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UNDERSTANDING ONLINE TRADERS: TRADING AND PERFORMANCE IN COMMON STOCK INVESTMENT

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Abstract

This paper analyzed the effect of online trading on investors' trading behavior based on investors' trading data provided by a major security firm in Taiwan. Our empirical findings are summarized as follows:

1. Male and the younger traders preferred online trading. Investors who had better gross return tend to switching to online trading mechanism.
2. Even though investors traded more actively after going online, their trade performance is not negatively affected.
3. Online trading does not significantly increase information-triggered trades (speculative trading), even though there is more access to information after going online.
4. Finally, the order execution efficiency of online trading is better than phone-based trading.

Keywords : online trading, trade performance

Introduction

Online trading has originally prospered in America, especially with Ameritrade being the pioneer and more and more securities companies involved in this market. Prior to the online trading phenomenon, the US securities market was primarily dominated by institutional investors. With rapid technology growth and widespread adoption along with the competitive lower transaction fees aggressively promoted by online trading brokerage firms, many retailer investors have shown tremendous interest in the online trading market. As a result, online investors have witnessed the growing trend of online trading towards the mainstream.

The online trading market in Taiwan has witnessed its dramatic growth in terms of overall trading volume since the adoption of online trading in 1997. In recent years, few researchers support the view that overconfidence of information caused by online trading leads to information-based trading and poor investment performance. It has become a worthwhile research topic to discuss the effect of such an online trading platform in the context of trading behavior and performance, specifically with aggressive promotion of competitive transaction fees and individualism by leading online trading securities firms.

Online trading platform is capable of providing extensive real-time market data and analysis to a large number of online traders. According to the investigation held by leading US investment web sites "Motley Fool" (1998) and "The Syndicate" (1998), approximately 70% interviewees indicated that research on the web was the primary channel to obtain market data and information for decision making. However, information overload without professional analysis may contribute to risky decision making process for certain investors (Barber and Odean 2002).

The primary source of the research data is from a major Taiwanese securities firm regarding its online trading activities from January 2004 through October 2005. This research is intended to investigate the behavior of online traders in the following areas:

1. What characteristics would lead traders to perform online trading?
2. What impact would online trading make to the online trading behavior and performance of the traders?
3. What effect would online trading have on information-triggered trades (speculative trading), provided that there is more access to market data and information?
4. What impact does online trading have on transaction efficiency of online investors?

Methodology

The primary data sources for this research are exacted from the intraday and the company's price information from a major Taiwanese securities firm on the investment from January 2004 through October 2005. In addition, the weekly transaction volume for each common stock and rate of return emanate from Taiwan Economic Journal (TEJ). To analyze the weekly behavior in stock trading after going online, this research assumes that all investors deal with trade in the last day of the week and ignoring the intraweek trade.

We selected 1,247 samples as the first time online traders and selected 1,247 comparison samples of non-online traders. The research methods are stated as follows:

A. Descriptive Statistic

By dividing the total samples into online and non-online groups, this research analyzes investors' attributes of becoming the online traders through descriptive statistics.

B. The effect of online trading on total turnover rate
The total turnover rate is calculated on the weekly basis to confirm investors' personal behavior in Taiwan Stock Exchange. Also we calculate the turnover rate by summarizing market capitalization of purchase and sale (half) divided by weekly balance of market capitalization. The same methods stated above are used to calculate the total turnover rate of comparative samples (before and after going online).

C. The effect of online trading on information triggered trading
Investors can obtain the latest investment information from Internet; therefore, many securities firms provide free web information to attract investors. Barber and Odean (2002) think overconfident investors will overestimate the value of their private information obtained from Internet, causing them to trade too actively. In this research, we compare the trade reaction before and after going online. We measure speculative trading by total turnover rates. Under the circumstance of higher total turnover rate, investors trade more actively due to the impact of obtaining market trade information from Internet.

D. The effect of online trading on investment performance
It is very important to discuss investment performance of online trading. In this research, we measure investment performance by examining risk-adjusted excess return. The related calculation methods and definitions are as follows:

(1) Gross return

The gross weekly return is calculated as

$$R_t^j = \frac{\sum_{i=1}^{n} W_{it}^j R_{it}}{\sum_{i=1}^{n} W_{it}^j} \quad (1)$$

Where R_t^j is the gross weekly gross return of stock j common stock in week t, R_{it} is the gross return of i common stock in week t, and W_{it}^j is

i stock market price $\times$ j common stock position divided by

$\sum_{i}^{n} (i \text{ stock market price} \times j \text{ common stock position})$

(2) Calculate risk-adjusted return

This research uses Famma-French 3 factor CAPM to calculate benchmark risk-adjusted return on measuring performance.

