

Using the Run Test method to test the efficiency of the financial market: a study in the industrial sector of the Iraqi Stock Exchange

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Abstract : The study aims, to use the run test method, to evaluate the efficiency of the. Iraqi stock market at a weak level. The study community represents, the industrial sector of, the Iraqi stock market, and the study sample. consisted of 5 companies for two years, monthly from 1/1/2021 to 31/12/2022. The closing prices of stocks and stock, returns for banks were used, as a research sample in the Run test.

The study found that the Iraqi ,stock market is efficient .at a weak level, represented ,by the research sample companies, as well as the efficiency of each. company that was researched, at a weak level. This indicates that investors cannot achieve, abnormal returns, in addition to the presence ,of a random walk in the monthly returns series .for banks and research, sample companies.

The study recommended providing, complete information for companies ,listed on the stock market, responding quickly to this information, ensuring transparency. in financial transactions, as well as developing and employing, experts and improving the performance ,of companies and the economic environment.

Keywords: Efficient financial market, weak level, Run test.

Introduction: The topic of financial markets, has become one of the important ,topics that occupies an important ,place in developed and developing, countries alike, for its role in achieving ,economic stability. The Iraqi Stock Exchange is one of the ,basic pillars in raising the level ,of economic activity in the country, by providing funds, that contribute to, economic development. In all sectors.

The financial market efficiency, test at the weak level aims ,to evaluate the performance of ,the market, and to find out" whether .investors can achieve, extraordinary returns by using ,trading strategies based ,on historical information. The Run test method ,is used to find out ,whether the information ,is reflected in stock prices and different ,market sectors. In order for the market, to perform "this role, it must be characterized ,by efficiency, that is, it must reflect all available information, and the relationship between securities .prices and financial information is of great. importance to all parties, to the securities market, in order to rationalize ,investment decisions and provide provisions, for monitoring the good. performance of the market.

From the above, the study dealt ,with four sections. The first section included the methodology, of the study and some, previous studies, while the second section included ,a theoretical framework, and the third section ,dealt with the applied one. This study concluded, with some conclusions, and recommendations as a final section.

The first topic:

Research methodology

First: the importance of research

The importance of the research is:-

- 1- Measuring the efficiency, of the Iraqi Stock Exchange is one, of the first tasks and an evaluation .of the management of the Securities, Commission in the market.
- 2- Efficient financial markets ,are the first task that ,market management. seeks to achieve, as this constitutes ,an incentive for investors to expand, the investment system, in the market, as well as leading to the ,entry of new investors, which leads to achieving .the goals of the management, of the Iraqi Stock Exchange.
- 3-The vision of most, traders in the market is also ,clear in order to develop. appropriate investment ,strategies for them.

Second: Research objectives

The research objectives, are the following points:

- 1- Testing the efficiency, of the market for securities ,at the weak level. In order for the study, to achieve its main objective, the researcher set the following. two sub-objectives:
- 2- Identify the concept, of financial market efficiency in ,general and focus on, efficiency at the weak, level in particular.
- 3- Shedding light and introducing, the Run test as one ,of the important tests for. the efficiency of, financial markets.

Third: The research problem

The research problem, is represented by the following question:

Is the Iraqi Stock Exchange, efficient at the weak level according, to the emergency patterns. (signals) method (Run test)?

Fourth: Research hypotheses

The research hypotheses were:-

Null hypothesis H0: The Iraqi Stock Exchange, represented by the industrial sector, in the research sample companies, is inefficient at the weak level according to the emergent patterns. (signals) method Run test.

Alternative hypothesis H1: The Iraqi Stock Exchange, represented by the industrial sector, with companies in the research sample, is efficient at the weak level according to the emergent patterns (signals) method Run test.

Fifth: The research ,population and sample

The research community represented ,the industrial sector, while the research sample consisted, of (5) companies listed on the Iraqi. Stock Exchange for which the necessary, data are available through the, necessary monthly data during the study, period and for a period of two years .from 1/1/2021 to 12/31/2022.

Sixth: Research method

From the above, the study dealt with four sections. The first section dealt with the research ,methodology and some previous studies, while the second section explained ,the theoretical framework, and the third section explained ,the applied aspect, and the study ended with some conclusions. and recommendations as a final section.

