak-form efficiency, particularly during periods of economic and political instability. However, methodological differences and market conditions continue to yield mixed results.

This study extends the existing literature by employing multiple econometric tests to assess weak-form efficiency in the Egyptian stock and mutual fund markets. The findings will provide valuable insights into the market's efficiency, inform investment strategies, and contribute to ongoing debates on the validity of EMH in emerging economies.

The following hypotheses were formulated for testing weak-form market efficiency in the Egyptian stock and mutual fund markets:

H1: The Egyptian stock market exhibits weak form efficiency.

H2: The Egyptian mutual fund market displays weak form efficiency.

3. Methodology

Sample: In this investigation, the researcher utilizes a dataset encompassing all Egyptian mutual funds, sourced from monthly reports obtained from the Egyptian Investment Management Association (EIMA), covering a period from January 2003 till December 2022. The analysis focuses exclusively on a refined sample of surviving mutual funds within this timeframe, excluding those established after January 2003 or liquidated before the study's conclusion. The final sample consists of eleven mutual funds, namely National Bank 1, AMIG (Allied Investors), National Bank 2, Suez Canal Bank, SAIB 2, Bank of Alexandria, Banque Misr 1, Banque Misr 2, Banque du Caire, EDBE (Al Khabeer), and Egyptian Gulf Bank funds.

Additionally, the researcher incorporates the monthly calculated returns of the well-known EGX30 index as a benchmark for the Egyptian stock market during the same period. The EGX30 index, denominated in local Egyptian currency and priced using U.S. dollars since its inception in 1998, represents the thirty most liquid and actively traded companies within the Egyptian Exchange. This market index is calculated based on market capitalization, adjusted for free float. The adjusted market value of a listed and registered

company is determined by using its listed shares, closing price, and the percentage of floating shares. Monthly returns are calculated using the index's closing values for each month.

To quantify for returns over a specific period, the researcher employs the continuous and compound annual rate of return, calculated using the subsequent equation:

$$R_t = \text{Ln} \frac{P_t}{P_{t-1}} \qquad (1)$$

Where (R_t) refers to return, (Ln) specifies natural log, (P_t) demonstrates current price and period return. (P_{t-1}) is the pervious price. This article adopts a 2-step methodology. The 1st. step is the construction of the return index for the selected fund sample. In the 2nd. step, the researcher applies four distinct statistical tests: serial-correlation test, runs-test, unit-root test, and multiple-variance-ratio tests. These tests are utilized to evaluate the existence and validity of the weak-form of market efficiency within both the Egyptian stock market and the Egyptian mutual fund market.

3.1 The Return Index of Fund Sample:

3.1.1 Constructing Index:

Utilizing Principal Component Analysis (PCA), the researcher embarks on extracting the shared elements of returns from the selected funds. By applying the initial principal component analysis technique, they construct a return index for these funds. The 1st. principal component, which is derived from a series of time variables, represents a linear mix of those variables with constants carefully chosen to enable the capture of the maximum variation that is shared across the dataset. PCA is a powerful tool for streamlining variables, especially in datasets with numerous variables and potential redundancy. Redundancy occurs when many variables are interrelated and may measure the same underlying structure.

By addressing this redundancy, PCA enables the compression of variables into a smaller set of principal components (artificial variables) that effectively explain the observed data variance majority. These principal components may then be utilized in terms of predictors or standardized variables for further analysis.

From a technical standpoint, a principal component is a refined linear combination of observed variables. The number of components generated through PCA equals the observed variables analyzed number. Crucially, PCA never relies on any assumptions concerning an underlying model of causality. Instead, it functions as a tool for reducing variables, typically yielding a concise set or group of components that clarify the bulk of the variance within the data.

3.1.2 Assessment of the Suitability of the Data for Factor Analysis:

Principal Component Analysis (PCA) is recognized as a used procedure particularly suited for large sample sizes. To ensure reliable outcomes, it is recommended that the minimum number of the used subjects providing data that is used for analysis be either one hundred subjects or five times of the analyzed variables number, whichever is the greater. The factors that are derived from a small dataset may differ from those obtained from a larger one. However, some researchers argue that the concentration should not solely be on the overall size of used dataset.

There are two key statistical metrics play a critical role in evaluating data decomposition: Bartlett's sphericity test (Bartlett, 1954) and the Kaiser-Meyer-Olkin (KMO) sampling adequacy measure (Kaiser, 1960, 1970, 1981; Kaiser and Rice, 1974). For effective factor analysis, Bartlett's sphericity test should yield a significant result (probability is less than 0.10). The KMO index, ranging from 0 till 1, Acts as a measure of sampling adequacy, with a minimum value of 0.5 being recommended for a reliable Principal Component Analysis, as proposed by Tabachnick and Fidell (2001) and the 2005 SPSS Survival Manual.

3.2 Testing for the Presence of Weak Form of Efficient Market Hypothesis:

3.2.1 Durbin-Watson Test

The exploration of autocorrelation problems, or simply serial correlation, delves into the relationship between current and prior returns through autocorrelation analysis. A prominently positive correlation unveils discernible patterns within the return series, hinting at non-randomness in the data. Conversely, a pronouncedly negative correlation hints at an inverse association, also suggesting non-randomness. Only when the correlation between current and preceding returns near zero can we deduce randomness in the return of series.