① estimate parameter of β_i、 s_i and h_i by 3 factor CAPM as

$$r_{it} = \beta_i (RM_t \quad RF_t) + s_i SMB_t + h_i HML_t + \varepsilon_T \quad (2)$$

r_{it}：return for stock i in week t

RM_t：weekly rate of return of TAIEX

RF_t：risk-free rate by using 1 year certificate deposit rate

SMB_t： return of portfolio in week t for small Co.
         minus return of portfolio in week t for big Co.

HML_t： return of high book-to-market ratio portfolio
         in week t for small Co. minus return of high
         book-to-market portfolio in week t for big Co.

β_i： risk parameter for market

s_i： risk parameter for company size

h_i： risk parameter for book-to-market equity ratio

② By using the parameter from 3 factor CAPM to estimate the benchmark return（ $R_t^{j \, Benchmark}$ ）for investment account

$$R_t^{j \, Benchmark} = \frac{\sum_{i=1}^{n} W_{it}^j \left[\beta_i (RM_t - RF_t) + s_i SMB_t + h_i HML_t \right]}{\sum_{i=1}^{n} W_{it}^j} \quad (3)$$

where

$R_t^{j \, Benchmark}$： benchmark risk-adjust return for account
                   j common stock in week t

W_{it}^j： Weight of market capitalization for account j
          common stock in week t on investment
          portfolio

$\left[\beta_i (RM_i - FM_i) + s_i SMB_i + h_i HML_t \right]$： benchmark risk-
                                                         adjust return for i
                                                         stock in t week

③ Calculate excess market return（ ER_t^j ）

$$ER_t^{j} = R_t^{j} - R_t^{j\ Benchmark} \qquad (4)$$

E.   The effect of information- triggered trade (speculative trading) on performance before and after going online

The effect of trade information triggered speculating trading on performance before and after going online is calculated as

$$R_t^{PB} = \frac{\sum_{i=1}^{n_t^{PB}} w_{it}^{PB} * r_{it}^{PB}}{\sum_{i=1}^{n_t^{PB}} w_{it}^{PB}} \qquad (5)$$

where

R_t^{PB} ：purchase before going online, the original return rate of portfolio for trade information triggered trading in week 2 before week *t*

$$w_{it}^{PB} = \frac{i\ \text{stock buying market price} \times \text{buying quantity}}{\sum_i^{n_t^{PB}} (i\ \text{stcok buying market price} \times \text{buying quantity})}$$

r_{it}^{PB} ： purchase before going online, the return rate of stock *i* for trade information triggered trading in week2 before *t* week

We will use the same method stated above to calculate R_t^{SB}（*SB* :sales before going online）and R_t^{PA}（*PA:*Purchase After going online）and R_t^{SA}（*SA:*Sales After going online.（$ER_t^{PB} - ER_t^{SB}$）< （$ER_t^{PA} - ER_t^{SA}$）means investors will buy better performing stocks and sell poor performing stocks because they can get more investment information such as trend analysis from online trading.

F.   The effect of online trading on investors' order execution efficiency

The order execution efficiency is calculated as

Efficiency of purchase price：$\dfrac{P_{k,H} - P_{k,B}}{P_{k,H} - P_{k,L}}$ (6)

Efficiency of sale price：$\dfrac{P_{k,S} - P_{k,L}}{P_{k,H} - P_{k,L}}$ (7)

where

$P_{k,B}$：purchase execution price in trade k of common stock

$P_{k,S}$： sale execution price in trade k of common stock

$P_{k,H}$： the highest execution price in trade k of common stock intraday

$P_{k,L}$ the lowest execution price in k trade of common stock intraday

Results
A.   Descriptive Statistics

In Table I, we illustrate descriptive information on the trading information based on our sample. Male online traders are 56.6%, and male non-online traders are 49%. The mean and median ages for the online investor are 39 and 37 respectively. The turnover rate for the online traders is higher than non-online traders. The average volume for each transaction online is lower than non-online.

Table I
Descriptive Statistic of online trader and nononline trader

	Online	Nononline	All
Male	56.6%	49.0%	52.8%
Age-Mean	38.9	40.8	40
Age-Median	37	39	38
Average account seniority	4	3	
Average Volume/ each	107,964	115,062	
Turnover/year	60.31%	43.43%	

B.   The effect of online trading on total turnover rate

In Table II we outline the change of turnover rate before and after transferring to online account based on our sample. The annual turnover rate has risen to 69.8% for online traders. After transferring to online, the rate changes from original 1.3 （40.0% and 50.9%, p<0.000）times to 1.5 times （69.8% and 47%, p<0.010）.