Some previous studies:

1-Study (Karmouche, 2020)

The study, entitled (The Role of Electronic, Publishing of Financial Information in Achieving, an Efficient Financial Market), aimed to conduct a comparative ,study in the Iraq Stock Exchange, for the period (2006-2011). The study relied on a comparison, between the manual, and electronic systems, representing the population, and sample of the study, in the Iraq Stock Exchange. The study concluded that The Iraq .Stock Exchange administration's ,endeavor to replace manual publishing, with the electronic publishing .system has contributed to, strengthening the market's infrastructure, and improving indicators, of its activities, especially those related to the depth and liquidity of the market. The study recommended paying attention, to modern technologies, used in global stock. markets, as we see that after, implementing the trading system, In 2009, the electronic trading process ,became easier and more transparent, which led to an. increase in foreign investors', interest in buying Iraqi stocks.

2-Study (Mohamed, 2014)

The study, entitled (The Randomness of Price, Movement, and the Level of Financial Market, Efficiency: The Case of the Amman, Stock Exchange), aimed to test ,the hypothesis of the efficiency .of the Amman Stock Exchange at the, weak level. The study population and sample, represented a series of daily, closing prices for the Amman. Index listed on the financial ,market for the period from. 2/ 1/2009 to 2/17/2013. Three statistical and measurement, tests were used: autocorrelation, frequencies, and unit root, (modified Dickey-Fuller test). The results of the three tests, showed that the Amman. Stock Exchange did not have. sufficient efficiency, at the weak level. The study recommended expanding,, the study of the efficiency of the ,Amman Financial Market, by reviewing recent studies. in this field.

3-Study (ANDABAI, BREY and YERIGBILIGA, 2019)

The study, entitled (The Efficient Market Hypothesis, at the Weak Level in the, Nigerian Stock Market), aimed to test the hypothesis .of the efficient market at the, weak level in the Nigerian ,Stock Market for, the period (1990-2017), representing the study population .and sample of companies listed ,on the Nigerian Stock. Market, using The ASI. index and time series econometric, techniques were . It was concluded by testing, the time series obtained, from the ADF test that ,the Nigerian stock market is not

random. and therefore unstable, which indicates that, the investor can predict ,market returns. The study recommended that, the work should increase, efficiency in the Financial market.

The second topic:

First: The concept of ,efficient financial markets

Financial markets differ, in their level of ,efficiency and effectiveness, and this is due to the difference. in the capabilities "available to, traders in these markets. It is noted that there are three ,levels of this efficiency "related. to the level of information, available and its content.

Achieving financial market ,efficiency is the first task that market, management seeks to achieve, as this constitutes an incentive ,for investors to increase the investment. process in the market, and the entry of new investors, thus achieving, the market objectives.

There are several, definitions of an efficient ,financial market. In 1970, Fama was one of the first. to clarify the, concept of efficiency. He knew that market efficiency, means that the share price. fully reflects all the information ,available about it in the market ,quickly and accurately, and thus the nominal value, of the "share represents a fair ,value that fully reflects its value. The real return generated by it is sufficient, to compensate "for the risks of investing. in the stock, and thus no, market dealer can ,achieve extraordinary returns, that exceed what. others determine. Fama,1970,383))

(Al-Shabib and Al-Jubouri, 2005: 7) define a market as having a high degree of flexibility, allowing for rapid responses in securities prices, which occur as a result of changes in the analysis of information data flowing to the market. This ultimately leads to achieving parity between market value and the real value of the security.

(Qanoush and Mazydo, 2020: 284) define an efficient market, as "a market in which, the prices of securities issued ,by institutions reflect all the information, available about them, and there is no time, lag in "obtaining the information. received into the market, and arriving "at specific results ,regarding the price of the security." Accordingly, market efficiency can be. defined as those markets that aim, at optimal allocation of resources, accurate evaluation of trade-offs, and provision of services, at the lowest cost.

Second: The importance of the efficiency ,of financial markets:

The importance of the, efficiency of financial markets, can be explained through. the following: (Brown & Reilly, 2009: 150) Stefan & Thesle, 2009: 15)

- Making and providing, information in the" financial ,markets to all investors and reflecting ,the prices of securities "traded, in the markets, and the market value. of these securities ,being similar to, their real value, thus providing favorable. opportunities for investors ,to determine their investment options.

