TESTING SEMI-STRONG-FORM EFFICIENCY IN AMMAN STOCK EXCHANGE

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ABSTRACT

This paper empirically investigates the behavior of daily stock return around securities characteristic line model for a sample of 5 most liquidate securities banks listed in the Amman Stock Exchange (ASE), over the years 2013-2017. More specifically, the paper investigates whether daily return follows the random walk theory. Such a finding would be consistent with the overreaction hypothesis, also referred to presenting the securities characteristic line model and study the abnormal returns of regression analysis.

The study indicates that the Amman Stock Exchange is not an efficient market at the semi-strong level, stock prices do not respond to the disclosure information and published financial reports for companies but affected by other factors.

Keywords: semi-strong level, Market efficiency; Random Walk Tests, securities characteristic line; CAPM.

Introduction

The role of the capital market is the allocation of ownership of the economy's capital stock and that's why its created mainly for this reason, and to drive the market to be efficient it supposed to meet objectives of financial reporting by providing investors and creditors with useful information to help them realize what is going around and take decision for make national investment and credit decision. (FASB, 1978)

This definition implies that it is anyone cannot earn the profit above average return by trading in the stock market. This means that as all the new information is already reflected in the current stock prices no investor could be able to outperform the market.

The story for the three efficient capital markets are known for most of readers who know a bit about what Fama’s efficiency level when he tries to classify his theory of capital markets (weak, semi-strong and strong) (Fama, 1991)and he also developed the ways to test them first, test for return predictability instead of weak-form test; second, event studies instead of semi-strong form test; third, test for private information instead of strong-form test. However here the paper will take it in the different explanation by focusing only about the currently available information and its affection on shares price, at the same time what will be the behavior of the shares after the announcement take a place?

The satisfaction of the investors would be related to the share price behavior and that’s what any company management try to focus on this will be a good sign to judge the management. In other
words, a market also can be defined in which prices provide accurate signals for resource allocation: a market could help for making reliable production-investment decision, and investors can choose from different options of securities that represent ownership of firms, on the other hand, these activities under assumption that security prices at any time “fully reflect” all available information.

Hence, new information cannot be used by anyone for earning abnormal returns. (Fama, 1970) A market can reflect all available information is called “efficient”, Semi-strong form efficiency is an aspect of the capital market hypothesis that assumes all public information would be reflected on the current stock exchange, one of good ways to analyze market and make decision if the market is efficient on the semi-strong form or not will be by using a type of regression line which is “Security Characteristic line” (SCL) (Cyrlac & Jeevanand, 2007) by plotting performance of particular security or portfolio against that of the market portfolio at every time period, THE (SCL) is a graph where Y-axis is the excess return on a security over risk free return and the x-axis is the excess return of the market in general.

The slope of the graph will represent the security’s Beta, and Alfa will be the intercept.

The semi-strong EMH states that predictability of movement in share prices is not possible on the basis of publicly available information. On another hand, there is a possibility to differentiate between two types of semi-strong efficiency, first; by using macro data such as inflation, exchange rate, the money stock, and the other based on microdata such as company-specific announcements (any information that company publishes to the investors could affect the decision making.

any given time and in a liquid market, security prices fully reflect all available information. This theory evolved from a 1960s Ph.D. dissertation by U. S. economist Eugene, (Fama, 1970). The theory contends that since markets are efficient and current prices reflect all information, attempts to outperform the market are subject to chance, not skill. The main idea behind this is the Random Walk Theory, where all price changes reflect a random departure from previous prices. Because share prices instantly reflect all available information, then the next day’s prices (t+1) are independent of today’s prices.

(1) And will only reflect tomorrow’s news.

