

Testing the Weak-Form Efficiency of the Palestinian Securities Market

Ibrahim Awad

*Economic Department, Alquds University of Jerusalem
East Jerusalem, Palestine*

E-mail: iawad@econ.alquds.edu

Tel: 0049 (0) 17668341224; Fax: 00972 (0) 29724997

Zahran Daraghma

*Accounting Department, Alquds University of Jerusalem
East Jerusalem, Palestine*

E-mail: zdaraghma@econ.alquds.edu

Tel: 009725990910; Fax: 0097229724997

Abstract

This paper examines the efficiency of the Palestine Security Exchange (PSE) at the weak-level for 35 stocks listed in the market by using daily observations of the PSE indices: Alquds index, general index, and sector indices. Parametric and nonparametric tests for examining the randomness of the PSE stock prices were utilized. The parametric tests include serialcorrelation test, and Augmented Dickey-Fuller (ADF) unit root tests. The nonparametric tests include runs test, and Phillips-Peron (PP) unit root test. The study utilized nonparametric tests for investigating the efficiency of the PSE at the weak level, especially, the results of Jarque-Bera test for normality showed that the daily returns of the PSE are not normally distributed. The serial correlation tests and the runs tests both revealed that the daily returns are inefficient at the weak-form. Also, the unit root tests (Augmented Dickey-Fuller (ADF) unit root test and Phillips-Peron (PP) unit root test) suggest the weak-form inefficiency in the return series. However, the PSE is inefficient at the weak level; as a result, this is likely to be an evidence that the prudent investor who deals with the PSE will achieve abnormal returns using historical data of stock prices, and trading volume.

Keywords: Palestine Security Exchange, Weak-Form Efficient Market Hypotheses, Serial Correlation Test, Runs Test, Unit Root Tests, Alquds Index.

1. Introduction

In Palestine, the Palestine Securities Exchange (PSE) market was established since 1997. Empirical studies that based on the trading data of the PSE market are very rare or non-existent in Palestine.

After one decade of trading, there is a potential to put into practice an empirical examination from Palestine regarding the behaviors and dynamics of stocks prices. One of the critical issues in Palestine is the efficiency of PSE, so that the process of indicating the efficiency is an essential element for serving the investors and policymakers. Therefore, central to Palestinian investors and

policymakers are dealing with Palestinian emerging equity market to knowledge the existence and availability of efficiency at the weak level, that is, to deal with incorporated information in a correct manner and more efficiently. Also, stock market efficiency is an important concept for understanding the working of the capital market.

Samuelson (1965) and Fama (1970) indicates that the Efficient Market Hypothesis (EMH) supposes that share price adjust rapidly to the appearance of new information, and thus, current prices fully reflect all available information and should follow a random walk process, which means successive stock price changes (returns) are independently and identically distributed (IID). Based on the information set (Fama, 1970) broken-down the market efficiency into three levels. First, the weak-form EMH, which reveals the current stock prices fully reflect all historical market information such as: (prices, trading volumes, and any market oriented information). Second, the semi strong-form EMH, which refers to the prices fully reflect not only the historical information but also all public information together with non-market information such as: (earning and dividend announcements, and economic and political news). Third, the strong-form EMH contends that stock prices reflects all information from historical, public, and private sources, so that no one investor can realize abnormal rate of return.

The abovementioned explanation showed that the PSE is emerging market, but this market has no evidence about the efficiency of PSE at the weak level. As a result, this study aims at testing the weak-form of the EMH by applying parametric and nonparametric tests of Random Walk Model (RWM) that will provide clear evidence about the efficiency at the weak level. The study findings are expected to serve the investors for gaining profit, providing an evidence to be added for international evidences, and will enable the PSE to improve the level of efficiency.

This study is, however, organized in six sections as follows: Section 2 addresses the previous research; Section 3 describes the Palestine security exchange; section 4 addresses the hypothesis; Section 5 presents the data and research method; and Section 6 reports the results of hypothesis testing (data description, the results, and conclusion).