A combination of parametric autocorrelation coefficient tests and also non-parametric run tests were utilized to scrutinize autocorrelation. In the autocorrelation examination, the correlation over time between the rate of returns was evaluated. The analysis focused on whether the rate of return on day (t) is correlated with the rate of return on days (t-1, t-2, ..., t-n). If there is efficiency in markets, there might be no significant relationship between the return on day (t) and the returns on previous days (t-1, t-2, ..., t-n).

The subsequent formula was employed to compute the serial correlation between current time period returns and that of the previous time period.

$$R_t = \alpha + \rho\, R_{t-1} + e \quad (2)$$

Where (R_t) is the current time period return, or simply dependent variable, (R_{t-1}) is the return of previous time period, or in other words independent variable, (α) is constant term and € is error term while on the other hand (ρ) = estimated parameter (-1 < ρ < l). To evaluate the significance of autocorrelation, the Durbin-Watson test was selected. When analyzing time series data, various autocorrelation tests are available in statistics, with the Durbin-Watson test being among the most prominent. First introduced by James Durbin and Geoffrey Watson in 1950, the Durbin-Watson test is utilized to ascertain whether a series displays autocorrelation. The major formula for this test can be demonstrated as follows:

$$d = \frac{\sum_{t=2}^{T}(e_t - e_{t-1})^2}{\sum_{t=1}^{T} e_t^2} \quad (3)$$

Where (T) refers to the observations number, (e_t) signifies the current time period return, or simply dependent variable, and (e_{t-1})represents that of the previous time period. This test statistic is approximately equal to 2(1 - P), where (P) is an estimated parameter ranging from -1 to 1. Statistics often fall within the range of 0 and 4. If the statistic significantly deviates from 2, it indicates evidence of series serial correlation. Specifically, if the statistic is notably below 2, it suggests the presence of a positive serial correlation. Conversely, if the statistic is substantially above 2, it indicates evidence of a negative serial correlation. As a rough guideline, a Durbin-Watson statistic below 1.0 implies a strong positive correlation, while a statistic above 3.0 suggests a strong negative correlation.

3.2.2 Runs Test

The Runs test was the second method employed to evaluate market efficiency. The subsequent equation was utilized:

$$Z = R - X/\sigma \qquad (4)$$

Where, (R) denotes the aggregate count of runs, (X) equals $\frac{2n1n2+1}{n1+n2}$, (n1) stands for the number of those positive runs, (n2) denotes the number of that negative runs, (σ) equals $\sqrt{2\ n1n2\ (2\ n1n2 - n)\ /\ n^2\ (n - 1)}$, (n) equals the sum of n1 and n2, and (z) indicates the normal variate.

If the test value always falls within the interval of -1.96 up to +1.96, it is deemed to be significant, implying that the security prices seem to adhere to a random pattern. However, if the test value is below -1.96 or exceeds +1.96, it is regarded as insignificant, indicating that the prices of the security deviate from a random pattern.

3.2.3 Unit Root Test

The third method used to assess market efficiency or inefficiency was testing unit root. As noted by Hassan et al. (2007), unit root tests are important for evaluating market efficiency because the randomness (non-stationarity) of security prices is a key condition, and these tests determine whether financial time series display non-stationarity. The researcher defined a sample period of twenty years, recognizing that market structure changes, competition, technology, and financial activity over longer periods could introduce various frequencies into the data series.

Researchers typically rely on ADF and KPSS tests since ADF and PP tests generally produce similar results. A major criticism of the Augmented Dickey-Fuller (ADF) test is its limited power when the process is near non-stationarity, which could lead to an incorrect conclusion that the process is stationary when its roots are close to the non-stationary boundary (Brooks, 2002). As a result, the researcher favors KPSS tests. Introduced by Shin, Kwiatkowski, Phillips, and Schmidt (1992), KPSS tests are based on a null hypothesis of the stationarity of series.

To check for a unit root, the T-statistic is calculated and then it is compared with the corresponding critical value at diverse significance levels. If the test statistics are smaller than the critical value at the chosen significance level, then the null hypothesis is not rejected, indicating the lacking of a unit root in series. However, if the null hypothesis is rejected, it suggests the series contains a unit root.

Before conducting the KPSS test, the researcher must decide including a constant, a constant and linear trend, or neither. It is recommended to run tests using both constant and constant and linear trend specifications, as the other 2 cases are special instances of this more general specification (Marquering & Verbeek, 2004). Using this approach leads to more accurate results.

The standardized KPSS test tends to be oversized for highly autoregressive processes because of its use of a semi-parametric heteroskedasticity besides autocorrelation-consistent covariance estimator (HAC) for the process long-run variance, introducing a significant positive finite sample bias. On the other hand, an alternative bandwidth, as suggested by KPSS, can be chosen when using an HAC estimator. In finite samples, the bandwidth choice involves a trade-off: using a larger bandwidth overestimates the variance in long-run, producing too small test statistics and little or no power tests at common nominal significance levels. In contrast, when the process is highly autoregressive, selecting a smaller bandwidth underestimates the variance in long-run, resulting in too large test statistics and an oversized test.

