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The Impact of Adopting Electronic Trading System on Performance of the Amman Stock Exchange

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ABSTRACT

This study aims to highlight the impact of adopting electronic trading System on performance of the Amman Stock Exchange (ASE) represented in the (value traded) and (market capitalisation) where, for the implementation of that, secondary data were collected from (taken from the monthly statistical bulletins of the Stock Exchange) related to the study variables, where an analysis of the difference between the middle two samples: the first study variables before the introduction of the system, and the other after you have inserted, to find out whether there is a significant difference between the size of the stock exchange in trading before and after the introduction of the electronic trading system, and whether there is a significant difference between the value between the market value of securities listed on the stock exchange before and after the introduction of the system. The results of the study show that the use of the electronic trading system as an alternative to the manual trading system has contributed to raise the volume of trading and the market value of the ASE. We believes that the result of the increase in the degree of transparency and security for traders and investors in the stock market, and give great flexibility and different information to brokers facilitated an analysis of the situation of companies traded faster, which achieved more justice, speed and ease of execution of orders, on the other hand, the system has led to facilitate control over the trading operations and the dissemination of information in real time for both local or foreign investors which contributes to increase the depth and liquidity of the market.

Keywords: *Jordan, Electronic trading system, Value traded, Market capitalisation, Amman Stock Exchange.*
JEL Classifications: *G0, G10, G15, F43, R11*

1. INTRODUCTION

An information play in our present an important role in various areas of life, not surprisingly, it has become our so-called era of information and a lot of decisions become political, military or economic, administrative or other decisions depend heavily on information accuracy and speed obtained in a timely manner. ASE gained an additional step of promoting dependence on IT, like many of the world's stock exchanges, that enter the electronic trading system as an alternative to the manual trading system, according to the agreement signed between them and the Paris Stock Exchange at the end of 1996, it is worth mentioning that the transfer of companies from manual trading system to the electronic system has been gradually, where they were to begin trading shares of ten companies, then the remaining companies were transferred in the form of straight sets, the last group was transferred (included 100 public joint stock company) to the electronic trading system in 15/06/2000, in addition to the transfer of bond trading and investment funds, thus, the ASE has completed the transfer of all shares of listed companies, bonds and mutual funds and non-listed companies from manual trading to electronic trading, and fully manual deal was cancelled dated 15/06/2000.

The financial market is described as efficient or inefficient depending on the availability of information and the speed of its impacts on the prices of listed securities, given the role played by modern technology in the provision of information by leaps and bounds, ASE has taken an important step to keep pace with technological renaissance taking place in the financial markets, introduced to electronic systems for the purpose of raising the efficiency of the market, from here this study came in an attempt to illustrate the impact that caused a manifestation of this evolution, and its contribution to increase the volume and trading prices through the study of the change in trading volume and market value before and after the introduction of this system.

This evolution in the way the market works, which necessarily commissioned ASE significant amounts worth looks to assess benefit that are supposed to touch results, here lies the importance of this study is to give indication about the impact of the introduction of this system on some important indicators for the ASE. This study aims to discuss the impact of the replacement of manual trading system based electronic trading on the ASE, through test the importance of the changes that have occurred in some stock indexes, it is particularly:

- Trading volume in the stock market in various sectors.
- The market value of securities listed on the stock exchange in various sectors.

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This study is based on two assumptions pillars:
First hypothesis: there is a significant difference between the average trading volume on the ASE in various sectors before the introduction of the electronic trading system and the average trading volume in the stock market after the introduction of the system, can be traced to enter the system.
Second hypothesis: there is a significant difference between the average market value of the ASE various sectors before the introduction of the electronic trading system and the average market value of the stock market after the introduction of the system, can be traced back to the introduction of that system.

