

# DOES ONLINE TRADING AFFECT INVESTORS' TRADING INTENTION?

Ya-Hui Wang, National Chin-Yi University of Technology

## ABSTRACT

*The purpose of this study is to investigate the relationships and effects of online trading, the illusion of knowledge and control, information processing cost, trading intention, and expected performance. The research findings' show that online trading itself will increase investors' trading intentions, information processing cost, and illusion of knowledge and control. Also, the information processing cost and the illusion of knowledge and control will further raise investors' expectations about future performance directly and indirectly via trading intention, meaning that online trading tends to make investors become overconfident about their future expected performance.*

**JEL:** D83, G02, G11

**KEYWORDS:** Online Trading, Illusion of Knowledge, Illusion of Control, Information Processing Cost

## INTRODUCTION

Online trading has become a major trend in stock markets around the world because of its lower commission cost for trading, faster trade execution, more control and flexibility over the types of transaction investors choose to conduct, and no time or geographical limitations. In other words, online stock trading has created an urge to trade and a desire to have more control over what investors are investing in (Hurley, 2000).

Investors can easily find a huge amount of information through the Internet, whereas more information often increases confidence in judgments (Oskamp, 1965; Gill, Swann, and Silvera, 1998; Hall, Ariss and Todorov, 2007) and causes investors to have the illusion of knowledge. Online investors have to collect and analyze their own information and place orders through the Internet by themselves. Such an active involvement makes investors feel the probability of favorable outcomes has increased, thus creating the illusion of control. Besides, online investors have to spend much time (information processing cost) to analyze the information they acquired from the Internet to turn that information into useful knowledge.

Online trading's low cost, improved execution speed, and greater ease of access may increase investors' trading intention. The illusion of knowledge and control and information processing cost may further increase investors' intention to trade and causes them to trade too actively, which not only leads to higher transaction costs, but possibly lower returns as well. According to statistics from the Taiwan Stock Exchange (TSE), individual investors account for about 60% of stock trading value in 2013. Individual investors are often not as professional as institutional investors, and so they may be more easily influenced by the information processing cost and the illusion of knowledge and control.

Most previous studies on online trading have focused on investors' actual performance persistence by taking secondary data from the financial market. For example, Barber and Odean (2002) analyzed investors who switched from phone-based to online trading during the 1990s, finding that those investors who switched to an online trading performed well before going online, but after online trading they traded more actively, more speculatively, and less profitably. Little or no research has investigated online investors' trading intentions directly through questionnaires. Therefore, our study tries to fill this gap by using a

questionnaire format to investigate the relationships between online trading, illusion of knowledge and control, information processing cost, trading intention, and expected performance.

There are five main sections in this study. Section 2 provides some literature reviews about online trading, illusion of knowledge and illusion of control, information processing cost, trading intention, and expected performance. Section 3 outlines the design of the questionnaire and the data we employ. Section 4 presents the empirical results, and section 5 concludes the paper.

## LITERATURE REVIEW

The advancement in Internet technology has helped facilitate the growth in online trading. Online trading means trading securities through an online trading system, in contrast to traditional trading in which all activities are carried out with the aid of brokers who help and spend a lot of time with investors throughout the entire investment process. In online stock trading, investors trade stocks mainly through brokers' online platforms. These platforms are instrumental in providing extra information related to real-time stock quotes, news, graphs, and financial reports to help investors conduct their own research.

Although the process of online trading is easy and convenient, there are various advantages as well as disadvantages associated with it. The main advantages include: lower commission costs for trading, faster trade execution, no time or geographical limitations, more control and flexibility over the types of transaction investors choose to conduct, etc. However, because of its low cost, many investors may trade too actively, which not only leads to higher transaction costs, but possibly lower returns as well. There is also the probability of a trading loss in case of a mechanical or platform malfunction.