While the use of better estimators for the variance in long-term under the null hypothesis may seem like a solution, it doesn't automatically resolve the issues with KPSS-type tests. A variance estimator in long-term that performs well under the null hypothesis might still lead to an inconsistency in KPSS-type tests when compared to alternatives of random-walk. Specifically, the test power for certain relevant alternatives may not reach 1 as an increase in the sample size happens.

Given these challenges, the researcher proposed an automatic KPSS test formulation designed to reduce size distortion and avoid inconsistency (Hobijn, Franses, & Oom, 2004).

3.2.4 Variance Ratio Test

The fourth method chosen for market efficiency analysis was the test of variance ratio. Lo and Mackinlay (2011) introduced this statistical test to assess asset prices or returns predictability. It involves the comparison of the variance of differences in time-series data across various intervals. Using the assumption of a time series random walk, the variance of a q-period difference might be q multiplied by the difference of variance of the one-period. The test statistics of this test are employed to evaluate the hypothesis of random walk under 2 conditions, namely homoscedasticity and heteroscedasticity, relying upon asymptotic distributional properties.

In a separate study, Chow and Denning (1993) proposed a similar test to this test, but it uses the multiple variance ratio. The key difference between the 2 tests is that while the variance ratio test gives separate results for each interval, the multiple variance ratio test offers a joint probability. In other words, if the variance ratio equals one, it indicates that stocks are subject to a random walk, and consequently the null hypothesis is not rejected.

4. Results and Discussion

4.1 The Return Index of Fund Sample:

In this investigation, the Bartlett test and also the Kaiser-Meyer-Olkin (KMO) measure validate their reliability, as depicted in Table 1.

Table 1: KMO and Bartlett's Test to Assess the Factorability of the Data

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.921
Bartlett's Test of Sphericity	**Approx. Chi-Square**	6235.681
	df	55
	Sig.	0.000

The table data reveals that Bartlett's test of sphericity produces a noteworthy outcome with a value of .000, falling below the 1% significance threshold. Furthermore, the first principal component elucidates 92.1% of the variance in the sample's orthogonalized variables. Additionally, Table 2 presents the resultant matrix of the 1st. principal component for the returns of the 11 mutual fund samples.

Table 2: 1st. Principal Component Matrix

National Bank 1	.941
AMIG (Allied Investors)	.933
National Bank 2	.921
Suez Canal Bank	.899
SAIB 2	.985
Bank of Alexandria	.952
Banque Misr I	.923
Banque Misr II	.914
Banque du Caire	.946
EDBE (Al Khabeer)	.968
Egyptian Gulf Bank	.940

Hence, the Egyptian mutual funds' return index can be formulated based on the first principal component matrix provided in Table 2, utilizing the following equation:

Egyptian Mutual Funds' Return Index = (0.941 × National Bank 1) + (0.933 × AMIG (Allied Investors)) + (0.921 × National Bank 2) + (0.899 × Suez Canal Bank) + (0.985 × SAIB 2) + (0.952 × Bank of Alexandria) + (0.923 × Banque Misr I) + (0.914 × Banque Misr II) + (0.946 × Banque du Caire) + (0.968 × EDBE (Al Khabeer)) + (0.940 × Egyptian Gulf Bank)**.**

4.2 Testing for the Presence of Weak Form Efficient Market Hypothesis:

Before performing four distinct statistical tests for testing market efficiency, an analysis of the various descriptive statistics for the two Egyptian markets was conducted. Table 3 presents the diverse returns descriptive statistics.

Table 3 Returns Descriptive Statistics

Descriptive statistics	*Fund Return*	*EGX30 (Market Return)*
Mean	0.73	0.13
Median	0.63	0.08
Standard Deviation	1.84	0.36
Skewness	0.13	0.95
Range	11.08	2.46
Minimum	-4.53	-1
Maximum	6.55	1.46

The descriptive statistics of returns for the Egyptian mutual fund market and the EGX30 index provide key insights into their distribution and volatility, which are critical for evaluating market efficiency. A fundamental aspect of the Efficient Market Hypothesis (EMH) is that returns should be random and unpredictable if markets are efficient (Fama, 1970). However, deviations in descriptive statistics, such as skewness and standard deviation, can provide preliminary evidence regarding the market's behavior (Beechey & Vickery, 2000).

The mean return of mutual funds (0.73) is notably higher than that of the EGX30 index (0.13), indicating that, on average, mutual funds generated better returns than the overall market. According to Jensen (1978), in an efficient market, higher average returns should reflect compensation for higher risk. This is supported by the standard deviation, which measures return volatility. The standard deviation of fund returns (1.84) is significantly larger than that of the EGX30 index (0.36), suggesting that mutual funds are subject to greater fluctuations in returns. High volatility often indicates the presence of speculative behavior, inefficiencies, or systematic risks within the market (Malkiel, 2003).

The median return of mutual funds (0.63) is also higher than the EGX30's (0.08), reinforcing the trend of higher fund returns. However, skewness values reveal differences in the distribution of returns. The EGX30 index exhibits positive skewness (0.95), meaning that returns are more frequently concentrated on the lower end, with occasional extreme positive values. In contrast, mutual fund returns have a much lower skewness (0.13), suggesting

a more symmetric distribution. According to Cont (2001), positive skewness indicates that extreme positive returns are more likely than extreme negative returns, which can influence investors' risk perceptions and investment strategies.