3- Making great use of, information in the process. of evaluating securities ,and determining their prices.

4- Low transaction costs in efficient ,financial markets, which ensures easy flow, of orders to buy ,and sell securities. in a flexible manner, thus making capital. move towards areas ,that are more productive. (Kazim, 2019: 186)

Third: Characteristics of, market efficiency:

The characteristics of an, efficient, market include, the following:

1- Liquidity: Liquidity is one of the most, important motivators for investors. in financial markets. What is meant by liquidity, is the possibility of disposing ,of or selling financial assets ,quickly and without incurring losses, unless new information comes in that affects, the announced prices. (Abdel Qader, 2010: 104)

2- Rationality: The investor's goal ,in investing is to make, a profit by processing. information and choosing, the best investment alternative, in the market. (Qaryaks, 1999: 180)

3- Efficiency of resource, allocation: It is represented by transferring, surplus funds and scarce. resources from those who have, this surplus to the economic. activities and investment, opportunities that are available, for these resources. Efficiency of resource allocation, is achieved when these scarce, resources are optimally, allocated to all investment activities, and then the public, benefit is achieved, For all customers. (Sultan, 2015:79)

4- Market comprehensiveness: This means that the financial, market is characterized, by its "large size and comprehensiveness. If the trading volume is large. resulting from supply and demand "orders, as a result of the trading. volume in large markets, then the difference between ,the ask price and the. offer price is low. If the number of sellers, and buyers in the market is small. and If the resulting ,trading volume is small, the market is also limited. (Kharbouch, 1998: 155)

7- Security: That is, there must be protection, against the risks to which the investor may be exposed, to fluctuations in prices, interests, and other risks ,that may occur in the, financial market.

Fourth: Types of efficiency in, financial markets:

The efficiency of financial, markets can be classified, as follows: (Kasri, 2016: 49)

1- Complete efficiency:

It means that there, is no time lag between analyzing. the information received into, the market and arriving at specific, results regarding the stock price, as an immediate ,change in the price occurs. This type of efficiency refers ,to the ability of the financial markets to, provide all traders in the market, with information quickly, transparently, and without any costs. Taking into account the fair, timing of their access. to this information so that they, can respond to it and make, their investment decisions. (Al-Moumani, 2013: 131)

In order for the concept ,of market efficiency to be called, complete efficiency, the following conditions, must be met: (Toubia, 2019: 17)

A- Transparency and speed, of transmission of information ,to everyone and without costs.

B- The presence of a large ,number of investors, as no investor alone can. influence the prices, of traded securities.

C- Freedom of transactions ,from any restrictions such, as transaction costs .or taxes, and no restrictions on, the entry or exit of any investor, from the market, or on his buying and selling, of any quantity of shares, and the company he desires.

D- The rationality of investors, and each one of them ,strives to achieve the. greatest possible benefit.

2- Economic efficiency:

It is the efficiency in which it ,is expected that there will be, a time "lag between. the arrival of information ,and the speed of its reflection ,on securities "prices. This means that the market, value may be higher or lower than, its true value for a short. period of time, and because of transaction ,costs and taxes, there will be no. difference between securities ,prices and their true value. (Samitas, 2004:6)

Fifth: The hypothesis of random, behavior of the efficient market:

Roberts (1959) is considered ,the first to study the random behavior ,of prices through his" study. of the actual price levels, of the market for (52) weeks. according to the Dow, Jones Industrial Average Index, and he concluded "that. the actual movement of stock, prices is a random movement. and it was Using the, phenomenon of random, behavior to describe the behavior, of the security price in. the financial markets, as it was formulated to give, the efficient financial market, hypothesis testable implications. The random behavior hypothesis confirms that successive price changes, are independent, meaning that prices in ,any time period on average .will reflect the true ,value of the stock, and that The changes that ,will occur in stock prices .in the future must be completely, independent of the changes. that occurred in the price in the past, and the link between the concepts. of random behavior and the, efficient market can be clearly, inferred and the content. of the weak level of efficiency, represented by the inability, to predict stock. prices based on the information ,available about prices. And the trading volumes ,that took place in the past (Al-Amiri 2010: 132-133).