More information could improve the quality of a decision by providing more cues for decision-makers, but the key point is the information should be relevant and the decision-makers have the ability to analyze it. Investors often believe that their prediction accuracy will increase as they get more information. However, more information often increases confidence in judgments (Oskamp, 1965; Gill, Swann, and Silvera, 1998; Hall, Ariss and Todorov, 2007), while not necessarily raising the prediction accuracy of uncertain outcomes or improving decisions. For example, Keller and Staelin (1987), Stewart et al. (1992) and Hall, Ariss and Todorov (2007) all concluded that information overload can reduce the accuracy of prediction. Barber and Odean (2001) called this phenomenon the "illusion of knowledge". In other words, the illusion of knowledge is the tendency for people to believe the accuracy of their forecasts increases with more information. The illusion of control refers to a phenomenon whereby people believe their personal involvement can influence random outcomes (Langer, 1975; Langer and Roth, 1975) or the beliefs that people have influence over the outcome of uncontrollable events (Montier, 2009). Langer (1975) presented that factors such as competition, choice, familiarity, and involvement all affect the illusion of control.

Hong (2000) defined information processing costs as the costs incurred to online investors before any transaction. Because there is a huge amount of information on the Internet, online investors have to spend much time and effort on their own to seek out the relevant online information and then to use such information to calibrate their final investment decisions. In the category of online trading, trading intention is similar to behavioral intention in marketing studies. Thus, we define trading intention as behavioral intention in this study. Behavioral intention is defined as a person's perceived likelihood or subjective probability that he or she will engage in a given behavior (Armitage and Conner, 2001). Intention is almost a synonym for "I plan to do...", can be viewed as a decision to carry out a planned future behavior, and is usually associated with extrinsic behaviors (Fishbein and Ajzen, 1975). Compared to beliefs, feelings, and attitude, intention is more directly related to one's ultimate behavioral pattern.

Because investors can access much information from the Internet, it often causes them to have the illusion of knowledge. Besides, without the aid of brokers, online investors have to collect and analyze information

and place orders through the Internet by themselves. This active involvement makes investors to feel that the probability of favorable outcomes has increased, thus creating the illusion of control. Online stock trading has created a demand to trade and a desire to have more control over what investors are investing in (Hurley, 2000). Barber and Odean (2002) also showed that investors trade more actively and speculatively after going online and that the illusion of knowledge and control can explain the increase in trading by online investors. Specifically, both online trading and the illusion of knowledge and control will increase investors' intention to trade. The illusion of control makes investors to believe that the probability of favorable outcomes (higher expected performance) will increase. Investors with a higher illusion of knowledge will also further increase their confidence in judgments. In other words, investors with higher degrees of illusion of knowledge and illusion of control will expect to achieve a higher expected performance. Therefore, we set up the following five hypotheses.

*H1: Online trading has a significantly positive impact on investors' illusions of knowledge and control.*

*H3: Online trading has a significantly positive impact on investors' trading intention.*

*H4: Illusion of knowledge and illusion of control have a significantly positive impact on investors' trading intention.*

*H5: Illusion of knowledge and illusion of control have a significantly positive impact on investors' expected performance.*

*H8: Trading intention has a significantly positive impact on investors' expected performance.*

Investors can easily get a huge amount of information through the Internet, but they have to spend much time (information processing cost) to analyze the information acquired from the Internet to turn the information into useful knowledge. Perceived behavioral control is an individual's perceived ease or difficulty at performing a particular behavior and is determined by the total set of accessible control beliefs. According to Ajzen's Theory of Planned Behavior, perceived behavioral control positively impacts behavior (1985, 1991). Therefore, when investors spend more time and effort to seek out the relevant online information before the transaction, they tend to believe that they have more useful information and a better perceived ease at performing online trading and get higher returns - that is, they have higher perceived behavioral control. Thus, we suppose that information processing cost will positively impact investors' intention of online trading and expected performance. We propose the following hypothesis.