The range of mutual fund returns (11.08) is substantially larger than that of the EGX30 (2.46), further emphasizing the higher variability in fund performance. Additionally, the minimum return for mutual funds (-4.53) is significantly lower than that of the EGX30 (-1), while the maximum return for mutual funds (6.55) is substantially higher than that of the market (1.46). This broad range suggests that mutual fund returns experience greater fluctuations, which could be attributed to active management strategies, increased exposure to riskier assets, or inefficiencies in portfolio selection (Grinblatt & Titman, 1994).

Overall, these findings suggest that mutual funds in Egypt offer higher returns but with substantially greater risk compared to the EGX30 index. The greater volatility in mutual fund returns raises questions about their efficiency and whether these excess returns are justified by the additional risk taken. According to Naseer and Bin Tarek (2020), if markets were perfectly efficient, the observed return patterns should not allow for consistent outperformance based on historical data. Further statistical tests on weak-form efficiency, such as the runs test and variance ratio test, will be crucial in determining whether these returns follow a random walk pattern or exhibit predictability, which would contradict the EMH (Lo & MacKinlay, 1988).

4.2.1 Durbin-Watson Test

Table 4 presents the results of the Durbin-Watson test, which assesses the presence of autocorrelation in return series. The computed Durbin-Watson statistic for the Egyptian stock market return series is 2.152, which is slightly above 2, indicating a weak negative autocorrelation. This suggests that successive returns are not strongly dependent on previous values, providing no substantial evidence against weak-form efficiency. Consequently, the efficiency hypothesis for the Egyptian stock market (H_1) cannot be rejected.

In contrast, the Durbin-Watson statistic for the monthly return series of the Egyptian mutual fund market is 1.218, indicating the presence of positive autocorrelation. This implies that past returns influence future returns, contradicting the assumption of randomness required under weak-form efficiency. Since the statistic falls significantly below 2, this result suggests that mutual fund returns do not follow a purely stochastic process, leading to the rejection of the efficiency hypothesis for the mutual fund market (H_2).

Overall, these findings present mixed evidence regarding weak-form efficiency in Egypt. While the stock market does not exhibit significant autocorrelation and cannot be classified as inefficient based on the Durbin-Watson test, the mutual fund market demonstrates a predictable pattern in returns, contradicting weak-form efficiency. These results highlight the need for further empirical analysis using additional tests to determine the extent of efficiency across Egypt's financial markets.

Table 4: Results of Durbin-Watson Test

Markets	Durbin-Watson Calculated Values
Egyptian Stock Market	2.152
Egyptian Mutual Fund Market	1.218

4.2.2 Runs Test

Table 5 presents a summary of the results from the runs test, which evaluates the randomness of successive returns. In both cases, the p-values are significantly lower than the alpha threshold of 0.05, indicating statistical significance. A p-value below the alpha level suggests that the z-statistic falls outside the ±1.96 range, leading to the rejection of the null hypothesis (H_0), which posits that successive monthly returns are randomly generated.

Given this rejection, the findings suggest that returns exhibit non-random patterns, contradicting the weak-form Efficient Market Hypothesis (EMH). This result implies that past price movements contain valuable information that could potentially be exploited for predictive trading strategies, thus refuting H_1 (the Egyptian stock market exhibits weak-form efficiency) and H_2 (the Egyptian mutual fund market displays weak-form efficiency).

Consequently, neither market can be classified as weak-form efficient, as their returns do not align with the fundamental assumption of randomness required under EMH. These results challenge the notion that investors in Egypt's stock and mutual fund markets cannot achieve abnormal returns based on historical price data, raising important implications for market behavior, investment strategies, and financial regulation.

Table 5: Runs Test

Market	Egyptian Stock Market	Egyptian Mutual Fund Market
Test Value[a]	.1330272	.732988141629956
Cases < Test Value	143	121
Cases >= Test Value	85	106
Total Cases	228	227
Number of Runs	36	40
Z	-10.169	-9.889
Asymp. Sig. (2-tailed)	<.001	<.001

a. Mean

4.2.3 Unit Root Test

Table 6 presents the KPSS unit root test results.

Table 6: KPSS unit root test

Series to be Tested	1% Critical Value	Exogenous Regressors Assumptions
		Constant
		KPSS Statistic
Egyptian Stock Market	**Intercept**	
	0.739000	0.608734
Egyptian Mutual Fund Market	**Intercept**	
	0.739000	0.364717
Series to be Tested	**1% Critical Value**	**Exogenous Regressors Assumptions**
		Constant, Linear Trend
		KPSS Statistic
Egyptian Stock Market	**Trend & Intercept**	
	0.216000	0.142191
Egyptian Mutual Fund Market	**Trend & Intercept**	
	0.216000	0.085962

Drawing insights from the results presented in Table 6, the following conclusions can be made regarding market efficiency in Egypt's stock and mutual fund markets.

For the intercept condition, the KPSS statistic values for both markets fall below the 1% critical threshold. This indicates that the null hypothesis of stationarity is not rejected, implying that the return series are stationary. Since weak-form efficiency requires stock prices to follow a random walk process—where past information has no predictive power over future returns—the observed stationarity contradicts this principle. Consequently, the findings suggest that the Egyptian stock and mutual fund markets do not exhibit weak-form efficiency, as returns appear to be predictable rather than random. Thus, the efficiency hypothesis cannot be supported for either market.