**Literature review**

Different studies have been work on the testing semi-strong form of the EMH throw many ways for example dividend, bonus, stock split, options listing, block trading, right issue, annual earning etc. mainly the paper will focus on critical review of the significant effect of studies by the researchers:

(Al-Khoury & Ajlouni, 2007) studied the behavior of daily stock return volatility around the price limit hit for a sample of 159 securities listed in Amman Stock Exchange (ASE), during 1994, and 1995. The study results indicated that stocks hit experienced its highest level of volatility on the day when stocks-hit reached its upper daily price limits of 5% (day 0) and decreases significantly one day after the hit. Similar results are documented when stock hits reach their lower daily price limits of -5%, however with less magnitude.

(Leuthold & Hartmann, 1979) was studying the semi-strong form test of the efficiency of the Live-Hog future market by employing econometric forecasting model. The study concludes the market (Live-Hog futures market has no performed efficiently. And the presence of objectionable inaccuracies has been observed, thereby supporting the view that live-hog futures market is inefficient.
(Ormos, 2002), tested the empirical data of the efficiency of the Hungarian Capital Market in its semi-strong and strong form. The study focused to examine whether the Hungarian Capital Market was efficient in the semi-strong form. The investigation was based on the capital market data over the period from 1991 to 2000, which was analyzed by employing an event study. The study concluded that a strong form of the efficiency of the capital market does not completely hold true, thereby supporting that Hungarian Capital Market is semi-strong form efficient.

(Hadi, 2006), throw types of Efficient Market Hypothesis. That paper undertook detailed research tested the three types of market efficiency forms. It is observed that accounting-based research generally assumes that the market is efficient in semi-strong form. The sense behind that is the financial reports are considered public information once they have been released in the market. So the paper provided empirical evidence from the Jordanian market, which suggested that the security market reacted with mixed signals on releasing profitability, liquidity and solvency information.

(Yalama & Sibel, 2008) also studied the semi-strong form by investigating Istanbul Stock Exchange Market (ISE-100), foreign Exchange market (FEM) and inter-bank Money Market (IMM) in respect to changes in Currency and Circulation (CIC). The data of daily trading during the period from 1990 – 2008 which was analyzed by employing Toda Yamamoto Causality method. That study concluded that Turkey money market is semi-strong form efficient while the capital market is not, by explaining the relationship between running form CIC to FEM and CIC to IMM, however, there is no causality relationship running from CIC to ISE-100.

(Satyajit & Chhaochharia, 2008) analyzed the impact of the information relating to the announcement of the stock split and bonus issue on stocks listed on the National Stock Exchange (NSE) by employing event study. Both the events, that is stock split and bonus issue reflect significantly positive announcement effect. For bonus issues, the abnormal return was about 1.8% and for stock splits it was about 0.8%. Thereby the study supports the view that the Indian Stock Market is efficient in semi-strong form.

(Pichardo & Bacon, 2009), examined the effect of Lehman Brother’s Bankruptcy on the overall market by taking stock price’s risk-adjusted rate of return for 15 selected brokerage firms. Statistical tests proved that the bankruptcy had a negative impact on stock price’s risk-adjusted rate of return for the 15 firms, which supports the semi-strong market efficiency theory. Even after the event, bankruptcy continued to affect the market. Some of the studies have also been made on the FII’s impact on Indian Capital Market separately i.e; not in the context of a testing semi-strong form of EMH only analyzing the influence of FII’s on Indian Capital Market.

(Vandana, 2003) tested the semi-strong efficiency of the Indian Stock market over the period 1995 to 2000 by employing an event study. The study involved a sample of 145 bonus issues, in order to examine the announcement effects of bonus issues on equity share prices in India. The study concluded that the Indian Stock market was semi-strong form efficient.

(Mishra, 2005) examined the reaction of the stock price to the information content of bonus issues over the period 1998 to 2004. For the purpose of the study samples of 46 stocks listed on the NSE and BSE of India were analyzed by employing event study using 180-day event window. It was found that stocks show abnormal return before eight or nine days of the announcement, thereby supporting the
evidence that the Indian Stock market is efficient in its semi-strong form.