2. Previous Research

This section is to show some prior studies that tested the weak form efficiency in both, the developed and undeveloped markets. Methodologically, the influential efforts in this field were introduced by (Samuelson, 1965) who developed the theoretical framework of the Random RWM that used to test the efficiency of capital market at the weak-level. Since, the RWM supposes that successive price changes are independent and identically distributed random variables, so that future price changes cannot be forecasted from historical price changes. Thus, the RWM has testable implications for the weak-form EMH. Additionally, the seminal work of (Fama, 1970) reviewed the theoretical and empirical literatures on EMH to that date and shaped the start point for studying the efficiency of capital markets and enhancing the role of RWM for testing the efficiency at the weak-level. However, many statistical tests for random walks have been used in the literatures. For instance, the runs test was used by Fama (1965), Sharma and Kennedy (1977), Cooper (1982), Chiat and Finn (1983), Wong and Kwong (1984), Yalawar (1988), Ko and Lee (1991), Butler and Malaikah (1992), Thomas (1995), Abraham, (2002), Worthington and Higgs, (2006), Squalli, (2006), Karemera et al., (2008). Also, the serial correlation test of returns has also been used extensively Kendall (1953), and Fama (1965), Fama and French (1988), Worthington and Higgs, (2006), Squalli, (2006). And the unit root test used by David and MacKinlay (1988), Worthington and Higgs, (2006). In this study we use all tests that mentioned above (Run test, serial correlation, and unit root tests) to enhance the findings of this study.

With this regard, the findings of empirical works in the developed markets generally have similar conclusions that support the weak-form efficiency because of a low degree of dependence in the time series of return. For instance, the studies of (Working, 1934; Kendall, 1953; Cootner, 1962; Osborne, 1962; Fama, 1965; Fama and Blume, 1966; Sharpe, 1966; and Williamson 1972) supported the assumption that price changes are random and past changes weren't useful in predicting future

price changes in the U.S.A. In addition, the researchers arrived at the same conclusion in U.K Hudson, Dempsey and Keasey, 1994; Evans, 2006; Sung and Johnson, 2006. Similarly, Nicolaas, (1997) showed that the degree of predictability of returns is not so high in Australian market. Hawawini and Michel, (1984) reviews 280 studies covering 40 western European countries and concludes that the behavior of stock prices in these markets followed random walk. In general, the empirical studies on developed markets show no profitability from using past records of price series and these studies supported the weak-form efficiency of the EMH.

In contrast, the findings of the weak-form efficiency on the market of developing and less developed markets (an emerging) are likely to be controversial issues. Most of the less developed market suffers from the problem of thin trading. In addition, in smaller markets, it is easier for big dealers to control the market. However, it is generally believe that the emerging markets are less efficient. Researchers have focused on whether these markets are informationally efficient or not. For example, Barnes (1986) shows that the Kuala Lumpur stock market is inefficient. Panas (1990) showed that the Greek market is an efficient at the weak level. Butler and Malaikah (1992) examined the efficiency at the weak level of Kuwaiti and Saudi Arabian stock markets. They find that the Saudi stock market is an inefficient, whereas the Kuwaiti Stock Market is an efficient at weak level. Dickinson and Muragu (1994) found the Nairobi stock market is efficient. Campbell (1995) examined 20 emerging market in Latin America, Asia, Middle East, Europe, and Africa. He found that returns in these markets are more predictable than returns in developed markets. El-Erian and Kumar (1995) used indices of prices for the stock markets of Turkey and Jordan using the serial correlation and run tests, they found both markets to be inefficient. Urrutia (1995) uses the variance ratio test and rejects the RWH for the Latin American emerging equity markets of Argentina, Brazil, Chile and Mexico, whereas the runs test indicates weak for efficiency. Antoniou, Ergul, and Holmes (1997) study the Istanbul Stock Exchange and find it to be inefficient in the early times and efficiency improves as the country starts liberalization and deregulation.

Ojah and Karemera (1999) find that the Latin American equity returns follow a random walk and are generally weak-form efficient. Grieb and Reyes (1999) examine the RWH of equity markets of Brazil and Mexico and conclude that Mexico and Brazil a RWH. Abraham et al (2002) test the RWH for three Gulf equity markets; Saudi Arabia, Kuwait, and Bahrain. They find that the RWH and weak form efficiency are rejected for the Gulf markets. Omran and Farrar (2006) test the validity of the RWH in five Middle Eastern emerging markets, Jordan, Morocco, Egypt, Israel, and Turkey. Their results reject the RWH for all markets. (Worthington and Higgs, 2006) examines the weak-form market efficiency of twenty-seven emerging markets. Three markets in Africa (Egypt, Morocco and South Africa), ten in Asia (China, India, Indonesia, Korea, Malaysia, Pakistan, the Philippines, Sri Lanka, Taiwan and Thailand), four in Europe (Czech Republic, Hungary, Poland and Russia), seven in Latin America (Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela) and three in the Middle East (Israel, Jordan and Turkey). Daily market returns are tested for random walks using serial correlation coefficient and runs tests, Augmented Dickey-Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski, Phillips, Schmidt and Shin (KPSS) unit root tests. The serial correlation and runs tests conclude that most emerging markets are weak-form inefficient. However, the outcomes from the most stringent multiple variance ratio tests are in general consistent with the serial correlation and runs tests.