2. LITERATURE REVIEW

This study is classified under the efficient market studies, which includes demonstrate the impact of a particular event on the performance of the market, where that aside from these studies is known research study (event study), there are many studies in this area, including (Leigh, et al., 2003), has addressed the impact of the prospect of war in Iraq on the indicators most important oil prices following market index American Stock Market (S & P 500), where moved these prices in proportion to the movements the prospect of war, suggesting that the war has raised the price of a barrel of oil ten dollars and lowered the stock market index of America's (S & P 500), including approximately 15% of its value at the time, the study predicted that these effects disappear within a year and a half. Almtori (1996) aimed to measure the efficiency of the ASE at the level of sub-strong where the information was used for the distribution of profits in the form of bonus shares and the prosecution of the impact of this information on the non-normal returns, the researcher has conducted a studying at all public shareholding companies listed on the ASE, which has distributed bonus shares during the years 1987 to 1993 where he reached the 38 companies, including 19 companies belong to the industrial sector, 15 companies belonging to the sector, banks and financial companies, 9 companies belonging to the insurance sector, and 5 companies belong to the service sector. However, a sample of 9 companies excluded from the study due to mergers, or suspension or non-traded for the entire test period, the study was conducted using the following form: the rate of return on the company's shares = fixed share + beta (market return + unusual return). The study tested the value of extraordinary earnings per sample of the shares within a period of four weeks before the announcement of dividends, and four weeks after the announcement, and concluded that the price does not reflect the efficiency of the market at this level where the prices have not significantly affected by the information.

Qawasmi (1990) aimed to test the efficiency of the pricing of the stock in the ASE through statistical hypothesis testing low level of efficiency in the pricing of the shares of industrial companies to contribute to the public during the period 1986 to 1987, the study was conducted during the test there is no relationship between revenue or stock prices historically, has been conducting the study by testing the regression equation between the temporal relationship of the weekly changes in the average yield is in each individual company on the one hand and between that relationship integrated investment market portfolio, have been estimated yield is normal for stocks under study through the capital asset pricing model (CAMP) have been estimating the expected earnings per share through this form, and then calculated the unusual yield. The researcher calculates the change in yield in unusual return over time for each share and then to the market portfolio, this study concluded inefficient pricing of the shares of the sample, and therefore inefficient pricing in the ASE. Vila and Sandman (1995) and Pirrong (1996) find that prices are less sensitive to volumes in automated than traditional markets. One of the reasons for this could be that the floor traders know when there are orders from clients and so they adjust their prices in response to demands. Cornell (2012) addressed the issue of political events and their impact on market indices, where researchers found in this study that the events of the first-order news (including political and military developments) explain a fraction of the movements of the stock market.

Other studies have examined the impact of various factors on the movement and volume of stock trading in sophisticated financial markets. While some studies have focused on the impact of information content on trading volume (e.g., Bamber, 1986), other studies have focused on the impact of the accounting revenue on trading volume (Atiase and Bamber, 1994). Astnpola (1997) tested the effect of the change in capital expenditures on prices and trading activity. On the subject of electronic trading and its impact on trading volume or the market value for a particular stock, the article published on the internet (World Bank, 2007) talked about the forecast for growth in the value of investment-mail in Western Europe at a compound rate of 10.5%, where this growth is due to matures in electronic market proliferation (e-investment), but that the most important problems that limit the growth process of these are: lack of safety in the operation of electronic trading, and the crisis of confidence among investors, in addition to sudden market fluctuations. Domowitz and Steil (2001) found that electronic systems incorporate information into the price faster than traditional systems.

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3. DATA AND VARIABLES MEASURE

3.1 Data

The data were collected by monthly bulletins ASE, and its the monthly statistical bulletins issued by the stock exchange in the study period (January 1997 to December 2003), summarised the data needed to conduct the analysis required in Appendix (1). The population of the study is all available data and indicators extracted from the ASE for that have been monitored during the period of the work of those stock market since its inception and until the date of preparation of this study, the sample of this study are two indicators of these two indicators and trading volume and market value, over a period of time stretching and eighty-four months, forty-two of them before the introduction of the electronic trading system of the Stock Exchange, and like them after, it is worth mentioning that the electronic trading system has been initiated entered on 26.03.2000 and after the completion of the process and put into practice fully with the end of the sixth month of the year 2000.

3.2 Variables Measure

This study follows the standard practice in the literature findings both theoretically and empirically. There are numerous studies which examine the significant of the impact of the introduction of electronic trading system in the performance of the ASE as follows.

