

Individual Investors' Stock Trading Behavior at Amman Stock Exchange

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Abstract

Many studies investigated the factors that affect investments in stock trading in developed and developing countries, but the investors' characteristics are still not well documented. The Amman Stock Exchange being a small exchange does not use stock trading programs that require advanced mathematical models. Most stock trading is executed the traditional face-to-face way. Therefore, stock trading depends on individual traders' judgments. Investors' trading behavior is influenced by several behavioral factors. The present paper seeks to identify these factors and their influence on investors' financial exposure. Towards this end the multiple regression technique was utilized. Four explanatory variables were identified. The investor's *age*, his/her use of the *internet* and his/her formal level of *education* were statistically significant (at 1% or 5% level) with positive signs. The *broker* variable was highly significant (less than 1% level) and had a negative sign implying the need for professionally trained and experienced analysts to win clients' trust.

Keywords: Amman Stock Exchange, Stock trading, Individual investors' decisions, Behavioral factors

1. Introduction

Amman Stock Exchange (ASE) is a small exchange. It has not utilized trading programs that require heavy and sophisticated investments and employ advanced models based on mathematical rules that can analyze huge amounts of information. Utilizing modern technology is still at its beginnings. Internet trading was launched in 2010 (ASE, 2011). Therefore, most stock trading is executed the traditional face-to-face way. The majority of analysts at ASE did not have the necessary training or experience that qualified them to give dependable advice to their clients. Therefore stock trading depended very much on individual traders' judgment. Investors' trading behavior is influenced by several factors. The present paper seeks to identify these factors.

Judgmental factors are psychological factors and lie within a rapidly growing area of behavioral finance. To identify these behavioral factors the multiple regression technique is employed in the current study. The estimated model identified four factors that explained investors' decisions how much money to invest in stock trading at ASE and, thereupon, the level of their financial exposure. The four explanatory variables were: The investor's *age*, his/her use of the *internet* and level of formal *education* were found statistically significant (1% or 5% level) with positive signs. The *broker* variable was found highly significant (less than 1% level) with a negative sign asserting that the analysts employed by the brokers needed professional training and experience to win their client's trust.

Stock traders use two methods to analyze information and decide which stocks to buy or sell. The first is the use of sophisticated mathematical models and modern technology. The use of this method is growing rapidly (see for example: Cho (2010), Ramayah et al (2009), Al-Jaroodi and Mohamed (2009), Jiang and Zhou (2010), and Zwick (2006)). The second, more likely in developing countries, is the use of the old fashion face-to-face method. Barber et al (2009) in a study about Taiwan using data covering the period 1995-1999, found individual investors to be at a disadvantage compared to institutional investors. The latter have better access to information and modern technology. They concluded that "trading in financial markets leads to economically large losses for individual investors." The estimated losses were staggering at a rate of 2.2% of Taiwan's gross domestic product.

Barber and Odean (2008) studied individual investors buying and selling behavior using data drawn from U.S. brokerage firms and thousands of individual investors covering the period January 1993 through March 1996. They found that individual investors bought the stocks that grabbed their attention but they did not do that when selling. This finding is contrary to many theoretical models which treat buying and selling as "two sides of the same coin." The authors thought that after a complicated search and sifting through a large number of stocks, the choice depended on personal experience and what grabbed the eye. Attention is affected by news, abnormal trading volumes, etc. The authors, on the other hand, found professional investors (institutions) to be "less prone to indulge in attention-driven purchases."

Konstantaras and piperpoulou (2011) studied the addictive effect of stock trading. They compared stock traders' behavior with gamblers using a risk taking scale and a risk perception scale and a demographics questionnaire that was filled by active investors and gamblers. They found that "retail trading in the stock market exhibited significant incidence of compulsive behavior" and there was "an apparent addiction problem between active retail investors."