The random behavior hypothesis, assumes that new ,information is random, and that its entry into, the market is random, which leads.q to random changes in prices, as changes in the prices ,of successive securities are. independent changes and, are distributed in a similar, probability distribution.

The hypothesis of random behavior, is closely linked to the efficiency .of financial markets, and when information is" received, into the efficient financial. market, it is reflected in stock prices quickly, and rationally. Prices tend to fluctuate. randomly around their, true value and completely, reflect the latest" information. available in the market, (Mutohya, 34: 2013). The random behavior hypothesis ,is one of the important models, that has been studied as, it is a sufficient condition for. achieving efficiency in financial markets.

The hypothesis of random, behavior can be studied ,from two aspects:

The first aspect: formulas for the efficiency, of financial markets

The efficient market hypothesis, assumes that stock prices reflect. all available information ,about these stocks at any given time. There are many types. of information that affect, the value of stocks. Therefore, market efficiency, is divided into three formulas, according to the type of information, that prices reflect. (Fama, 1970), which include:

A- Market efficiency at, the weak level:

This formula assumes that market, prices reflect all historical, information only, such as changes in prices. trading volumes, and any numbers, and graphs of stock, movement that occurred in the past.

It cannot be "used at all in an, attempt to achieve extraordinary. profits. This means that, the price movement" in the future. is completely independent ,of the changes that ,occurred in the past and, cannot

be predicted. Therefore, if the market is efficient according to the weak formula, then technical analysis is useless, and exceptional profits cannot be achieved based on it. This formula expresses the essence of the random walk theory of stock movement (Bodie et al., 2008).

B- Market efficiency at the semi-strong level:

The second formula for market efficiency, according to Fama, is the average formula, or the semi-strong formula. According to this formula, security prices reflect "all available relevant public information, as well as historical information, which this information may be in the form of financial or accounting statements, or information related to the market and the economy in a way. In general, if the market is efficient according to the average formula, then investors are unable to achieve extraordinary profits based on strategies based on information available to everyone and therefore fundamental analysis, like technical analysis, is useless. (Bodie et al., 2008).

Studies that tested the average formula of market efficiency can be divided into two groups. The first includes studies that relied on predicting future returns based on general information as well as historical information, while the second includes event studies, which are conducted through tests of the speed of stock price response to any new important events, such as the announcement of a... A merger, acquisition, or distribution of profits, and finding out whether there is a possibility of achieving extraordinary returns immediately after announcing these events. (Brown and Reilly, 2009)

C- Market efficiency at the strong level:

Fama "called the third characteristic of market efficiency the strong" formula. This formula means that, current prices immediately reflect all available information, including public and private. That is, an efficient market, according to this formula, has stock prices that reflect all current historical information as well as private information that only a few know. People such as members of the board of directors and those within the company, and therefore no one can follow any strategy to achieve extraordinary profits in the market. (Levy and Post, 2005)

The third topic:

Studying the efficiency of the Iraqi Stock Exchange, at the weak level, according to the run test method, by describing and analyzing data and testing hypotheses.

First: describe and analyze the data

The research data to be described and analyzed was as follows:

First: monthly closing prices

Regarding the study sample of industrial companies, the research sample for the year 2021, represented by the monthly closing prices, was as follows:

Al-Mansour Pharmaceutical Industries Company reached its highest monthly closing price in July (2,920) dinars, while the lowest closing price during January was (1,450) dinars.

While the Iraqi Carpet and Furniture Company reached its highest monthly closing price in April (17,250) dinars, while the lowest closing price during January was (10,600) dinars.

The Chemical and Plastic Industries Company achieved its highest monthly closing price in June (2,670) dinars, while the lowest closing price in November was (2,350) dinars.

Al-Kindi Veterinary Vaccines Company reached its highest monthly closing price in April (1,910) dinars, while its lowest closing price during November was (1,390) dinars.

The ready-made clothing production company reached its highest monthly closing price in the month of November (14,060) dinars, while the lowest closing price during the month of April was (9,300) dinars.