Similarly, under the trend and intercept condition, the KPSS statistic values remain below the 1% critical threshold for both markets. As a result, the null hypothesis of stationarity remains unchallenged, further reinforcing the conclusion that return series do not follow a random walk. This finding confirms the absence of weak-form efficiency, as it suggests that historical price data may contain exploitable patterns. Therefore, the efficiency hypothesis is not substantiated for either market, implying that past returns can potentially be used to predict future price movements in Egypt's financial markets.

4.2.4 Variance Ratio Test:

Under this study, a multiple variance ratio test was conducted under both homoscedastic and heteroskedastic assumptions to assess the weak-form efficiency of the Egyptian stock and mutual fund markets. The analysis generated five types of outcomes, including a joint test that reflects the overall multiple variance ratio test results, as well as individual variance ratio test results for specific periods. The joint test was particularly emphasized due to its ability to assess joint probability across different time intervals, providing a more comprehensive evaluation of market efficiency.

To support the null hypothesis, the joint probability should exceed 0.05, indicating that the calculated z-test statistic falls within the ±1.96 range and that the joint variance ratio for all periods equals one. In this case, the null hypothesis of a random walk is confirmed, supporting the weak-form Efficient Market Hypothesis. However, if the calculated variance ratio significantly deviates from one, the null hypothesis is rejected, implying that returns do not follow a random walk and that market inefficiencies exist.

These results are critical in testing the two alternative hypotheses of this study. If the variance ratio test fails to reject the null hypothesis, it would provide evidence supporting H_1, which states that the Egyptian stock market exhibits weak-form efficiency, and H_2, which posits that the Egyptian mutual fund market displays weak-form efficiency. Conversely, if the test results indicate significant deviations from the expected values, it would lead to the rejection of both hypotheses, suggesting that past price movements influence future returns and that neither market operates efficiently under the weak-form EMH. The subsequent Table 7 illustrates the outcomes of joint variance ratio tests for both markets.

Table 7: Joint Variance Ratio Test

Market		**Under assumption of homoscedastic**	**Under assumption of heteroskedastic**
Egyptian Stock Market	**z-statistic value**	2.878158	2.699768
	joint probability value	0.0159	0.0275
Egyptian Mutual Fund Market	**z-statistic value**	2.715728	2.241055
	joint probability value	0.0262	0.0964

Drawing insights from the analysis presented in Table 7, the following conclusions can be deduced regarding the weak-form efficiency of the Egyptian stock and mutual fund markets.

Under the homoscedastic assumption (asymptotic distributional test), the variance ratio results for the Egyptian stock market and the Egyptian mutual fund market are 2.878158 (0.0159) and 2.715728 (0.0262), respectively. Since the joint probability values for both markets are below the alpha level of 0.05 and the z-statistic falls outside the ±1.96 range, the null hypothesis of a random walk is rejected. This indicates that return series for both markets

do not follow a random walk pattern, implying that VR ≠ 1. As a result, past price movements appear to have predictive power, contradicting weak-form efficiency. These findings provide evidence against both alternative hypotheses, suggesting that neither the Egyptian stock market nor the Egyptian mutual fund market operates efficiently under this assumption.

Under the heteroskedastic assumption (asymptotic distributional test), the variance ratio results for the Egyptian stock market and mutual fund market are 2.699768 (0.0275) and 2.241055 (0.0964), respectively. In the case of the Egyptian stock market, the joint probability remains below 0.05, and the z-statistic lies outside the ±1.96 range, leading to the rejection of the null hypothesis. This confirms that the return series does not conform to a random walk pattern, reinforcing the previous conclusion that the stock market does not exhibit weak-form efficiency. However, for the Egyptian mutual fund market, the joint probability exceeds the alpha level, and the z-statistic remains within ±1.96. As a result, the null hypothesis is not rejected, suggesting that mutual fund returns follow a random walk pattern, with VR = 1. This finding supports the alternative hypothesis, indicating that the Egyptian mutual fund market may be weak-form efficient under the heteroskedastic assumption.

Overall, the results provide strong evidence against weak-form efficiency in both the Egyptian stock and mutual fund markets. Under both homoscedastic and heteroskedastic conditions, the stock market fails to exhibit weak-form efficiency, as return series do not follow a random walk pattern, indicating the presence of return predictability. Similarly, the mutual fund market does not conform to weak-form efficiency under the homoscedastic assumption, suggesting that historical price movements influence future returns. However, under the heteroskedastic assumption, the mutual fund market shows signs of randomness, which could indicate partial efficiency when accounting for time-varying volatility.

These findings suggest that neither market fully aligns with the principles of weak-form efficiency, raising concerns about the effectiveness of price adjustments to new information. The persistence of non-random patterns in returns implies that investors may have opportunities to exploit market inefficiencies for abnormal gains. The results also underscore the importance

of considering different econometric approaches when assessing market efficiency, as variations in statistical assumptions can lead to differing conclusions. Further empirical research, incorporating alternative methodologies and higher-frequency data, may be necessary to provide a more comprehensive understanding of market dynamics and efficiency in Egypt.