Finally, Chandler (2009) in a study similar to the current paper, he assessed the effect of investors' competence (subjective skills or knowledge in the area of finance) on stock trading. He found that the investors' competence was explained by a combined function of sex, education, age, and income. The current paper and Chandra's paper both are behavioral studies. There are differences in the variables used, their measurement and interpretation. The sex variable is not present in the current paper since only a negligible number of females participated in stock trading at ASE. The age variable in the two studies has the opposite sign. The current study found age to mean more experience and more trading. While Chandra's study found that the older the investor gets the less self-confident he becomes. The education variable is measured differently in both studies. Chandra measured education as training in the area of finance and the current paper used years of formal education – a broader measure. The present paper used the broker variable to measure the importance of the trader-broker relationship. This relationship was found highly significant. The broker variable did not appear in Chandra's study. Finally, the income variable was deleted from the current paper due to statistical insignificance and covariance problem. The income variable contributed to self confidence in Chandra's study.

2. Background

Modern technology plays an increasing role in stock trading. More than half of stock trading in developed countries is executed through automated systems known as program trading (EBSCO, 2008). The systems are based on mathematical rules and require heavy investments in technology and sophisticated trading strategies. Automated trading systems reduce the role of brokers and eliminate many entry barriers caused by physical distance to financial services and made trading easier (D'Avolio et al, 2001). Automated trading improved liquidity (being able to trade quickly and at low cost) and helped reduce transactions costs including brokerage commissions, fees, taxes, and bid-ask spread.

Levine and Zervos (1998) found the liquidity of stock exchanges to be more important to economic growth than the size of the stock exchange. They also found that "developed countries such as the United States and France have a much higher (10 times higher) liquidity than Middle East and North African (MENA) countries. They also found liquidity to be particularly important to MENA countries because their small companies rely heavily on local markets in their financial needs. Levine (1991) and Bencivenga et al., (1995) asserted the importance of liquidity. They thought that liquid stock markets increased the availability of funds to finance long term investments. Liquidity is affected by transactions costs. Analysts found that lower transactions costs indicated higher market activity and higher value. Shah and Thomas (2001) found "a strong cross-sectional relationship between the market capitalization of a country and the total transactions costs in the country, with an elasticity of -0.156. That is, a 1% increase in the market capitalization of the country is associated (on average) by a 0.156% reduction in total transactions costs." Developments in modern technology caused a decline in transactions costs and improved liquidity. Table 1 shows the rapid decline of online commissions in the United States (D'Avolio et al., 2001).

In the year 2011, commissions ranged from USD3.00 to USD10.95 per trade. Commissions depended on how much help the investors needed (Penny Sleuth, 2011). Jordan and other developing countries have not applied program trading and yet realized some benefits from modern technology. Modern information technology made possible the dissemination of a vast amount of information and data to advisors and investors, gave banks better opportunities to market their products, improved business transactions, reduced transactions costs, and improved securities markets' liquidity (D'Avolio et al., 2001, Choi et al., 2000, and Abrussa et al., 2000). Al-Khoury and Al-Ghazawi (2008) found that the adoption of electronic trading reduced volatility in ASE and improved liquidity.

Utilizing modern technology is still at its beginnings at ASE and other stock exchanges in developing countries. Individual investors' stock trading is done the traditional face-to-face way. Traditional models have limited ability of predicting future returns. Enormous amounts of information flows made predictions more difficult. The ability to disseminate information and data can only be useful when sophisticated methods of analysis are employed. The inexperienced or the unsatisfactorily trained analyst would be unable to properly scrutinize and analyze the information and accurately assess security values. As Oskamp, (1965) put it: when information grows, the accuracy of forecasts grows much slower. In an interview conducted by the authors with ranking officials at Jordan Securities Commission (JSC) during September 2007, the officials indicated that the majority of stock analysts at ASE did not have sufficient formal training or experience to handle large amounts of information and give appropriate advice to their clients. To make things worse, it is a well known fact (no formal data available) that the better qualified

analysts migrated to neighboring Gulf Cooperation Council (GCC) countries. The stock market in Jordan is small. In small countries few resources and little human capital are devoted to operate the exchanges (Shah and Thomas, 2002). Next is a case study of individual traders' trading behavior. It lies in the area of behavioral finance which is growing rapidly (Shefrin, 1999).