As for the industrial sector, for the year 2022, Al-Mansour Pharmaceutical Industries achieved the highest monthly closing price in January (2,780) dinars, while the lowest closing price was in August (1,340) dinars.

The Iraqi Carpet and Furniture Company reached its highest monthly closing price in July (16,800) dinars, while the lowest closing price during January was (14,500) dinars.

The Chemical and Plastic Industries Company reached its highest monthly closing price in April.

(2,550) dinars, while the lowest closing price during the months of November and December was (1,910) dinars.

Al-Kindi Veterinary Vaccines Company reached its highest monthly closing price in February (1,650) dinars, while the lowest closing price during August, September, November and December was (1,400) dinars.

The ready-made clothing production company reached its highest monthly closing price in January, February and March (13,000) dinars, while the lowest closing price during October was (4,890) dinars.

From the above, the company that achieved, the highest monthly closing price. in the year 2022 among all companies, is the Iraqi Carpet and Furnishing Company, which reached (16,800) dinars.

The company that obtained the lowest, monthly closing price in 2022 was, Ashur Bank, reaching (0.110) dinars.

The variation in the monthly, closing prices of the banks and industrial. companies in the research sample is noted, as a result of the disturbance in transactions. in those corporate banks ,due to the unstable conditions that. the country is witnessing.

Second: Earnings per share

To calculate the monthly return, for the research sample of (5) companies ,for a period of two years, by calculating the return monthly.

As for the industrial sector, for the year 2021, Al-Mansour Pharmaceutical. Industries achieved the highest. monthly earnings per share ,in April (0.3833) dinars, while the lowest monthly, earnings per share during the month ,of May was (0.1165) dinars.

While the Iraqi Carpet. and Furniture Company reached its highest ,monthly share return ,in April (0.4375) dinars, while the lowest monthly share return ,during December was (-0.0625) dinars.

The Chemical and Plastic, Industries Company reached its highest, monthly earnings per share, in January (0.1729) dinars, while the lowest monthly earnings. per share during, August was (-0.0551) dinars.

Al Kindi Veterinary Industries, Company reached its highest monthly stock ,return in April (0.2229) dinars, while the lowest ,monthly stock return in May, was (0.1667) dinars.

The ready-made clothing, production company reached the. highest monthly earnings per share, in the month of November (0.2226) dinars, while the lowest monthly ,earnings per share during the month, of October was (0.1516) dinars.

As for the industrial sector for the year 2022, Al-Mansour Pharmaceutical Industries achieved the highest ,monthly earnings per share in the month ,of October (0.2899) dinars, while the lowest monthly earnings per share during the month of July was (0.3440) dinars.

While the Iraqi Carpet and Furniture. Company reached its highest monthly, earnings per share in the month ,of March (0.0621) dinars, while, the lowest monthly earnings per share, during the month of August was (0.0595) dinars.

The Chemical and Plastic ,Industries Company reached its highest. monthly earnings per share, in April (0.0851) dinars, while the lowest monthly .earnings per share, during August was (0.0977) dinars.

Al-Kindi Veterinary Industries Company, reached its highest monthly share .return in October (0.0714) dinars, while the lowest monthly share return during August and November was (-0.0667) dinars.

The ready-made clothing production, company reached its highest monthly. earnings per share, in November (0.0675) dinars, while the lowest monthly. earnings per share, during June was (-0.2996) dinars.

The disparity is noted in the, monthly returns of the banks and industrial. companies in the research ,sample as a result of the disturbance in transactions ,in those companies due, to the unstable conditions, that the country is witnessing.

Industrial sector:

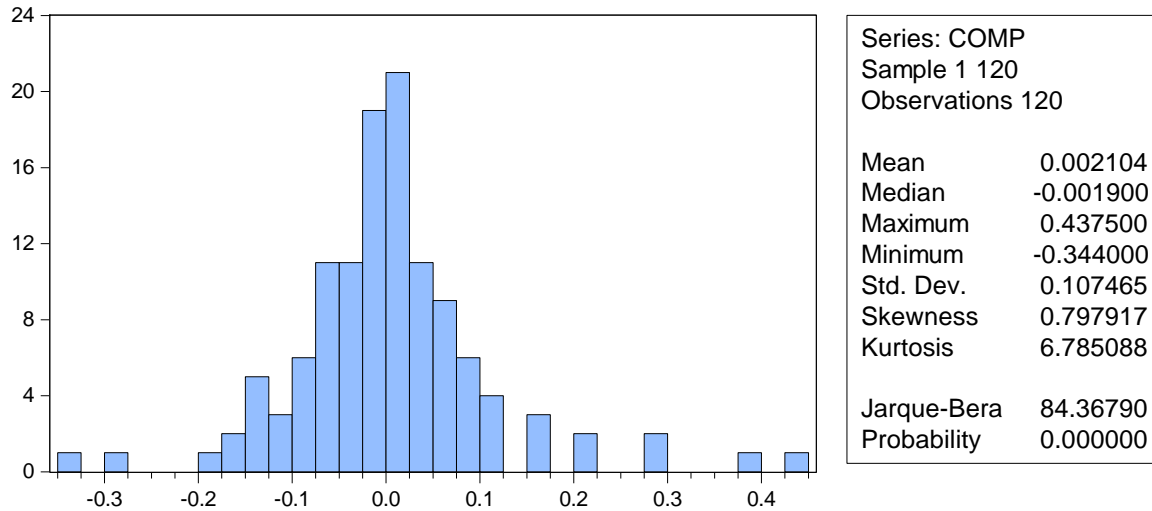


Figure (17) Descriptive statistics of returns data for industry sector

Source: Prepared by the researcher based on the results of the Eviews9 program

The above results indicate that the skewness value reached 0.79, which is a positive value that indicates the distribution is skewed to the right. The average returns were 0.002104 with a standard deviation of 0.107465.

The value of the Jarque-Bera test statistic, which amounted to 84.36790, also indicates that the data does not follow a normal distribution, and from this we conclude that the series of monthly returns for this sector is not random.

Table No. (17) shows

Signal test results for monthly returns series

Runs Test	
	comp1
Test Value ^a	.002104
Cases < Test Value	71
Cases >= Test Value	49
Total Cases	120
Number of Runs	51
Z	-1.515
Asymp. Sig. (2-tailed)	.130
a. Mean	

Source: Prepared by the researcher based on the results of the Eviews9 program

The results of the above table indicate acceptance of the hypothesis that the series of monthly returns is random. This means that returns move randomly and that the market is efficient at the weak level.

Section Four: Conclusions and recommendations

Conclusions:

Based on the results obtained, the following conclusions can be formulated:

- 1- Through the results, the study concluded that the Iraqi Stock Exchange can be considered efficient at the weak level, and through the practical aspect of the study, the Iraqi Stock Exchange is efficient at the weak level, using the run test method.
- 2- It became clear that stock prices are characterized by independence, and randomness, and that prices cannot be predicted, based on historical information.
- 3- Stock prices follow random walk, which means rejecting the null hypothesis, and accepting the alternative hypothesis, represented by the efficiency of the Iraqi stock market according to the research hypothesis.
- 4- According to the method of emergent patterns (signals) (Runs test), stock returns in the Iraqi Stock Exchange are independent, that is, they follow random behavior, and there is no possibility of achieving unusual returns by investors.

5- The study concluded that ,the Iraqi stock market, at the weak level, is efficient in both the banking, and industrial sectors and within every. bank and company ,that was researched.

Recommendations:

According to the study's conclusions, the following recommendations can, be made:

1. Supervisors of the Iraqi Stock ,Exchange must provide information to all. investors and communicate, it to them, to improve the efficiency of the financial market, and limit the ability of some investors, to obtain unusual returns.

2-Work to improve the economic ,and investment environment and develop, laws that contribute to attracting ,investors and allocating resources effectively.

-3Factors that activate the, market and their importance, such as full disclosure, obligating listed companies. to issue periodic bulletins, enabling investors, to know all information about the status, of companies and correct. stock prices, and that the market is characterized, by respecting the principle of, transparency and providing the necessary ,data to investors and researchers, to improve the performance, of the financial market.

4-The importance of financial analysis, to improve the performance of companies. to clarify the role of information ,related to stock price fluctuations. and their impact on their ,value in the financial market.

-5Through the results of this study, it will help the Securities ,Commission increase, the degree of efficiency of the ,Iraqi financial market.

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