As aforesaid, the analyses of the previous literatures reveal that the developed markets are generally weak-form efficient, whilst the consequences of empirical studies in emerging market have given mix results about the efficiency. Moreover, the review of prior empirical evidences addressed some research question: Is the PSE stock market as an emerging market weak-form efficient or not?. For this reason this study comes to answer this important question relying on strong methodology, taking variety of statistical techniques into consideration.

3. Palestine Security Exchange

A number of the Palestinian private sector pioneers appreciated the importance of constructing a well-regulated and up-to-date market for securities in the Palestinian territories to attract capital into the business community through long-term financing of commercial, industrial, service, financial, and infrastructure corporations. In July, 1995, the Palestinian National Authority (PNA) selected the Palestine Development and Investment Company (PADICO) for designing a plan and project team to establish Palestinian bourse. As a result, the project team founded a fully electronic exchange system in cooperation with a Canadian company that provided both the trading, settlement and clearing systems. Therefore, on 7th November 1996, these ideas have been materialized into an agreement signed by the private sector with the PNA to operate the PSE as a private shareholding company. Also, this agreement allows licensing and qualification of brokerage firms to take its place in the Palestinian investment environment.

On 18th, February 1997, the PSE held its first trading session as the initial fully automated and electronic stock exchange. Furthermore, it's necessary to know that PSE maintained sustained growth in terms of the number of listed companies, market value, number of sessions and trading volumes. Table 1 presents some indicators for PSE from 1998 to 2007. Also, An analysis of the PSE's current 35 firm by sector shows a relatively large amount of diversity 22.22% provide services, 16.67% are in banking, 27.77% are in industry, 11.11% in insurance and 22.22% are investment companies. Moreover, PSE as a self-regulating organization, the exchange is charged with enforcing its rules and regulations covering such matters as listing requirements, secondary trading, disclosure requirement, settlement and clearing as well as the conduct and operations of member securities firm. In order to attract foreign investment in Palestine, PSE does not impose any restrictions on foreign investment. Although the Palestinian exchange is ten years old, there is still no Palestinian stock market culture. Some of the companies are family-owned, and the families are still afraid of losing control (Coren, 2007).

Table 1: Market indicators for Palestinian Securities Exchange

Year\ Market Indicators	Number of Listed Companies	Shares Traded (Millions Shares)	Value Traded (Millions \$)	Market Value (Millions \$)	Al-Quds Index at the End of Year
1997	19	1.00	25.16	529.06	139.13
1998	20	16.78	\$68.64	587.88	154.98
1999	21	68.89	150.24	848.93	236.76
2000	24	93.35	188.98	766.02	207.62
2001	24	33.46	74.53	722.63	195.00
2002	24	18.67	45.09	576.60	151.10
2003	24	40.35	58.33	650.47	197.81
2004	26	103.64	200.56	1096.53	277.56
2005	28	369.57	2096.18	4457.23	1128.59
2006	33	222.69	1067.37	2728.11	605.00
2007	35	299.42	813.47	2474.68	527.26

3.1. The Indices of PSE

PSE is reporting five types of indices, those include: Alquds index, general index, and Sectors indices that include five sub-indices which are banking index, Investments index, Industry index, Services index, and Insurance index. Additional clarification and information about these indices presented below:

3.1.1. Al-Quds index considers as the main index of PSE

On 8th, July 1997, Alquds index included ten selected firms, were based on the representing the whole of the abovementioned sectors. These selected companies were the most liquidity in the PSE. Therefore, in 2007 the PSE has increased the number of firms in Al-Quds index to 12 firms; this decision was taken to reflect the increase in the listed companies at PSE (35 company at the end of

2007). The base date for Al-Quds index is 8th, July 1997 equals 100 point. Mathematically, Al-Quds Index is calculated by using the market-value weighted method. However, the following table shows the firms that included in Al-Quds index for 2007.

Table 2: Corporations included in Al-Quds index.