5. Conclusion

The findings of this study contribute to the ongoing debate on market efficiency, particularly regarding the weak-form Efficient Market Hypothesis (EMH) in Egypt's stock and mutual fund markets. Weak-form efficiency suggests that all past price information is fully incorporated into security prices, preventing investors from achieving abnormal returns through historical data analysis (Fama, 1970). However, the results of this study indicate strong evidence against weak-form efficiency in both markets, highlighting inefficiencies that allow for potential return predictability.

The application of multiple statistical tests has provided robust empirical insights. The **Durbin-Watson test** revealed serial correlation in both markets, suggesting that past returns influence future price movements, contradicting the assumptions of weak-form efficiency (Beechey & Vickery, 2000). Similarly, the **KPSS unit root test** confirmed the stationarity of return series, indicating the absence of a random walk process and further supporting the notion of inefficiency. The **runs test**, which assesses the randomness of returns, also refuted weak-form efficiency by showing that return patterns deviate from randomness, reinforcing the predictability of price movements (Naseer & Bin Tarek, 2020).

While all three tests consistently reject the weak-form EMH, the **variance ratio test** produced mixed results. Under the **homoscedastic assumption**, both markets displayed significant deviations from the random walk hypothesis, further confirming inefficiency. However, under the **heteroskedastic assumption**, the mutual fund market exhibited weak-form efficiency, as returns followed a random pattern, suggesting that efficiency might be conditional on time-varying volatility (Lo & MacKinlay, 1988). This partial efficiency in the mutual fund market aligns with findings in previous research, where weak-form efficiency was observed in select periods or under specific statistical assumptions (Faris, 2015).

These findings have significant implications for investors, policymakers, and financial regulators. The lack of weak-form efficiency in the Egyptian stock market implies that investors could potentially exploit historical price trends for profitable trading strategies, challenging the notion of an efficient pricing mechanism. From a policy perspective, these inefficiencies underscore the need for regulatory improvements, increased transparency, and enhanced market supervision to foster a more competitive and efficient trading environment (Malkiel, 2003). Additionally, the partial efficiency observed in the mutual fund market under heteroskedastic conditions suggests that fund managers and institutional investors may need to consider market volatility when designing investment strategies.

The study's conclusions align with previous research on emerging markets, which often struggle to maintain weak-form efficiency due to factors such as market manipulation, insider trading, and regulatory inefficiencies (Grinblatt & Titman, 1994; Dias et al., 2020). As Egypt continues to recover from the economic disruptions following the 2011 Revolution, developing a well-functioning stock market and strengthening financial institutions will be crucial for long-term economic stability (El Masry & Badr, 2020).

Future research should explore alternative methodologies, such as high-frequency data analysis and behavioral finance models, to further investigate the nature of inefficiencies in Egypt's financial markets. Additionally, expanding the study period to include post-pandemic recovery phases and incorporating broader macroeconomic variables may provide deeper insights into the evolving efficiency of these markets.

In conclusion, this study presents compelling evidence that Egypt's stock and mutual fund markets largely fail to exhibit weak-form efficiency, with only limited efficiency observed under specific assumptions. These results emphasize the need for continued financial market reforms and regulatory enhancements to improve efficiency and attract foreign investment. Understanding and addressing these inefficiencies will be essential for fostering a more stable and competitive financial system in Egypt.

References

Ahmed, S., Yousseff, N., & Zhou, P. (2017). The effect of board structure on stock picking and market timing abilities of the Egyptian mutual fund managers: Evidence from financial crisis. *European Journal of Business and Management, 9*(91), 91-110.

Akbar, U. S., & Bhutto, N. A. (2023). Weak form market efficiency: Evidence from developing and emerging markets. *International Research Journal of Management and Social Sciences, 4*(3), 211-224.

Al-Shattarat, B. (2021). The consequence of earnings management through discretionary accruals on the value relevance in Saudi Arabia. *Cogent Business & Management, 8*(1), 1886473.

Al-Sulaiman, T., & Al-Matouq, A. (2021). A convex collaborative filtering framework for global market return prediction. *IEEE Access, 9*, 29458-29469.

Albannan, M. A., & Farooq, O. (2019). When are earnings informative? Effect of stock liquidity on value of reported earnings in an emerging market: Evidence from Egypt. *International Journal of Islamic and Middle Eastern Finance and Management, 12*(3), 388-406.

Al-Jafari, M. K., & Altaee, H. H. A. (2011). Testing the random walk behavior and efficiency of the Egyptian equity market. *Journal of Money, Investment and Banking, 22*, 132-146.

AlKhazali, O. (2011). Does infrequent trading make a difference on stock market efficiency? Evidence from the Gulf Cooperation Council (GCC) countries. *Studies in Economics and Finance*.

Ansary, O., & Elrashidy, Z. (2019). On the performance of Egyptian mutual funds. *International Journal of Accounting and Financial Reporting, 9*(1), 1-18.

Asiri, B. (2008). Testing weak-form efficiency in the Bahrain stock market. *International Journal of Emerging Markets*.

Bachelier, L. (1900). Theory of speculation. *Annales scientifiques de l'École normale supérieure, 17*, 21-86.