Electronic Trading System: all electronic components related to trading operations, that entered the Stock Exchange as of 26/03/2000, This includes hardware, software and networking mechanisms liability in the processes of buying and selling securities listed on the ASE, and the announcement of those operations. For the purposes of implementation of this study, regression model was developed describing the relationship between trading volume and market value (dependent variables) on the one hand, and the presence of the electronic trading system (independent variable) on the other hand, Where it was the expression of the independent variable in a quantitative manner so as to take this variable value (zero) when the existence of the order, and values (1) when its existence, (See Appendix, 1).

Trading Volume: the value of securities traded on the ASE in various sectors in the relevant time period, the monthly trading volumes adopted for the purposes of implementing this study, so that was taken forty-two monthly value before the introduction of the electronic trading system (the period January 1997 to June 2000), and forty-two monthly value after you have inserted (the period July 2000 to December 2003) (see Appendix, 1).

Market value: the value of all securities listed on the ASE various sectors; the monthly market value of those securities has been adopted for the purpose of implementing this study, so that was taken forty-two monthly value before the introduction of the electronic trading system (the period January 1997 to June 2000) and forty-two monthly value after you have inserted (the period July 2000 to December 2003) (see Appendix, 1).

4. EMPIRICAL RESULTS

4.1 Descriptive Statistics

For the implementation of this study we use: analysis of the difference between the average two samples, so was the use of data related to the study variables (trading volume and market value) for a period of study, and then test whether there is a significant difference between the average trading volume before the introduction of the system and after you have inserted, as well as test whether there is a significant difference between the average market value of the stock exchange before the introduction of the system and after you have inserted, the test procedure described using the statistical program SPSS (see Appendix, 2). Simple regression equation of the first class, to represent the relationship between each of the dependent variable (volume) and the independent variable (the presence of the electronic trading system) (see Appendix, 3). While, simple regression equation of the first degree: to represent the relationship between each of the dependent variable (market value) and the independent variable (the presence of the electronic trading system) (see Appendix, 4).

4.2 Statistical Analysis

When the results of the statistical analysis examine in the appendices (2, 3, 4) we can see the follow:

1. The value of the difference (increase) between the average trading volume before the introduction of the system and average trading volume after you have inserted 57.3517 million JD, and test by test known as T (T-test) This is a statistically significant difference at a temperature of 100% confidence, (Appendix, 2).
2. The value of the difference (increase), between the average market value before the introduction of the system and the average market value of after inserted 1004.90 million JD, and test by test known as T (T-test) this is a statistically significant difference degree 100% confidence, (Appendix, 2).
3. To connect the moral difference quotient in trading volume (mentioned in item 1) introduction of electronic trading system, has been developed regression equation simple linear representation of the relationship between the values of trading volume as the dependent variable, and the values that represent the presence or absence of the electronic trading system, so that it considered the value zero to express

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their existence, and a value of 1 to express their existence, according to the results extracted from the computer (Appendix, 3), the regression equation is as follows:

$$Y = 29.2222 + 57.352X \quad (1)$$

Average trading volume for the period prior to the introduction of electronic trading system 29.2219 million JD, while the average trading volume for the period subsequent to the introduction of 86.5736 million JD (Appendix, 2). The average market value for the period prior to the introduction of the electronic trading system 3696.86 million JD, while the average market value for the period subsequent to the introduction of 4701.6612 million JD (Appendix, 2).

Where: Y: Volume on the ASE. X: the presence of the electronic trading system, and takes the values zero or 1. Testing the suitability of the regression model to represent the relationship between the two variables independent of Y and X, and test known Fisher (F-Test), and show that this model is appropriate at a temperature of 100% confidence.

The value of the coefficient of determination R^2, (the proportion is explained by the independent variable in changes in the dependent variable) 23.1%, and this means that despite the presence of the impact of the introduction of the electronic trading system in the volume of trading on the ASE, but the changes in volume by 76.9% are caused by factors other than the presence of the electronic trading system.