3. Amman Stock Exchange-A preview

Amman Stock Exchange is a small exchange. The number of listed firms at ASE is 272. In terms of capitalization, it was worth JD22 billion in December 2010 and ranked 8th among 15 Arab stock exchanges. Its capitalization was 3.53% of total capitalization of the fifteen exchanges. Saudi Stock Market was ranked 1st with 35.2% and Kuwait came 2nd with 10.39%. Non – Jordanians' investments in listed companies at ASE at the end of March, 2011 was 49.8% of total market value; 32.9% were Arab and 16.9% were non – Arab investors (Omet, 2011). Stock ownership at ASE is concentrated in the hands of few investors (ASE, 2011) Therefore ASE is not diversified enough to give a latitude of choice or sufficient liquidity and gave manipulative power to the few. Shah and Thomas (2001), found strong evidence of a sharp drop in liquidity for small countries. Small stock exchanges have few resources devoted to operate the exchange and little human capital specializing in technical analysis. Transactions costs at ASE are high. As a matter of fact they are the highest compared to other Arab markets. Table 2 gives early 2007 lower commission limits in nine Arab countries. In 2011 commissions at ASE are still 54.00 per ten thousandth of stock value.

However, Jordan possesses positive characteristics and has a relatively free economy. It was ranked 38th among 179 countries in the Index of Economic Freedom (Heritage Foundation and the Wall Street Journal, 2011). The World Bank ranked Jordan No.1 among 14 Arab States in achieving the educational goal (Ministry of Education, 2008). The number of internet lines in Jordan exceeded 78 thousands in the third quarter of 2007, an increase of more than 26 times in a five year period. Internet usage penetration was 33% in the 3rd quarter of 2010. Jordan was ranked 8th among Arab countries. The total number of mobile subscribers reached 2.3 million in the 3rd quarter of 2010 (Jordan Telecommunications Group, 2008 and 2010). The World Economic Forum (2010) ranked Jordan 65th among 139 countries in readiness to absorb, produce and utilize modern technology to fulfill domestic needs.

4. Materials and Methods

The data were collected via questionnaires handed out to stock investors at ASE. Out of 450 questionnaires, 300 respondents gave complete sets of answers and were useful for statistical analysis. The questionnaires were designed to study the behavior of investors at ASE during February-2010. Investors were asked to answer 17 questions using 5-point Likert scale, which ranged from strongly agree to strongly disagree. The respondents were also given space to express the precise nature of their view.

The dependent variable measured the amount of money used for stock trading. It was intended to measure the degree of financial exposure the investors faced. Investors were exposed to loss when stock prices declined. The loss materialized only if the stocks were sold at the lower market price. Otherwise it remained on paper.

The change in the independent variables explained the change in the dependent variable or the amount of money the investor allocated for stock trading. The dependent variable was broken into 5 categories in JD as follows:

$$y \leq 10\ 000, 10\ 000 < y \leq 20\ 000, 20\ 000 < y \leq 30\ 000, 30\ 000 < y \leq 40\ 000, y > 40\ 000.$$

The independent variables describing investors' characteristics and behavior were as follows:

Age: in years. It is a proxy measure of experience, knowledge, and availability of time. Older investors could be retirees with plenty of time at their disposal.

Education: This variable measures the level of formal education the investor achieved. Education contributed to the understanding of the mechanism of financial markets and gave the investor self-confidence. Education was broken into four categories: high school or less, diploma (2 years college), B.Sc. or B.A., and M.Sc. or Ph.D.

Internet: Understanding and utilizing the internet as a source of data, information and for trading purposes made it easier and faster to trade stocks and encouraged investors to trade and place orders.

Broker: The relationship between the investor and the broker could be very important depending on the trust the investor had in the broker.

Multiple regression technique was utilized to study the effect of the independent variables on the dependent variable. The regression model was as follows:

$$y_i = \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \beta_4 x_{4i} + \varepsilon_i, \quad i = 1, \dots, 300$$

Where: y_i is the dependent variable which indicated the total amount of money allocated for stock trading. x_{1i} , x_{2i} , x_{3i} , and x_{4i} are the independent variables indicating: age, education, internet and broker respectively. The ε_i indicates the random measure of error. β_1 , β_2 , β_3 , and β_4 are parameters to be estimated. Estimation was performed using SPSS18 Software.