*H2: Online trading has a significantly positive impact on investors' information processing cost.*

*H6: Information processing cost has a significantly positive impact on investors' trading intention.*

*H7: Information processing cost has a significantly positive impact on investors' expected performance.*

## DATA AND METHODS

We design the items of the questionnaire for six dimensions: online trading, illusion of knowledge and control, information processing cost, trading intention, expected performance and demographic variables. These items are measured on Likert's seven-point scale, ranging from 1 point to 7 points, denoting "very disagree", "disagree", "a little disagree", "neutral", "a little agree", "agree", and "very agree", respectively. The survey was conducted from February 1 to May 1, 2013. We administered the questionnaires to stock investors living in Taiwan using random sampling. A total of 520 responses were distributed, and 500 usable responses were collected. An acceptable response rate was 96.154%. The pre-test results show that all the dimensions have a Cronbach's  $\alpha$  between 0.699 and 0.819. This means a good reliability, because the Cronbach's  $\alpha$  coefficient has a value greater than 0.7 (Nunnally, 1978; Wortzel, 1979). The results

from factor analysis indicate that all factors have an eigenvalue greater than 1, a factor loading greater than 0.6, a cumulative explained variation greater than 50%, and all the correlations between each factor and their items are greater than 0.5. This meets the criterion of convergent validity proposed by Kaiser (1958). Therefore, we use this pre-test questionnaire as our formal questionnaire.

The gauging scales are selected from the literature. Online trading is gauged by 5 items to measure investors' dependence on Internet. Illusion of knowledge and illusion of control are measured by 5 items by means of Barber and Odean (2001), Langer (1975), and Langer and Roth (1975). Information processing cost is measured by 4 items taken from Hong (2000). Trading intention is gauged by 3 items taken from Armitage and Conner (2001). Expected performance is gauged by 3 items to measure whether investors think online trading will enhance their future investment return.

## ANALYSES AND RESULTS

We perform data analyses on SPSS 13.0 and AMOS 19.0. The methods adopted include descriptive statistics analysis, reliability and validity analysis, correlation analysis, factor analysis, and structural equation modeling (SEM) analysis. Through descriptive statistics analysis in Table 1, we found that the basic attributes of major group are male (55.4%), married (58.6%), 21-30 years old (49.2%), university education level (70.2%), live in central Taiwan (68.8%), work in service industry (27.4%), and monthly income NT\$20,001-NT\$40,000 (51.0%).

Table 1: Sample Analysis

| Demographic Variables | Items                      | No of Respondents | %    |
|-----------------------|----------------------------|-------------------|------|
| Gender                | Male                       | 277               | 55.4 |
|                       | Female                     | 223               | 44.6 |
| Marital status        | Unmarried                  | 293               | 58.6 |
|                       | Married                    | 207               | 41.4 |
| Age group             | Younger than 21 years old  | 13                | 2.6  |
|                       | 21-30 years old            | 246               | 49.2 |
|                       | 31-40 years old            | 135               | 27   |
|                       | 41-50 years old            | 73                | 14.6 |
|                       | Older than 50 years old    | 33                | 6.6  |
| Education level       | Junior high school         | 8                 | 1.6  |
|                       | Senior high school         | 93                | 18.6 |
|                       | University                 | 351               | 70.2 |
|                       | Graduate school            | 37                | 7.4  |
|                       | Ph. D.                     | 11                | 2.2  |
| Monthly income (NT\$) | Lower than 20,001          | 120               | 24   |
|                       | 20,001-40,000              | 255               | 51   |
|                       | 40,001-60,000              | 87                | 17.4 |
|                       | 60,001-80,000              | 18                | 3.6  |
|                       | Higher than 80,000         | 20                | 4    |
| Residential area      | Northern Taiwan            | 93                | 18.6 |
|                       | Central Taiwan             | 344               | 68.8 |
|                       | Southern Taiwan            | 62                | 12.4 |
|                       | Eastern Taiwan             | 1                 | 0.2  |
| Occupation            | Service industry           | 137               | 27.4 |
|                       | Financial industry         | 126               | 25.2 |
|                       | Manufacturing industry     | 44                | 8.8  |
|                       | Public servants & teachers | 38                | 7.6  |
|                       | High-technology industry   | 34                | 6.8  |
|                       | Students                   | 78                | 15.6 |
|                       | Others                     | 43                | 8.6  |