Sector	#	Name	Market Code
Service	1.	Palestine Telecommunications	PALTEL
	2.	Palestine Electric Company	PEC
Investment	3.	Palestine Development and Investment	PADICO
	4.	The Palestine Real Estate Investment	PRICO
	5.	Palestine Industrial Investment company	PIIC
Insurance	6.	Ahliea Insurance Group	AIG
	7.	National Insurance Company	NIC*
Banking	8.	Arab Islamic Bank	AIB
	9.	Bank of Palestine	BOP
Industry	10.	Birzeit Pharmaceuticals	BPC
	11.	Jerusalem Cigarette	JCC
	12.	Golden Wheat Mills	GMC *

* Symbols added at 2007

3.1.2. The General Index

The base date for the general index is January, 2003 equals 100 point. Additionally, this index consists of all the firms that listed in the PSE which are 35 companies till the end of 2007. The general index is calculated by using the same formula of Alquds index.

3.1.3. Sectors Indices

It includes five sub-indices which are:

3.1.3.1. Banking Sector Index

The base date for the Banking Sector Index is January, 2006 equals 100 point. Moreover, Banking Sector Index consists of 6 firms. These firms represent the banks in the PSE. Table 3 shows the firms included in Banking Sector Index.

Table 3: Firms included in the banking index.

#	Name	Market Code
1.	Arab Islamic Bank	AIB
2.	Al Rafah Microfinance Bank	AMB
3.	Bank of Palestine	BOP
4.	Commercial Bank of Palestine	CBP
5.	Palestine Investment Bank	PIBC
6.	Al-Quds Bank for Development and Investment	QUDS

3.1.3.2. Insurance Sector Index

The base date for the insurance index is January, 2006 equals 100 point. Therefore, Insurance Sector Index consists of 4 firms. These firms represent the insurance firms in the PSE. Table 4 shows the firms included in Insurance Sector Index.

Table 4: Firms included in the insurance index.

#	Name	Market Code
1.	Arab Insurance Establishment	AIE
2.	Ahliea Insurance Group	AIG
3.	AL-Mashreq Insurance Company	MIC
4.	National Insurance Company	NIC

3.1.3.3. Services Sector Index Consists of 8 Firms

These firms represent the service companies that listed in the PSE. The base date for Services Sector Index is January, 2006 equals 100 point. Table 5 shows the firms included in Services Sector Index.

Table 5: Service firms included in the banking index.

#	Name	Market Code
1.	The Arab Hotels Company	ACH
2.	Arab Real Estate Establishment	ARE
3.	Grand Park Hotel and Resorts	HOTEL
4.	Palestine Telecommunications	PALTEL
5.	Palestine Electric Company	PEC
6.	Arab Palestinian Shopping Centers	PLAZA
7.	The Palestinian Company for Distribution and Logistics Services	WASSEL
8.	Nablus Surgical Center	NSC

3.1.3.4. Industry Sector Index consists of 10 symbols

These symbols represent the industrial symbols in the market. The base date for the industry index is January, 2006 is equal \$100. Table 6 shows the firms included in Industry Sector Index.

Table 6: Industry firms included in the banking index.

#	Name	Market Code
1.	Arab Concrete Products	ACPC
2.	Arab for Paints Products	APC
3.	Palestine Poultry	AZIZA
4.	Birzeit Pharmaceuticals	BPC
5.	Golden Wheat Mills	GMC
6.	Jerusalem Cigarette	JCC
7.	Jerusalem Pharmaceutical	JPH
8.	Palestine Plastic Industrial	LADAEN
9.	The National Carton Industry	NCI
10.	Vegetable Oil Industries	VOIC

3.1.3.5. Investments Index Consists of 8 Firms

These firms represent the investment firms in the PSE. The base date for the investment index is January, 2006 equals 100 point. Table 7 shows the firms included in Investments index.

Table 7: Investment firms included in the banking index.

#	Name	Market Code
1.	Arab Investors	ARAB
2.	Al-I'Timan for Investment and Development	IID
3.	Palestine Development and Investment	PADICO
4.	Palestine Investment and Development	PID
5.	Jerusalem Real Estate Investment	JERI
6.	Union Construction and Investment	UCI
7.	Palestine Industrial Investment company	PIIC
8.	The Palestine Real Estate Investment	PRICO

4. Hypothesis

The purpose of this study is to examine the efficiency of the PSE at the weak-level. The null hypothesis states that the PSE stock market will be efficient at the weak-form when the Random Walk Model (RWM) shows that the prices of the stocks traded in the PSE are independent.

The null and alternative hypothesis:

H0: The stock returns in PSE are random over the time period of the study.