(Iqbal & Mallikarjunappa, 2007) tested market reaction to quarterly earnings announcement of 149 companies listed on the Bombay Stock Exchange for September 2001 by employing both parametric and nonparametric tests. It is observed that during the event window, runs test are not significant at 5% level, which signifies that abnormal returns occur randomly. On the other hand, t-test rejects the existence of abnormal returns on daily basis, which provides an opportunity to beat the market and earn abnormal returns. The study concludes that the Indian stock market is not efficient in semi-strong form.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Market name</th>
<th>Source of Data</th>
<th>Name of the test used</th>
<th>Period of study</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Leuthold &amp; Hartmann, 1979)</td>
<td>live-hog futures market</td>
<td>Econometric model</td>
<td>econometric forecasting model semi-strong form</td>
<td>1964</td>
<td>Inefficient</td>
</tr>
<tr>
<td>(Hadi, 2006)</td>
<td>Jordanian market and Arab Capital markets</td>
<td>semi-strong form</td>
<td>integration techniques</td>
<td>2005-2006</td>
<td>security market reacted with mixed signals on releasing profitability, liquidity and solvency information</td>
</tr>
<tr>
<td>(Yalama &amp; Sibel, 2008)</td>
<td>Istanbul Stock Exchange Market</td>
<td>daily trading</td>
<td>semi-strong form</td>
<td>1990 - 2008</td>
<td>no causality relationship running from CIC to ISE-100</td>
</tr>
<tr>
<td>(Satyajit &amp; Chhaochharia, 2008)</td>
<td>Indian Stock Market</td>
<td>90 stock splits and 82 bonus issues announced by companies listed on the BSE 500</td>
<td>event study</td>
<td>2001-2007</td>
<td>efficient</td>
</tr>
</tbody>
</table>
From the previous researches noticed some similarities and differences, especially from the test used at the same level of efficiency and the same study style but at the same time founded differences in the results. For example, the last two studies about the Indian stock market after using different samples and different tests they conclude different efficiencies, notice also lack of studies for the Jordanian capital market and recommendations for managers, investors, shareholders, and government authorities in making their decisions. From those points, this study gets its importance to spot the light on more specific details at the Jordanian capital market.

**Problem statement**

This study seeks to measure the behavior of stock prices in the Amman Stock Exchange (ASE), which is expected to follow a random walk. The aim of the study is to measure the semi-strong form efficiency in the context of securities characteristic line (SCL) and impact on Jordanian Capital Market which in the recent years has become a key and prominent factor. Since new information is publicly available in an unbiased manner it is not possible to earn an excess return on the basis of that information. The concept of the Efficient Market Hypothesis is a vital aspect of the Efficient Market Theory.

**The objectives of the study**

This paper will present the (SCL) model on the Jordanian capital market, and study the abnormal
returns throw the regression statistics.
The following equation refers to (SCL):
\[ R_{j,t+1} = \alpha_j + \beta_j R_{m,t+1} + \mu_{j,t+1} \]  \hspace{1cm} (1)

- \( R_{j,t+1} \) = the rate of return on security \( j \) for the period for \( t \) to \( t + 1 \);
- \( R_{m,t+1} \) = the corresponding return on a market index \( m \);
- \( \alpha_j \) and \( \beta_j \) = parameters that vary from security to security; and
- \( \mu_{j,t+1} \) = error term.

Risk free rate is incorporated into \( \alpha_j \) and \( \beta_j \) by the following
\[ \alpha_j(\Phi_t) = R_{f,t+1} [1 - \beta_j(\Phi_t)] \]  \hspace{1cm} (2)
\[ \beta_j(\Phi_t) = \frac{\text{Cov}(R_{j,t+1}, R_{m,t+1}/\Phi_t)}{\sigma^2(R_{m,t+1}/\Phi_t)} \]  \hspace{1cm} (3)

Using the context of an efficient-market pricing model in which \( \Phi_t \) is the set of relevant information available for determining security prices at time \( t \), Equation (1) may be rewritten:
\[ E(R_{j,t+1}|\Phi_t) = \alpha_j(\Phi_t) + \beta_j(\Phi_t)E(R_{m,t+1}|\Phi_t) \]

Tests of this form will help to understand:

1. The speed of adjustment of stock prices to new information
2. Studies that consider whether investors can achieve above-average profits by trading on the basis of any publicly available information.