4. To connect the difference moral quotient in the market value of the Stock Exchange (mentioned in item 2) the introduction of electronic trading, has been included regression equation simple linear representation of the relationship between the values of the market value as the dependent variable, and the values that represent the presence or absence of the electronic trading system, so that considered value (zero) to express a lack of, and value (1) to express their presence, according to the results extracted from the computer (Appendix, 4), the regression equation is as follows:

$$Y = 3696.76 + 1004.901X \quad (2)$$

Where: Y: the market value on the ASE. X: the presence of the electronic trading system takes the values zero or 1. Testing the suitability of the regression model to represent the relationship between the two variables independent of Y and X, and test known Fisher (F-test) and found that the model adequately when 100% degree of confidence. The value of the coefficient of determination R^2 26.8%, and this means that despite the presence of impact for the introduction of electronic trading system in the market value of the ASE, but the changes in this value by 73.2% caused by factors other than the presence of the electronic trading system.

5. CONCLUSION AND FUTURE RESEARCH

The most important results that have been reached in this study:

1. Acceptance of the first hypothesis of this study notion that there significant difference between the average trading volume in the ASE various sectors before the introduction of the electronic trading system and the average trading volume in the stock after the introduction of the system, can be traced in part (by 23.1%) to the system, has been relying on No. items (1) and (3) of the terms "compendium of statistical analysis".
2. Acceptance of the second hypothesis of this study notion that there significant difference between the average market value of the ASE securities various sectors before the introduction of the electronic trading system, and the average market value of the stock after the introduction of the system, can be traced in part (by 26.8%) to the system, has been depending on the items (2) and (4) of the terms "compendium of statistical analysis".
3. Based on outcomes (1, 2) above, the researcher believes that the use of the electronic trading system as an alternative to the system manual trading has contributed to raising the efficiency and speed of trading in securities, and to achieve transparency and security for traders and investors in the stock market, and gave great flexibility and different information to brokers facilitated their knowledge worker processes and is carried out and an analysis of the situation of companies traded shares faster, which bring more justice, speed and ease of execution of orders, on the other hand it has led to facilitate control over the trading operations and the dissemination of information in real time, both for local investors or external, which contributes to the increase the depth and liquidity of the market, not evidenced by the results of this study.

Based on previous results researcher recommends the following:

1. Promote the use of information technology in the ASE in accordance with the needs of dealers in the stock market.

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2. Further studies to see the effect of replacing the manual trading system electronic trading system on other indicators of the Stock Exchange.
3. Invite developing stock markets in general, and particularly Arab, because follows the example of the ASE for the introduction of modern electronic systems for trading to raise the efficiency of those exchanges.

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Appendix (1) Table 1. Monthly trading value and market capitalisation on a monthly basis

Time	Value Traded	Market Capitalisation	Existence of the System	Time	Value Traded	Market Capitalisation	Existence of the System	Time	Value Traded	Market Capitalisation	Existence of the System
Jan-97	15.06	3215.06	0	May-99	35.23	3830.67	0	Sep-01	81.54	4040.80	1
Feb-97	10.96	3285.83	0	Jun-99	37.01	3759.75	0	Oct-01	56.94	4303.21	1
Mar-97	13.74	3190.35	0	Jul-99	18.20	3655.26	0	Nov-01	92.39	4460.81	1
Apr-97	9.05	3157.35	0	Aug-99	29.48	3545.63	0	Dec-01	60.59	4476.75	1
May-97	24.35	3409.75	0	Sep-99	40.52	3545.65	0	Jan-02	56.70	4551.62	1
Jun-97	37.80	3342.40	0	Oct-99	16.26	3576.79	0	Feb-02	58.79	4491.21	1
Jul-97	24.59	3505.53	0	Nov-99	19.91	3617.30	0	Mar-02	54.09	4448.09	1
Aug-97	28.42	3476.35	0	Dec-99	17.83	3790.15	0	Apr-02	85.21	4280.40	1
Sep-97	43.46	3670.49	0	Jan-00	20.71	4082.49	0	May-02	58.02	4501.02	1
Oct-97	30.82	3595.72	0	Feb-00	40.21	3988.21	0	Jun-02	59.52	4780.71	1
Nov-97	22.57	3595.24	0	Mar-00	24.99	3853.16	0	Jul-02	56.08	4733.39	1
Dec-97	43.39	3602.47	0	Apr-00	27.98	3706.85	0	Aug-02	49.51	4627.59	1