Table II
Total turnover rate before & after transferring account

	Before transferring account	After transferring account	Change
Online	50.8872	69.7632	18.876* (0.077)
Nononline	39.6344	47.2212	7.5868** (0.003)
Difference (online minus nononline）	11.2528*** (0.000)	22.5420* (0.010)	11.2892* (0.081)

p.s：***,**,*indicate under significance 1%,5%,10%，t-test is significant。The numeral in ( ) stands for p-value

C. The effect of online trading on trade information triggered trading

From Table III, the annual turn over rate for online traders before transferring is 50.2%. It comes to 20.3216%, decreases to 29.9% (p<0.000), different from expected.

Table III
Total turnover rate before & after transferring account
(trade information triggered trading)

	Before transferring account	After transferring account	Change
Online	50.2268	20.3216	-29.9052*** (0.000)
Nononline	23.3324	41.3452	18.0128*** (0.000)
Difference (online minus nononline）	26.8944*** (0.001)	-21.0236*** (0.000)	-47.918*** (0.000)

p.s：***,**,*indicate under significance 1%,5%,10%，t-test is significant。The numeral in ( ) stands for p-value

D. The effect of online trading on investment performance

This research measures investment performance by looking into gross return and risk-adjusted return. This research employs three-factor model（Fama and French） to calculate α_i (constant for excess return)、 β_i (parameter for market risk)、 s_i （parameter for company scale） and h_i （risk

parameter for book-to-market） as risk-adjusted return. The return rates for online and non-online before and after transferring account are shown in Table IV.

Table IV
Return rate before & after transferring account

		Before transferring account	After transferring account	Change
On-line	Gross Return	-0.1241	-0.1585	-0.0344 (0.569)
	Extra Return	1.8733	2.0019	0.1286** (0.012)
Non on-line	Gross Return	-0.2953	-0.1790	0.1163** (0.012)
	Extra Return	1.8644	2.0152	0.1508*** (0.000)
Difference (online minus nononline)	Gross Return	0.1712*** (0.008)	0.0205 (0.648)	-0.0819 (0.559)
	Extra Return	0.0089 (0.869)	-0.0133 (0.756)	-0.0222 (0.412)

p.s：***,**,*indicate under significance 1%,5%,10%，t-test is significant。The numeral in ( ) stands for p-value

E. The effect of information-triggered trading (speculative trading) on performance before and after going online

The net excess return for sales before online （$ER_t^{PB} - ER_t^{SB}$） is -1.3162 （p<0.000）. The net excess return for sales after online （$ER_t^{PA} - ER_t^{SA}$） is -1.3144 （p<0.000）. Both of them are negative, which means online traders are not able to achieve better return on investment though there is more access to information after going online.

Table V
Price execution efficiency of online and phone-based order

	Online order	Phone-based order	Difference
purchase	0.5954	0.4498	0.1456*** （p<0.000）
sale	0.5023	0.3964	0.1059*** （p<0.000）

p.s：***,**,*indicate under significance 1%,5%,10%，t-test is significant. The numeral in ( ) stands for p-value

F. The effect of online trading on investor's order execution efficiency

In Table V, the efficiency of purchase price is 0.5954 by Internet, and 0.4498 by phone. The difference is

0.1456（p<0.000）. The efficiency of sale price is 0.5023 by Internet, and 0.3964 by phone. The difference is 0.1059（p<0.000）. That means the order execution efficiency of online trading is better than phone-based trading.

Conclusions

The previous studies have focused on the effect of investors' turnover rate and performance on online trading. However, few studies have been done on the effect of order execution efficiency on online trading. This research further discusses the effect of order execution efficiency since it provides valuable information for investors for selecting trading methods in a timely manner. The paper also provides managerial implication for securities firms since it analyzes gender, age and investors' behavior of online traders.

This paper analyzes the effect of online trading on investors' trading behavior and return performance based on investors' trading data provided by a major security firm in Taiwan. Our empirical findings are summarized as follows:

1. Male and the younger traders preferred online trading. Investors who had better gross return tend to switching to online trading mechanism and reinforcing the behavior of over confidence.
2. Even though investors traded more actively after going online, their trade performance is not negatively affected.
3. Online trading does not significantly increase information-triggered trades (speculative trading), even though there is more access to information after going online.
4. The security firms offer online interface for investors to place stock orders and investors can trade quickly and conveniently with an online trading mechanism.

With the empirical study we find investors can obtain price and real time information through the online system and the order execution efficiency of online trading is better than phone-based trading.

Due to research constraints that complete investors' beginning portfolio account data could not be obtained, we can use logic inference to calculate it, which is sufficient to validate the hypothesis.

As for the research suggestions, this paper obtained investors' trading data provided by a major securities firm in Taiwan, including gender, age and tenure. In order to protect investors' personal information, we selected the virtual customer number. If we can get further detailed data (e.g., investors' education, marital status, income and investment experience….etc.) through securities firms to implement questionnaire, we can understand investors' behavior more.

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