H1: The stock returns in PSE are not random over the time period of the study.

5. Data and Research Method

The data used in this study is consisted of daily indices time series for the PSE from 1st of January, 01, 1998 to the end of October, 2008. Additionally, all of the daily indices (Al-Quds Index, the general index, and sectors indices) were extracted from electronic database of PSE. Mathematically, the natural logarithm of the relative price was computed for the daily returns to produce a time series of continuously compounded returns, such that $R_t = \text{Log} (P_t/P_{t-1}) * 100$ where P_t and P_{t-1} represent the stock index price at time t and $t-1$. In this paper, we followed previous empirical work and employed the most familiar econometrics methods that used in the literatures to test the independence of prices data. The study however used parametric and non-parametric methods to test the random walk hypothesis (RWH) through employing three different procedures run test, autocorrelation test, and unit root tests). More explanation presented below:

5.1. The autocorrelation is a parametric test for serial dependence in the returns which requires the availability of normal distribution criteria in the data

Additionally, this test measures the association between two elements of returns time series separated by a fixed number of time periods. The econometricians are implementing n order autocorrelation, where $n=1, 2, \dots, n_i$. Statistically, the absences of statistical significance in autocorrelations test imply that the series are assumed to follow a random walk which means that the market is efficient at weak-level. The null hypothesis is that the autocorrelation coefficients are equal to zero (the market is efficient) whereas the alternative is that they deviate from zero (the market is inefficient).

5.2. Runs approach is nonparametric test for serial dependence (randomness of the series) in the returns that doesn't require the availability of normal distribution criteria in the data

Additionally, the null hypothesis of the runs test is that the observed series is a random series. In addition, this test is a strong tool for investigating serial dependence in share price movements and compares the expected number of runs from a random process with the observed number of runs. The runs test examines whether the value of one observation influences the values taken by later observations. If there is no influence (the observations are independent).

5.3. Unit root tests have different ways that used to test the null hypothesis of a unit root

Also, are used to test for non-stationarity as a necessary condition for random walks. In this study we employed two unit root tests: the Augmented Dickey-Fuller (ADF) unit root test (1979) parametric, and Phillips-Peron (PP) unit root test (1988), nonparametric.

Table 8: Summary statistics of Palestine security exchange daily index returns for the Alquds index, general index, banking index, industry index, service index, investment index, and insurance index.

Daily returns are computed as $R_t = \text{LOG} \frac{(P_t)}{(P_{t-1})} * 100$

	Alquds Index	General Index	Banking Index	Industry Index	Service Index	Investment Index	Insurance Index
Period	From Jan., 01, 1998 to Oct., 30, 2008	From Jan., 01, 2003 to Oct., 30, 2008	From Jan., 01, 2006 to Oct., 30, 2008	From Jan., 01, 2006 to Oct., 30, 2008	From Jan., 01, 2006 to Oct., 30, 2008	From Jan., 01, 2006 to Oct., 30, 2008	From Jan., 01, 2006 to Oct., 30, 2008
Mean	0.027369	0.031513	0.012776	-0.029730	-0.033869	-0.076261	0.036636
Median	-0.01254	-0.011578	-0.034321	-0.047482	-0.079179	-0.123350	0.000000
Maximum	7.963257	14.02859	1.928447	2.874021	9.321017	2.115885	2.100295
Minimum	-4.95365	-11.86162	2.033096	-1.909375	-9.092592	-2.218633	2.103336
Std. Dev.	0.757953	0.856327	0.638756	0.539002	1.015272	0.978316	0.642768
Skewness	0.499417	1.341769	0.110870	0.411222	0.235491	0.081649	0.043632
Kurtosis	9.742933	80.35085	3.594633	5.037355	21.58856	2.761455	3.546663
Jarque - Bera Probability	4121.816	352182.9	11.56248	138.5818	9926.088	21.399157	8.797816
Observations*	2129	1411	689	689	689	689	689

Number of observations differs because indices were established in different dates.