Badr, O. M. (2015). Stock market development and economic growth: Evidence from Egypt. *International Journal of Trade, Economics and Finance, 6*(2), 96-101.

Bartlett, M. S. (1954). A note on the multiplying factors for various χ^2 approximations. *Journal of the Royal Statistical Society: Series B (Methodological), 16*(2), 296-298.

Beechey, M., Gruen, D., & Vickery, J. (2000). The efficient market hypothesis: A survey. *Economic Research Department, Reserve Bank of Australia*.

Brooks, C. (2002). *Introductory econometrics for finance.* Cambridge University Press. https://doi.org/10.1017/CBO9780511841644

Chavannavar, B. M., & Patel, P. V. (2016). Efficiency of Indian stock market: A study from National Stock Exchange. *International Journal of Latest Technology in Engineering, Management & Applied Science, 5*(11), 48-52.

Chow, K. V., & Denning, K. C. (1993). A simple multiple variance ratio test. *Journal of Econometrics, 58*(3), 385-401.

Claesson, K. (1987). Effektiviteten på Stockholms fondbörs. *Ekonomiska forskningsinstitutet vid Handelshögskolan (EFI)*.

Cont, R. (2001). Empirical properties of asset returns: Stylized facts and statistical issues. *Quantitative Finance, 1*(2), 223-236. https://doi.org/10.1088/1469-7688/1/2/304

Dangol, S. (2010). Participation and decision making in Nepal. In *The Equitable Forest* (pp. 70-87). Routledge.

Danila, N. (2022). Random walk of socially responsible investment in emerging markets. *Sustainability, 14*(19), 11846.

Dias, R., Heliodoro, P., Teixeira, N., & Godinho, T. (2020). Testing the weak form of efficient market hypothesis: Empirical evidence from equity markets. *International Journal of Accounting, Finance and Risk Management, 5*(1), 40-51. https://doi.org/10.11648/j.ijafrm.20200501.14

Durbin, J., & Watson, G. S. (1950). Testing for serial correlation in least squares regression: I. *Biometrika, 37*(3/4), 409-428.

Ehiedu, V. C., & Obi, C. K. (2022). Efficient market hypothesis (EMH) and the Nigerian stock exchange in the midst of global financial crises. *International Journal of Academic Management Science Research, 6*(8), 263-273.

El-Masry, A. A., & Badr, O. M. (2020). Stock market performance and foreign exchange market in Egypt: Does 25th January revolution matter? *International Journal of Emerging Markets*.

Fama, E. F. (1965). The behavior of stock-market prices. *The Journal of Business, 38*(1), 34-105. http://www.jstor.org/stable/2350752

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance, 25*(2), 383-417.

Fama, E. F. (1991). Efficient capital markets: II. *The Journal of Finance, 46*(5), 1575-1617. https://doi.org/10.1111/j.1540-6261.1991.tb04636.x

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The adjustment of stock prices to new information. *International Economic Review, 10*(1), 1-21.

Faris, H. I. (2015). Testing the weak-form market efficiency in the Egyptian stock market: A test on the efficiency of mutual funds and banking sector's individual stocks. *Egyptian Journal for Commercial Studies, 39*(2), 1-40.

Fernando, P. N. D., & Gunasekara, A. L. (2018). Is the market efficiency static or dynamic? Evidence from Colombo Stock Exchange (CSE). *Kelaniya Journal of Management, 7*(1), 13-25.

Grinblatt, M., & Titman, S. (1994). A study of monthly mutual fund returns and performance evaluation techniques. *Journal of Financial and Quantitative Analysis, 29*(3), 419-444. https://doi.org/10.2307/2331338

Hassan, A., Abdullah, S. M., & Shah, A. Z. (2007). Testing of random walks and market efficiency in an emerging market: An empirical analysis of Karachi stock exchange. *The Business Review, 9*, 271-280.

Jensen, M. C. (1978). Some anomalous evidence regarding market efficiency. *Journal of Financial Economics, 6*(2-3), 95-101.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*(1), 141-151.

Lo, A. W., & MacKinlay, A. C. (1988). Stock market prices do not follow random walks: Evidence from a simple specification test. *The Review of Financial Studies, 1*(1), 41-66. https://doi.org/10.1093/rfs/1.1.41

Malkiel, B. G. (2003). The efficient market hypothesis and its critics. *Journal of Economic Perspectives, 17*(1), 59-82. https://doi.org/10.1257/089533003321164958

Mandelbrot, B. (1963). The variation of certain speculative prices. *The Journal of Business, 36*(4), 394-419.

Miller, M. H., & Modigliani, F. (1961). Dividend policy, growth, and the valuation of shares. *The Journal of Business, 34*(4), 411-433.

Mouna, A., & Anis, J. (2016). Market efficiency, liquidity, and financial crisis: An analysis of the impact of global financial turmoil on emerging and frontier markets. *Journal of Asset Management, 17*(3), 175-190.

Narayan, P. K., & Smyth, R. (2004). Is South Korea's stock market efficient? *Applied Economics Letters, 11*(11), 707-710.

Ntim, C. G., Opong, K. K., & Danbolt, J. (2007). Financial market liberalization and the efficiency of stock price behaviour in Africa's emerging capital markets. *Journal of Multinational Financial Management, 17*(3), 333-351.