Capital Assets Pricing Model (CAPM) can be used simultaneously to test the efficiency of the capital market and the validity of the CAPM, as shown by (Roll, 1977). Under the definition that semi-strong form reflects all available information, the fair-game model, which says expected return on an asset equals its actual return, should apply. Expected abnormal return for the security should be zero.

**SCOPE:**

The present study tests the market efficiency of Jordanian Capital Market in its semi-strong form of Efficient Market Hypothesis in the context of securities characteristic line (SCL) and impacts on Jordanian Capital Market. This study covers the period of five years i.e.: from 1st January 2013 to 31st December 2017. also, the study will focus on most liquidate shares in the listed shares in order to study most 10 important disclosures in the period mentioned before. An attempt is made to carve out a clear picture of the behavior of stock prices in the Amman Stock Exchange (ASE), which is expected to follow a random walk.
Importance of the study:

This study came to achieve some objectives
1. To assess the growth and development of the Jordanian Capital Market
2. To test the efficiency of the Jordanian Capital Market
3. To develop an understanding of the concept and role of efficiency and easy to compare the Jordanian capital market with another market at the same level of efficiency.
4. To study the relationship between the movement of stock prices and disclosures, in another word the efficiency of management listed company shares and its price behavior.
5. To test the existence of the semi-strong form of Efficient Market Hypothesis in Jordanian Capital Market in the context of (SCL), and (CAPM).

Data Collection

The news archives of JSC (Commission, 2018) and ASE (Exchange, 2018) in Jordan Securities commission and Amman stock exchange, respectively, as news sources. According to the law on Financial Securities market in listed companies are required to provide the market regulator with the important news But the definition itself from the Jordanian Securities Commission still not obvious comparing with the same level of disclosure with a comparison of another country for example Lithuania
“Immediately but not later than the news are announced to the mass media” (Lithuanian, 2018)
“The Stock Exchange shall immediately disclose information and data it receives which may have an impact on the prices of securities and trading.” (Exchange, 2018)
And it also needs to define the word immediately in the Amman stock exchange to enhancing the effective tools in the capital market.

Research Hypotheses:

A. Testing if Amman Stock Exchange following the (SCL) to help the investors easily to measure risk and make decisions.
   Null Hypothesis (H0): Amman stock exchange is following the (SCL). Alternate Hypothesis (Hα): Amman stock exchange is not following the (SCL).

   Null Hypothesis (H0): There is a relation between the movement of stock return and disclosures.
   Alternate Hypothesis (Hα): There is no relation between the movement of stock return and disclosures.

C. Testing the efficiency of Jordanian Capital Market at the semi-strong form.
   Null Hypothesis (H0): Jordanian Capital Market is Semi-Strong Form Efficient. Alternate Hypothesis (Hα): Jordanian Capital Market is not Semi-Strong Form Efficient.
**DESIGN AND METHODOLOGY**

The characteristic line is founded by plots of the securities return at the different points in time. The y-axis on the chart measures the excess return of the security. Excess return is measured against the risk-free rate of return. The x-axis on the chart measures the market's return in excess of the risk-free rate (Bollerslev et al, 1988).

Fama’s assumes that the state of independent investment opportunity set, the distribution of deflated excess rates of returns for individual securities would also be identically distributed over time. This suggests that unbiased estimates of a portfolio's expected rate of return, beta and gamma may be obtained from deflated excess rates of return over the sample period. (Fama, 1970)

The interesting thing here is how to account the errors and of the measurement in beta and gammas? risk asset portfolios were formed with a grouping procedure similar to the procedures used by (Black, et al, 1972)and (Fama and J. MacBeth, 1973)Using the riskless lending rate and deflated excess rates of return, beta and gamma were estimated for each stock that was continuously listed on the (ASE) during the 60 months from January 2013 through December 2017. The estimates of beta and gamma for the security were calculated by respectively