*This table shows descriptive statistics analysis of the sample. The first two columns represent demographic variables and their items considered in this research. The third and fourth column reports the number of respondents and its corresponding percent, respectively.*

Cronbach’s  $\alpha$  is commonly used as an estimate of the reliability (Cronbach, 1951). It is defined to have “high reliability” when Cronbach’s  $\alpha$  coefficient has a value greater than 0.7 (Nunnally, 1978; Wortzel, 1979) or 0.8 (Guilford, 1965). As presented in Table 2, all the dimensions have a Cronbach’s  $\alpha$  near or greater than 0.7. Hence, the reliability coefficient (Cronbach’s  $\alpha$ ) of the questionnaire is within the acceptable level. Factor analysis is also taken as a tool to verify the convergent validity of the questionnaire. This study adopts principal component analysis and uses the Varimax to maximize the sum of the variance of the loading factors. We extract factors with an eigenvalue greater than 1, cumulative explained variation greater than 50%, and a factor loading greater than 0.5 (Kaiser, 1958). According to the results in Table 2, the questionnaire has convergent validity. In addition, it has content validity, because our scale and item contents are constructed according to the literature review and passed the questionnaire pre-test. The questionnaire also has discriminant validity, because the correlation coefficient of each of the two factors in Table 3 is lower than the Cronbach’s  $\alpha$  of each dimension (Gaski and Nevin, 1985).

Table 2: Reliability and Validity Test

| Dimensions (Factors)   | Eigen Value | Explained Variance | KMO   | Cronbach’s $\alpha$ |
|------------------------|-------------|--------------------|-------|---------------------|
| Online Trading         | 3.128       | 62.56%             | 0.841 | 0.809               |
| Illusions              | 2.749       | 54.98%             | 0.782 | 0.79                |
| Information Processing | 2.652       | 66.30%             | 0.76  | 0.819               |
| Trading Intention      | 2.014       | 67.13%             | 0.639 | 0.699               |
| Expected Performance   | 2.181       | 72.69%             | 0.701 | 0.812               |

*This table shows the reliability and validity test of all factors in this study. The first and third figure in each cell is the Eigen value and the Cronbach’s  $\alpha$  value, respectively. The second figure in each cell represents the explained variance of each factor*

Table 3: Correlation Analysis

| Dimensions                    | Online Trading      | Illusion            | Information Processing | Trading Intention   | Expected Performance |
|-------------------------------|---------------------|---------------------|------------------------|---------------------|----------------------|
| <b>Online Trading</b>         | 1.0000              |                     |                        |                     |                      |
| <b>Illusion</b>               | 0.522***<br>(0.000) | 1                   |                        |                     |                      |
| <b>Information Processing</b> | 0.399***<br>(0.000) | 0.453***<br>(0.000) | 1                      |                     |                      |
| <b>Trading Intention</b>      | 0.539***<br>(0.000) | 0.383***<br>(0.000) | 0.383***<br>(0.000)    | 1                   |                      |
| <b>Expected Performance</b>   | 0.466***<br>(0.000) | 0.559***<br>(0.000) | 0.476***<br>(-0.006)   | 0.593***<br>(0.000) | 1                    |