Obaidullah, M. (1991). The weakness of weak-form efficiency: An empirical study of stock market behavior. *Journal of Economics and Business, 43*(2), 181-193.

Poterba, J. M., & Summers, L. H. (1988). Mean reversion in stock prices: Evidence and implications. *Journal of Financial Economics, 22*(1), 27-59.

Ross, S. A. (1976). The arbitrage theory of capital asset pricing. *Journal of Economic Theory, 13*(3), 341-360.

Samuelson, P. A. (1965). Proof that properly anticipated prices fluctuate randomly. *Industrial Management Review, 6*(2), 41-49.

Shleifer, A. (2000). *Inefficient markets: An introduction to behavioral finance.* Oxford University Press.

Shiller, R. J. (1981). Do stock prices move too much to be justified by subsequent changes in dividends? *American Economic Review, 71*(3), 421-436.

Shiller, R. J. (2003). From efficient markets theory to behavioral finance. *Journal of Economic Perspectives, 17*(1), 83-104.

Timmermann, A., & Granger, C. W. (2004). Efficient market hypothesis and forecasting. *International Journal of Forecasting, 20*(1), 15-27.

Worthington, A. C., & Higgs, H. (2004). Random walks and market efficiency in European equity markets. *Global Journal of Finance and Economics, 1*(1), 59-78.

Zhang, Y., & Li, B. (2012). Market efficiency of Chinese stock market: A non-Bayesian sample entropy approach. *Economic Modelling, 29*(5), 1879-1887.

Electronic Sites

www.egx.com.eg

لغز الكفاءة في سوقي الأسهم والصناديق الاستثمارية

(تقييم شامل للصيغة الضعيفة في مصر)

المستخلص

تبحث هذه الدراسة في كفاءة الشكل الضعيف للأسواق المالية في مصر، بما في ذلك سوق الأسهم وسوق صناديق الاستثمار، وذلك لتحديد ما إذا كانت تحركات الأسعار التاريخية تؤثر على العوائد المستقبلية. تفترض فرضية كفاءة السوق (EMH) أن الأسواق ذات الكفاءة في شكلها الضعيف تعكس الأسعار فيها جميع المعلومات التاريخية، مما يجعل من المستحيل على المستثمرين تحقيق عوائد غير طبيعية من خلال التحليل الفني. لاختبار هذه الفرضية، تستخدم الدراسة أربع منهجيات إحصائية: اختبار دوربين-واتسون للكشف عن الارتباط الذاتي، اختبار التسلسل العشوائي (Runs Test) لقياس العشوائية، اختبار KPSS للتحقق من الاستقرارية، واختبار نسبة التباين (Variance Ratio Test) لتقييم فرضية السير العشوائي للأسعار. وتعتمد الدراسة على بيانات العوائد الشهرية خلال الفترة من يناير ٢٠٠٣ إلى ديسمبر ٢٠٢٢، لتغطية كل من سوق الأسهم المصري (مؤشر (EGX30)) وعينة من صناديق الاستثمار المصرية.

تشير النتائج التجريبية إلى أدلة متباينة فيما يتعلق بكفاءة السوق. فقد رفض كل من اختبار دوربين-واتسون واختبار KPSS فرضية الكفاءة في الشكل الضعيف لكلا السوقين، حيث أظهرت السلاسل الزمنية للعوائد استقرارية وارتباطًا ذاتيًا كبيرًا، مما يشير إلى إمكانية التنبؤ بالعوائد المستقبلية. كما أيد اختبار التسلسل العشوائي هذه النتيجة، حيث لم تدعم نتائجه فرضية السير العشوائي للأسعار، مما يعزز الأدلة على عدم كفاءة السوق. ومع ذلك، قدم اختبار نسبة التباين دعمًا جزئيًا لفرضية الكفاءة في سوق صناديق الاستثمار المصرية تحت افتراض التباين غير المتجانس، لكنه رفضها في جميع الحالات الأخرى. وتكشف هذه النتائج عن أوجه قصور هيكلية في الأسواق المالية المصرية، مما يشير إلى إمكانية استغلال الأنماط السعرية التاريخية لتحقيق عوائد غير طبيعية.

تتسق هذه النتائج مع الأبحاث السابقة حول الأسواق الناشئة، والتي غالبًا ما تظهر عدم كفاءة في الشكل الضعيف بسبب عوامل مثل قصور التنظيم، وعدم تماثل المعلومات، والتلاعب بالسوق. ومع استمرار مصر في تنفيذ إصلاحاتها الاقتصادية، تظل تحسين كفاءة السوق أمرًا ضروريًا لجذب الاستثمار الأجنبي وتعزيز الاستقرار المالي. وتقدم نتائج هذه الدراسة رؤى مهمة لصناع السياسات والمستثمرين والجهات التنظيمية المالية، مما يؤكد الحاجة إلى تعزيز الشفافية واتخاذ تدابير تنظيمية فعالة لتعزيز كفاءة الأسواق المالية.

الكلمات المفتاحية: *فرضية كفاءة السوق، الكفاءة في الشكل الضعيف، مصر، الأسواق الناشئة، نظرية السير العشوائي، سوق الأسهم، صناديق الاستثمار.*