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Jan-98	16.64	3554.76	0	May-00	26.32	3723.35	0	Sep-02	44.79	4528.41	1
Feb-98	18.94	3730.03	0	Jun-00	27.24	3664.64	0	Oct-02	31.09	4404.30	1
Mar-98	41.93	3664.08	0	Jul-00	18.03	3570.55	0	Nov-02	54.72	5051.02	1
Apr-98	26.65	3753.70	0	Aug-00	22.89	3484.15	0	Dec-02	54.70	5029.01	1
May-98	27.65	3985.89	0	Sep-00	24.18	3457.22	0	Jan-03	73.92	5085.12	1
Jun-98	19.05	3984.99	0	Oct-00	23.57	3523.89	0	Feb-03	29.06	4846.81	1
Jul-98	45.46	4001.67	0	Nov-00	18.09	3501.16	0	Mar-03	46.13	5020.65	1
Aug-98	34.84	4031.92	0	Dec-00	14.16	3509.65	0	Apr-03	83.39	5379.59	1
Sep-98	16.49	3838.77	0	Jan-01	28.69	3574.18	1	May-03	133.36	5584.49	1
Oct-98	21.77	3648.56	0	Feb-01	24.12	3612.48	1	Jun-03	154.50	5889.22	1
Nov-98	93.03	3713.74	0	Mar-01	13.35	3623.69	1	Jul-03	234.27	6403.03	1
Dec-98	51.26	3835.03	0	Apr-01	28.65	3574.87	1	Aug-03	213.54	6740.81	1
Jan-99	44.80	3996.43	0	May-01	48.03	3718.43	1	Sep-03	233.57	6995.57	1
Feb-99	40.76	4078.45	0	Jun-01	52.72	3721.25	1	Oct-03	247.86	6839.11	1
Mar-99	20.37	4031.64	0	Jul-01	62.05	3817.81	1	Nov-03	130.02	7574.36	1
Apr-99	22.31	3887.38	0	Aug-01	60.90	3940.77	1	Dec-03	275.64	7773.72	1

Source: Monthly statistical data of ASE (Jan-1997 - Dec-2003).

Appendix (2) Table 2. Analysis of the difference between the average of the two samples (before and after the introduction of electronic trading system)

Value Traded Before				Value Traded After			
N	Mean	Std. Error	Std. D	N	Mean	Std. Error	Std. D
42	29.2219	2.26292	14.66539	42	86.5736	11.34638	73.53297
Market capitalisation Before				Market capitalisation After			
42	3696.7600	37.26309	241.49240	42	4701.6612	179.74818	1164.137

Value Traded Before and After						Market capitalisation Before and After					
df	Mean	Std. Error	Std. D	t	Sig	df	Mean	Std. Error	Std. D	t	Sig
41	-57.3517	11.453	74.224	-5.008	0.000	41	-1004.90	166.27	1077.55	-6.044	0.000

Appendix (3) Table 3. Regression analysis between the two variables trading volume and the existence of the electronic trading system

Variables Entered/ Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Existence of the system[a]	.	Enter

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a. All requested variables entered.

b. Dependent variables: Value Traded.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the estimate
1	0.480[a]	0.231	0.221	53.01967

a. Predictors: (Constant), Existence of the system.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig
1	Regression	69073.487	1	69073.487	24.572	0.000[a]
	Residual	230509.0	82	2811.086		
	Total	299582.5	83			

c. Predictors: (Constant), Existence of the system.

d. Dependent variable: Value Traded.

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	29.222	8.181		3.572	0.001
Existence of the system	1004.901	11.570	0.480	4.957	0.000

a. Dependent variable: Value Traded.

Appendix (4) Table 4. Regression analysis between the market value of variables and the existence of the electronic trading system

Variables Entered/ Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Existence of the system[a]	.	Enter

a. All requested variables entered.

b. Dependent variables: Market Capitalisation.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the estimate
1	0.517[a]	0.268	0.259	841.22345

a. Predictors: (Constant), Existence of the system.

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ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig
1	Regression	21206354	1	21206354.46	29.967	0.000[a]
	Residual	58027865	82	707656.893		
	Total	79234220	83			

a. Predictors: (Constant), Existence of the system.

b. Dependent variable: Market Capitalisation.

Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	3696.760	129.804		28.480	0.000
Existence of the system	1004.901	138.570	0.517	5.474	0.000

b. Dependent variable: market capitalisation.