![Graphs showing the relationships between different factors.](image-url)
After examining the data to apply it on a scatter diagram it is a relation to expected return and systematic risk (beta) to show how the market must price individual securities in relation to their security risk class. Only two banks out of five are possible to apply the CAPM model Arab bank and Cairo Amman bank, calculate the reward-to-risk ratio for any security in relation to that of the overall market. Therefore, when the expected rate of return for any security is deflated by its beta coefficient, the reward-to-risk ratio for any individual security in the market is equal to the market reward-to-risk ratio, thus:

\[ R_{j,t+1} = \alpha_j + \beta_j R_{m,t+1} + \mu_{j,t+1} \]  

And its \( R^2 = 0.1183 \), that’s mean 11\% proportion of the variation in Y axes (Arabic share) being explained by the variation of X (market)

And its \( R^2 = 0.1001 \), that’s mean 10\% proportion of the variation in Y axes (Arabic share) being explained by the variation of X (market)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error</th>
<th>( \alpha_j ) (intercept)</th>
<th>( \beta_j ) (Slope)</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabic</td>
<td>6.795667</td>
<td>98.8%</td>
<td>12.76%</td>
<td>1.0243</td>
<td>0.70%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Iskan</td>
<td>9.053333333</td>
<td>56.7%</td>
<td>7.32%</td>
<td>0.3549</td>
<td>0.03%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Islamic Jordanian</td>
<td>3.560833</td>
<td>35.4%</td>
<td>4.57%</td>
<td>0.3676</td>
<td>0.21%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Cairo Amman</td>
<td>2.440833</td>
<td>61.6%</td>
<td>7.96%</td>
<td>1.4462</td>
<td>1.10%</td>
<td>10%</td>
</tr>
<tr>
<td>Safwa</td>
<td>1.055833</td>
<td>17%</td>
<td>2.20%</td>
<td>0.6789</td>
<td>0.31%</td>
<td>5.6%</td>
</tr>
</tbody>
</table>
And this means to reject the Null Hypothesis (H0): Amman stock exchange is following the (SCL), it’s not easy for the investors to measure risk and make decisions, because only two banks out of five could be reliable to apply the SCL. 

Throw the statistical regression analysis (Durbin & Watson, 1950)they developed a static number that tests for autocorrelation in the residual form this static always between 0 and 4. The positive autocorrelation means the number will be more related to zero and the negative autocorrelation is more related to 4 while the exact 2 means there is no autocorrelation in the sample and this is the weak form of efficiency, and to make sure the population is normally distributed to test the null hypothesis if the p-value is less than the chosen alpha level, then the null hypothesis is rejected and there is evidence that the data tested are not normally distributed. On the other hand, if the p-value is greater than the chosen alpha level, then the null hypothesis that the data came from a normally distributed population can’t be rejected (Shapiro & Wilk, 1965)

The following data will explain the accumulated return for the sample, before and after 10 days of the disclosures while the 11th (Bold and red) is reflecting the day of disclosures, the most effective examples were taken to explain the accumulated return behavior:

Here the sheet shows that there was an increasing before the disclosure and this could be because some the investors can access information before others which is a good example for the inefficiency of the semi-strong form.
Data for an annual report an increase of capital is taking its normal place before and after announcing to stay redundant within a limit, but for the decision of Increasing capital, it didn't affect the market much on this share.

By taking an another different examples on the decisions of Board of directors and appointment a new member at board of directors due to annual report it will be easy to notice the return could affect the disclosures after it takes place on the 11th day on sheet while the different accumulated return remains constant and after the announcement could increase or decrease, this case is the right behavior of the semi-strong efficiency and the strong form as well.