5. Results

The estimated parameters are presented in Table 3. Out of 15 possible independent variables, only 4 variables were found statistically significant. Age, internet and broker were found highly significant at the 1% level. Education was found significant at the 5% level. The intercept was found (0.65) with t-statistic=1.33 and p-value=0.185 was found insignificant and therefore the intercept was dropped. All four independent variables showed significant bivariate association with the dependent variable based on Pearson correlation coefficient.

The ANOVA table tested the acceptability of the model from a statistical perspective. As shown in the Appendix, the significance value of the F-statistic is less than 0.001, which means that the variation explained by the model is not due to chance. R is the linear correlation between the observed and model-predicted values of the dependent variable. R was found about 90%, indicating a very strong relationship. The coefficient of determination, R^2 shows that about 82% of the variation in y was explained by the proposed model and adjusted R^2 was about 81%. Many tests were performed and the results show (see the Appendix):

- a. The linearity assumption was correct.
- b. No serious multi-co-linearity was found.
- c. Durbin-Watson statistic was not significant at 1.90.
- d. No violation of homoscedasticity was found.

The estimated model explained more than 80% of variations in the dependent variable. Four investor characteristics played a major role in investors decisions how much money to invest in stock trading and, therefore, the amount of financial exposure to some problem or crisis. The *age* variable was found statistically highly significant with positive sign. Older investors have more experience. Older investors with extra money could be retirees with desire to engage in some “exciting” activity they enjoy. The *internet* gave investors access to more information, follow market news and online trading. The *education* variable was found significant at 5 % level with positive sign. More years of formal education gave investors the confidence and ability to understand the market and encouraged them to invest more.

The *broker* variable which describes the investor-broker relationship was found statistically highly significant with negative sign. Investors at ASE didn't trust their brokers. Analysts working for the brokers as described earlier did not have the technical training or the experience necessary to properly use the sophisticated analytical methods to analyze huge volumes of information.

6. Conclusions

Trading at ASE in most cases is executed the traditional face-to-face way. Therefore, investors' behavioral characteristics play a major role. Using the multiple regression technique, the present study identified four behavioral factors that influenced investors' trading decisions. Investor's *age*, *education*, and his/her accessibility to the *internet* had a significant and positive effect on stock trading. The interaction between the investor and his/her *broker*, on the other hand, had a highly significant and negative effect. Brokers did not employ professionally trained analysts therefore they lost their clients' trust. Thereupon, investors should educate themselves in the complexities of financial markets including ways and means of combating market manipulations. They should understand the brokers' job in order to make the most of their services. Brokers to have good working relationships with their clients, they should seek qualified analysts and be keen to provide timely, accurate, and transparent information in order to win investors trust. This also helps the efficiency of the market. Authorities should take every possible action to stop illegal practices, prevent, and pursue market manipulators. Authorities should help make modern technology affordable and accessible. Finally, the adoption of previous recommendations helps boost confidence in the economy and encourage domestic investments and attract foreign capital.

Appendix

Using ordinary least squares (OLS) method, data analysis involved five steps. In step 1, a histogram or P-P plot of the residuals is used to check the assumption of normality of the error term. Neither the histogram nor the P-P plot indicates that the normality assumption is violated. Also the linearity of the proposed relationship is checked based

on the scatter plot of regression standardized residual and regression studentized residual versus regression standardized predicted value charts. In step 2, the problems of regression model analysis (multi-collinearity, autocorrelation and heteroscedasticity, where usually found in cross sectional data) are conducted. Based on condition index, multicollinearity was checked in the final assumed model, where no serious multicollinearity was found. Although the autocorrelation is usually found in the time series data, the proposed model was checked and the Durbin-Watson statistics was found 1.90 which is not significant. As the data used in this paper are cross-sectional, test for constant variance (homoscedasticity) was done based on the scatter graphs of each independent variable versus standardized residual. No violation for homoscedasticity was found. Step 3 included the estimation of parameter coefficients, adjusted coefficient of determination, the significance of the estimated parameters, and ANOVA Table.