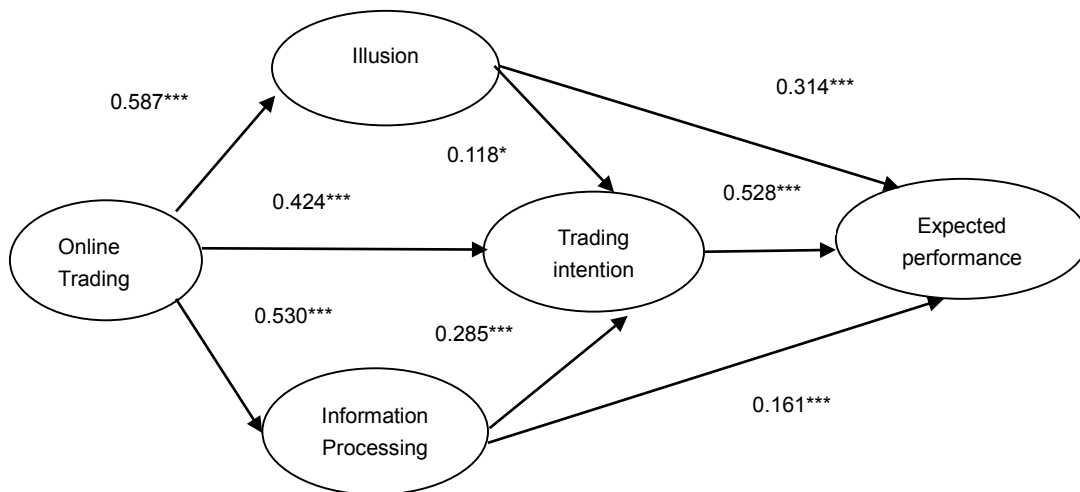
*This table shows the correlation analysis of online trading, illusion of knowledge and control, information procession cost, trading intention, and expected performance. Values on the non-diagonal are Pearson correlation coefficient between two factors. The figures in parentheses represent p-value. \*\*\*, \*\* and \* indicate significance at the 1, 5 and 10 percent levels, respectively.*

This section conducts structural equation modeling (SEM) analysis to test the fit of the factors (dimensions) of online trading, illusion of knowledge and control, information processing cost, trading intention, and expected performance. For a model with good fit, GFI (goodness of fit) should be greater than 0.8 (Brown and Cudeck, 1993). AGFI (adjust goodness of fit) should be greater than 0.8 and CFI (comparative fit index) greater than 0.9 (Hair et al., 1998; Gefen et al., 2000). RMSEA (root mean square error of approximation) should be under 0.08 (Brown and Cudeck, 1993), and the ratio of chi-square value to degrees of freedom ( $\frac{\chi^2}{df}$ ) should be no greater than 5 (Wheaton et al., 1977). The goodness-of-fit indices of

the model are as follows: GFI is 0.893, AGFI is 0.862, CFI is 0.913, RMSEA is 0.072, and  $\frac{\chi^2}{df}$  is 3.617. All these indices are within the acceptable range, meaning that the overall model fitness is good.

According to the path analysis in Figure 1, we find that online trading has a significant positive influence on illusion of knowledge and control, trading intention, information processing cost (H1, H2 and H3 are supported). Both illusion of knowledge and control and information processing cost have a significant positive influence on trading intention and expected performance (H4, H5, H6 and H7 are supported). Trading intention also has a significant positive influence on expected performance (H8 is supported). The results show that online trading will significantly increase investors' illusion of knowledge and control, information processing cost, and trading intention. Both information processing cost and illusion of knowledge and control will further encourage investors' trading intention and make them feel that their expected performance will become better.