After examining the behavior of the data comparing every share return with the period before and after the information announcements for ten days before and ten days after, and the results noticed in two points:

(1) there are three types of behavior for the sample shares:
<table>
<thead>
<tr>
<th>Event</th>
<th>Semi-strong Efficiency</th>
<th>Strong efficiency</th>
<th>Total Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resignation</td>
<td>17-02-2016 05-10-2016 16-02-2016</td>
<td>05-10-2016 17-02-2016 16-02-2016</td>
<td>3</td>
</tr>
</tbody>
</table>
Total percentage of the semi-strong efficient form is 28%\(=14/50\) this will lead that the Amman Stock Exchange is not an efficient market from the efficiency of disclosures point \((1-0.28)\) is not <0.5. 14 observations showed shares return was not moving before and affected after the price shares effected directly after disclosures take place.

Total percentage of the strong efficient form is 28%\(=14/50\) This also includes that the capital market is no effect at the strong form the point of disclosures \((1-0.28)\) is not <0.5. 14 observations showed shares return was not moving before but affected at the time of disclosure, the price shares were stable and affected directly at the time of disclosures.

(2) There were three groups of disclosure behavior:

First group "efficient": the price shares were stable and affected directly by the time of disclosures whether increasing or decreasing highly effect after disclosures

Second group: the price shares effected before and still effects at the time of disclosure to be stable again after a short time of announcing information to the public.

3ed group: the price shares does not affect at all to the disclosure information provided to still reaming before and after.

If data doesn't affect before the disclosure this means its semi-strong efficient and there is no insider trading, at the same time if Data effected after the disclosures directly this means investors react to information to make a decision and this is the strong form of efficiency.

Testing the relationship between disclosures and behavior of stock return in Amman Stock Exchange (ASE), which conclude to, Reject the Null Hypothesis (H0) There is a relation between the movement of stock return and disclosures, and accept the Alternate Hypothesis there is no relation between the movement of stocks return and disclosures, that’s because only 9 out of 50 (18%) could be semi-strong efficiency form.

**FINDINGS AND DISCUSSION**

The analysis of the data based on correlation and regression techniques leads to the conclusion that the Null Hypotheses in all three cases are rejected:

1- Amman stock exchange is not following the (SCL):
Which means it’s not easy for the investors to measure risk and make decisions because only two shares out of four could be reliable to apply the SCL.

2- There is no relation between the movement of stocks return and disclosures:
Stock prices do not respond to the disclosure information and published financial reports for companies, but affected by other factors.

3- Testing the efficiency of Jordanian Capital Market at the semi-strong form.
Reject the Null Hypothesis (H0): Jordanian Capital Market is Semi-Strong Form and concludes the Amman Stock Exchange is not an efficient market at a semi-strong form.
CONCLUSION

Efficiency of capital markets is connected directly to the speed change of share prices listed in the market, specially information available to the public and that will help the investors to reevaluate the financial stock to decide take an action, at the same time the efficiency level is different from market to another depends on the degree of information available, while this study concluded that Amman Stock Exchange is not an efficient market at the semi-strong form which leads to agree with previous studies, on the basis of the data analyzed, that there is no significant relationship between the movement of shares return and disclosures time, in the Jordanian capital market and Amman Stock Exchange, Hence there is an insignificant relationship between the movement of price return and disclosures. Capital Market in relation to the SCL Model is not semi-strong form efficient), while this paper used a different methodology and data after financial crises period, the capital market still affected of the financial crisis.

To make the market efficient the securities commission has to:
- Provide information at the right time with more speed, because any delay will affect negatively on the market and motivate to get information in an illegal way.
- Follow up new ways to analyze the stocks listed in the market, for example, CAPM, SCL, and Securities characteristic line.
- Introduce more rules to gain the investors' trust by controlling the disclosures to be more efficient and effective by time and accuracy.
- For investors, they can make more money by analyzing the shares after disclosures and react after a short time to the changes in price shares.

Consequently, it is suggested that future research carried out in the Middle Eastern context should include periods before and after the financial crises of 2008 to test its impact on market efficiency. Furthermore, future research is suggested to study the interrelationship between market efficiency at the semi-strong form and the impact of the information relating to the announcement of stock.

Bibliography