Descriptive statistics are calculated for all variables as shown in Appendix Table 4. The five-number summary of dependent and independent data set consists of the minimum, maximum and the quartiles (1st. quartile, Q_1 ; 2nd. quartile, Q_2 ; 3rd. quartile, Q_3). From the five-number summary, the variations of the four quarters of the dependent variable are found (Q_1 -minimum=1), (Q_2 - Q_1 =1), (Q_3 - Q_2 =2) and (maximum- Q_3 =zero) respectively, where the third quarter has the greatest variation of all. The variations of the four quarters of the independent variable are found as follows: for age they are 19, 9.5, 8.5, and 20 respectively, where the first and fourth quarters have the greatest variation of all. For education they are 1, 1, 0, and 1 respectively. For internet they are 1, 1, 1, and 1 respectively. For broker they are 1, 0, 1, and 2 respectively, where the fourth quarter has the greatest variation of all. Based on the calculated means of the dependent and independent variables, we can see that most investors invest around JD30 000 or less in stock trading, which is considered limited compared to previous years. From the mean of age explanatory variable, it is obvious that most investors are of the upper age bracket. The means of the explanatory variables: education, internet, and brokers, were found approximately in the middle of their categories.

The ANOVA table tests the acceptability of the model from a statistical perspective. As shown in Table 5, the significance value of the F-statistic is less than 0.001, which means that the variations explained by the model were not due to chance. While the ANOVA table is a useful test of the model's ability to explain any variation in the dependent variable, it does not directly address the strength of that relationship. The multiple correlation coefficient, R is the linear correlation between the observed and model-predicted values of the dependent variable. R is found about 90%, where its large value indicates a strong relationship. The coefficient of determination, R^2 indicates about 82% of variations in y is explained by the proposed model and adjusted R^2 is about 81%.

After necessary checking for the classical assumptions of OLS method, and removal of insignificant variables, all remaining independent variables showed significant relationships with the degree of exposure the investor faced when holding stocks. 15 independent variables were tested, but only 4 variables proved to be statistically significant-as shown in Table 1. To determine the relative importance of the significant predictors, we checked the standardized coefficients. Even though x_1 has small absolute coefficient compared to: x_2 , x_3 and x_4 , x_1 contributes more to the model because it has a larger absolute standardized coefficient as shown in Table 3.

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Table 1. Online Commissions in the United States in Selected Months during the Years 1996 - 1998

Month – Year	Commission (per trade)
March – 1996	52.89 \$
June – 1996	50.20 \$
Sept. – 1996	46.69 \$
Dec. – 1996	34.65 \$
March – 1997	32.19 \$
June – 1997	31.66 \$
Sept. – 1997	21.10 \$
Dec. – 1997	15.95 \$
March – 1998	15.53 \$
June – 1998	15.75 \$

Table 2. Lower Commission Limit (per ten thousandth of the value) in Nine Arab Countries

The Country	The commission
Egypt – Alexandria & Cairo	1.25
Saudi Arabia	1.50
Palestine	7.20
Bahrain	10.00
Kuwait	10.00
UAE – Abu Dhabi & Dubai	27.50
Oman	40.00
Qatar	40.00
Jordan	54.00

Source: JSC, 2007.

Table 3. The estimated coefficients and their significance

Coefficients	Un-standardized	Standardized	Std. error	t-statistic	p-value
$\hat{\beta}_1$	0.04	0.68	0.01	8.36	< 0.001
$\hat{\beta}_2$	0.20	0.17	0.09	2.16	0.032
$\hat{\beta}_3$	0.25	0.22	0.06	3.91	< 0.001
$\hat{\beta}_4$	-0.18	-0.15	0.07	-2.74	0.007

Table 4. Descriptive statistics for all variables in the regression model

Variable	Minimum	maximum	Mean	Std. deviation	Skewness	kurtosis	Q1	Q2	Q3
y	1	5	2.98	1.57	0.12	-1.53	2	3	5
x_1	23	80	50.94	12.29	-0.19	-0.71	42	51.5	60
x_2	1	4	2.65	0.88	-0.45	-0.46	2	3	3
x_3	1	5	2.72	1.17	0.12	-1.13	2	3	4
x_4	1	5	2.55	1.16	0.46	-0.61	2	2	3

Table 5. ANOVA table

s.o.v	S.S	D.F	M.S	F	p-value
Regression	2773.97	4	693.49	329.48	< 0.000
Residual	623.03	296	2.11		
Total	3397.00	300			