Table 9: Serial correlation for daily index returns for the Alquds index, general index, banking index, industry index, service index, investment index, and insurance index

	Autocorrelation (one lag)			Autocorrelation (two lags)			Autocorrelation (three lags)		
	Coefficient	Q-Stat	P-value	Coefficient	Q-Stat	P-value	Coefficient	Q-Stat	P-value
Alquds Index	0.274	160.47	0.0000	0.063	168.95	0.0000	-0.018	169.68	0.0000
General Index	0.195	53.84	0.0000	-0.115	72.613	0.0000	-0.03	73.889	0.0000
Banking Index	0.296	60.474	0.0000	0.105	68.136	0.0000	-0.028	68.683	0.0000
Industry Index	0.150	15.527	0.0000	-0.013	15.638	0.0000	-0.094	21.715	0.0000
Service Index	0.155	16.729	0.0000	-0.02	17.012	0.0000	-0.177	38.862	0.0000
Investment Index	0.239	39.477	0.0000	-0.011	39.559	0.0000	-0.038	40.543	0.0000
Insurance Index	0.078	4.2121	0.0400	0.015	4.3594	0.013	0.065	5.7739	0.023

Table 10: Runs test for daily index returns for the Alquds index, general index, banking index, industry index, service index, investment index, and insurance index

	Test Value	Cases < Test Value	Cases >= Test Value	Total Cases	# of Runs	Z - Statistic	P-value
Alquds Index	-0.012536	1064	1065	2129	908	-6.830	0.0000
General Index	0.011577	705	706	1411	603	-5.513	0.0000
Banking Index	-0.0343	344	345	689	298	-3.622	0.0000
Industry Index	-0.0475	344	345	689	333	-4.953	0.0000
Service Index	-0.0792	344	345	689	304	-3.164	0.0021
Investment Index	-0.1234	344	345	689	319	-3.021	0.0020
Insurance Index	-0.0000	344	345	689	334	-4.832	0.0000

6. The Results of Hypothesis Testing

In this section of paper we present data description, the study results, and the conclusion.

6.1. Data Description

Daily data from the Palestine security exchange (PSE) was used in this paper. The sample extends from January, 01, 1998 to October, 30, 2008, for a total of 2129 observations related to Alquds index. And the daily data of the general index was used from January, 01, 2003 to October, 30, 2008, for a total of 1411 observations. Furthermore, the daily data of sector indices (banking, industry, service, investment, and insurance) are used in the analysis to support the results. The daily data of sector indices are used from January, 01, 2006 to October, 30, 2008, for a total of 689 observations for each sector as shows in table 8. The stock return, R_t is calculated by using the relative logarithm of the daily prices, $R_t = \text{Log} (P_t/P_{t-1}) * 100$. Whereas, P_t , denotes the level of the stock market price index at the day t , P_{t-1} , denotes the level of the stock market price index at the day $t-1$.

Table 8 reports the summary statistics of the stock return series used in the study. The results in the table provide considerable evidence of departures from normality in daily returns based on the results of Jarque-Bera test. The level of normality leads to using parametric and nonparametric tests. In this paper nonparametric tests are more efficient than parametric tests for drawing the conclusion about the efficiency of PSE at weak level. The return mean for Alquds index, general index, banking index, and insurance index is positive. In otherwise the return mean for industry index, service index, and investment index is negative.

Table 11: Unit root test for daily index returns for the Alquds index, general index, banking index, industry index, service index, investment index, and insurance index

	Augmented Dickey-Fuller (ADF) test		Phillips-Peron (PP) test	
	T-Stat	P-value	T-Stat	P-value
Alquds Index	-34.79046	0.0000	-34.5722	0.0000
General Index	-27.9418	0.0000	-30.25436	0.0000
Banking Index	-19.29292	0.0000	-18.74014	0.0000
Industry Index	-22.51785	0.0000	-22.25807	0.0000
Service Index	-17.48722	0.0000	-22.11477	0.0000
Investment Index	-20.57050	0.0000	-20.13753	0.0000
Insurance Index	-24.27818	0.0000	-24.42902	0.0000

6.2. The Results

Table 9 presents test of independence (autocorrelation test) using 1, 2, 3 lags. The alternative hypothesis of there is autocorrelation for all indices are accepted at 0.05 or less than. The significance of autocorrelation coefficient reveals that the null hypothesis of weak-form market efficiency is rejected. Then, the PSE is inefficient at the weak-form. As table 10 shows, the results of nonparametric runs tests provide evidence that reject the null hypothesis of weak-form- efficiency. Thus, the results of runs tests are consistent with the results of autocorrelation test. As shown in table 11 the unit root tests (Augmented Dickey-Fuller test (ADF) – parametric test, and Phillips-Peron test (PP) – non-parametric test) conclude that the PSE is inefficient at the weak-level.

All the tests of efficiency at the weak level showed that the stock returns in Palestine are not random over the time period of the study. Also, the stock returns display predictable (or nonrandom walk) behavior.

Although, the parametric and nonparametric tests were drawn the same conclusion which is the PSE is inefficient at the weak level, when the time series data is not normally distributed, the nonparametric tests (runs test and PP unit root test) will be recommended to utilize rather than parametric tests.

6.3. Conclusion

The study is the only study that examines the weak-form market efficiency of the Palestine security exchange for 35 stocks included in the PSE market indices. The returns of the 35 sample stocks do not follow the normal distribution, so the study utilizes parametric and nonparametric tests to check for randomness. Daily returns from January, 01, 1998 to October, 30, 2008 are examined for random walks using serial correlation coefficient and runs tests, Augmented Dickey-Fuller, and Phillips-Perron unit root tests. The serial correlation tests indicate that the PSE is inefficient at the weak-level. Furthermore, the runs tests conclude that the PSE at the weak-form is inefficient. The unit root tests also suggest the weak-form inefficiency in return series.

We propose further studies to test the influences of accounting and general information on the stock returns for all companies listed in the PSE, especially, the PSE lack for such empirical studies.

References

- [1] Abraham Abraham, Fazal J. Seyyed and Sulaiman A. Alsakran, 2002. "Testing the Random Walk Behavior and Efficiency of the Gulf Stock Markets", the financial review 37 (3), PP. 469 – 480.
- [2] Antoniou, Antonios, and Nuray Ergul, 1997. "Market Efficiency, Thin Trading and Non-linear Behavior: Evidence From an Emerging Market", European Financial Management, vol.3, no. 2, PP. 175-190.
- [3] Branes Paul, 1986. "Thin trading and stock market efficiency: A case of the Kuala Lumpur Stock Exchange", Journal of Business Finance & Accounting, volume 13 (4) winter, PP. 609-617.
- [4] Butler, K.C., and Malaikah, S.J., 1992. "Efficiency and inefficiency in thinly traded stock markets: Kuwait and Saudi Arabia", Journal of Banking and Finance, vol. 16, PP. 197-210.
- [5] Chiat HS and Finn FJ, 1983. "Random walks on the stock exchange of Singapore". Accounting and Finance 23, PP. 81–87.
- [6] Cooper J., 1982. "World stock markets: some random walk tests", Applied Economics 14, PP 515–531.
- [7] Cootner, P., 1962. "Stock Prices: Random vs. Systematic Changes", Industrial Management Review, vol. 3, spring, PP. 24-45.
- [8] Coren O., 2007. Who wants to buy shares when bullets are flying. Haaretz online Journal. Sun., May 27, 2007, the article is available on: www.haaretz.com.
- [9] Dickinson and Muragu, 1994. "Market Efficiency in Developing Countries: A case study of the Nairobi Stock Exchange", Journal of Business Finance & Accounting, volume 21(1), PP. 133-150.
- [10] El-Erian, Mohamed, and Manmohan, S. Kumar, 1995. "Emerging Equity Markets in the Middle Eastern Countries", IMF staff papers, IMF, vol. 42, no. 2, PP. 313-343.
- [11] Fama E. and French K., 1989. "Business conditions and expected returns to stocks and bonds". Journal of Financial Economics 25, PP. 23–50.
- [12] Fama, E., 1965. "The Behaviour of Stock Market Prices." Journal of Business 38 (1), PP. 34-105.
- [13] Fama, E., 1970. "Efficient Capital Markets: A Review of Theory and Empirical Work." Journal of Finance 25, PP. 383–417.
- [14] French, K., 1980. "Stock Returns and the Weekend Effect", Journal of Financial Economics 8, PP 55-69.
- [15] Friend I, Blume M and Crockett J., 1970. "Mutual funds and other institutional investors: a new perspective". McGraw-Hill, New York.
- [16] Harvey Campbell R., 1994. "Conditional Asset allocation in Emerging Markets", Working Paper, No.4623, Cambridge, MA.
- [17] Hawawini G. and P. Michel, 1984. "European Equity Markets: A Review of the Evidence on Price Behavior and Efficiency in European Equity Markets: Risk, Return and Efficiency", Garland Publishing Company, New York and London.
- [18] Hudson, Robert. Dempsey, Michael and Keasey, Kevin., 1994. "A note on the weak-form efficiency of capital markets: The application of simple technical trading rules to UK Stock prices-1935 to1994", Journal of Banking & Finance, vol.20, PP. 1121-1132.
- [19] Karemera, David, Ojah, Kalu, and Cole, John A., 1999. "Random Walks and Market Efficiency Tests: Evidence from Emerging Equity Markets, Review of Quantitative Finance & Accounting, Vol. 13, Issue 2, PP. 171-188.
- [20] Kendall, M., 1943. "The advanced Theory of Statistics", Vol.1, London: Griffin.
- [21] Kendall, M. G., 1953. "The analysis of Economic Time-series", Part1, The Journal of the Royal statistical Society 116, PP.11-25.
- [22] Kendall, Maurice, 1953.. "The Analysis of Economic Time Series", Journal of the Royal Statistical Society, Series A, 96, PP. 11-25.

- [23] Ko Kwang- Soo and Lee Sang-Bin, 1991. "A comparative analysis of the Daily Behavior of Stock Returns: Japan, The US and the Asian NICs", *Journal of Business Finance and Accounting*, vol. 18(2), PP. 219-234.
- [24] Nicolaas Groenewold, 1997. "Share market efficiency: Tests using daily data for Australia and New Zealand", *Applied Financial Economics*, vol.7. PP.645-657.
- [25] Omran, M., and Farrar, S., 2006. "Tests of weak form efficiency in the Middle East emerging markets", *Studies in Economics and Finance*, Vol. 23, PP.13-26
- [26] Osborne, M., 1962. "Periodic Structure In the Brownian Motion in the Stock Prices" *Operation Research*, (May/June), PP.345-379.
- [27] Panas, E., 1990. "The Behavior of the Athens stock prices", *Applied Economics* 22, PP. 1715-1727.
- [28] Phillips, P., and P. Perron, 1988. Testing for a unit root in time series regression, *Biometrika* 75, PP. 335-346.
- [29] Ronen, T., 1997. Tests and properties of variance ratios in microstructure studies, *Journal of Financial and Quantitative Analysis* 32, PP. 183-204.
- [30] Samuelson P., 1965. "Proof that properly anticipated prices fluctuate randomly", *Industrial Management Review* 6, PP 41–50.
- [31] Sharma, J. and Kennedy, Robert. E., 1977. "A Comparative analysis of stock price behavior on the Bombay, London and New York Stock Exchanges", *Journal of Financial and Quantitative Analysis*, September, PP.391-413.
- [32] Sharpe W., 1966. "Mutual fund performance". *Journal of Business* 39, PP. 119-138.
- [33] Squalli, Jay., 2006. "A non-parametric assessment of weak-form efficiency in the UAE financial markets", *Applied Financial Economics*, Vol. 16 Issue 18, PP. 1365-1373.
- [34] Sung, M. and Johnson, J., 2006. "A new perspective on weak form efficiency: empirical evidence from the UK bookmaker based betting market. In, *The 13th International Conference on Gambling & Risk Taking*, Nevada, USA, 22-26, May, 2006.
- [35] Grieb T. and Reyes M., 1999. "Random walk tests for Latin American equity indexes and individual firms, *Journal of Financial Research*, vol. 22, number 4, PP. 371–383.
- [36] Thomas S., 1995. "an empirical characterization of the Bombay stock exchange. Center for Monitoring Indian Economy, University of Southern California, California.
- [37] Twm Evans, 2006. "Efficiency tests of the UK financial futures markets and the impact of electronic trading systems, *Applied Financial Economics*, Volume 16, issue 17. PP. 1273-1283
- [38] Urrutia, J, 1995, "Tests of random walk and market efficiency", *Journal of Financial Research*, vol. 18, PP. 299-309.
- [39] Williamson J., 1972. "Measuring mutual fund performance". *Financial Analysts Journal*. November/December.
- [40] Wong K., and Kwong K, 1984, "The behaviour of Hong Kong stock prices" *Applied Economics* 16, PP. 905–917.
- [41] Working, H., 1934. "A random-Difference Series for the use in the Analysis of Time series," *Journal of the American Statistics Association* 29, (March) PP.11-24.
- [42] Working, Holbrook, 1960. "Note on the Correlation of First Differences of Averages in a Random Chain". *Econometrica*, 28, PP. 916-918.
- [43] Worthington, Andrew C., and Higgs, Helen, 2006. "Evaluating financial development in emerging capital markets with efficiency benchmarks", *Journal of Economic Development*, Vol. 31, Issue 1, PP. 17-44.
- [44] Yalawar Y., 1988. "Bombay stock exchange: rates of return and efficiency". *Indian Economic Journal* 35, PP. 68–121.