Figure 1: Path Analysis from SEM



*This figure shows the path analysis from structural equation modeling. Values beside the path represent the standardized regression coefficients. \*\*\*, \*\* and \* indicate significance at the 1, 5 and 10 percent levels, respectively.*

## CONCLUSIONS AND IMPLICATIONS

Online trading has become a major trend in stock markets around the world. Investors can access a lot of information from the Internet, but the huge amount of information often causes them to have the illusion of knowledge and increases their information processing cost. Moreover, the active involvement also makes online investors to feel that the probability of favorable outcomes has increased, thus creating the illusion of control. It brings to a question: Will information processing cost and the illusion of knowledge and control increase online investors' trading intention and expected performance? Most previous studies on online trading have focused on investors' actual performance persistence by taking secondary data from the financial market. Little or no research has investigated online investors' trading intentions directly through questionnaires. Therefore, our study attempts to fill this gap by using a questionnaire format to investigate the relationships between online trading, illusion of knowledge and control, information processing cost, trading intention, and expected performance. The questionnaires were administered to stock investors living in Taiwan using random sampling from February 1 to May 1, 2013. The methods adopted include descriptive statistics analysis, reliability and validity analysis, correlation analysis, factor analysis, and structural equation modeling (SEM) analysis.

The results from SEM show that online trading has a positive direct effect on trading intention and also a positive indirect effect on trading intention via the intervening variables of the illusion of knowledge and control and the information processing cost. Additionally, the research findings also present that both the information processing cost and the illusion of knowledge and control have direct and indirect effects on expected performance, and the indirect effect is mediated by trading intention. In other words, the information processing cost and the illusion of knowledge and control not only raise investors' expectations about future investment performance directly, but also increase their expectations indirectly via trading intention.

The rise in trading frequency will also increase investors' transaction costs. Moreover, the information acquired from the Internet is not always relevant to investment decisions. Therefore, we suggest that online investors should be disciplined in their investments in order to prevent their profits from being eroded through transaction costs. Investors should also strengthen their professional financial knowledge as best as they can, because doing so can enhance their analytical ability to find the correct online information, decrease the illusion of knowledge and information processing cost, reduce their decision errors in the decision-making process, and helps improve their actual investment performance.

The primary limitation of this study is that it only considers expected performance, without further compare the differences between expected performance and actual performance. Future research is recommended to do this and compare the differences between them. Moreover, we only considered illusion of knowledge and control, information processing cost in this study. There are still other determinants of trading intention that could be included in more comprehensive models with possibly higher explanatory power. Finally, most of the respondents in our study are from the age group of 21-30 years old, monthly income NT\$20,001 – 40,000 persons. Therefore, the result may be biased due to the different trading behaviors among different age (income) groups. Therefore, the study can also be strengthened by balancing and comparing different age (income) groups.

## REFERENCES

- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. J. Kuhl, & J. Beckman (Eds.), *Action-control: From cognition to behavior*, 11-39. *Heidelberg: Springer*.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology*, 40(4), 471-499.
- Barber, B. M., & Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The Quarterly Journal of Economics*, 116(1), 261-292.
- Barber, B. M., & Odean, T. (2002). Online investors: do the slow die first? *Review of Financial Studies*, 15(2), 455-488.
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen, & J. S. Long (Eds.), *Testing Structural Equation Models* (pp. 136-162). Newbury Park, CA: Sage.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.

- Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Gaski, J. F., & Nevin, J. R. (1985). The differential effects of exercised and unexercised power sources in a marketing channel. *Journal of Marketing Research*, 22(2), 130-142.
- Gefen, D., Straub, D. W., & Boudreau, M. C. (2000). Structural equation modeling and regression: guideline for research practice. *Communications of the Association for Information Systems*, 4(7), 1-70.
- Gill, M. J., Swann, W. B., Jr., & Silvera, D. H. (1998). On the genesis of confidence. *Journal of Personality and Social Psychology*, 75, 1101–1114.
- Guilford, J. P (1965) *Fundamental statistics in psychology and education*, 4th Edition, New York: McGraw-Hill.
- Hair, J. R., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate Data Analysis*, 5th Edition. Macmillan, New York.
- Hall, C. C., Ariss, L., & Todorov, A. (2007). The illusion of knowledge: When more information reduces accuracy and increases confidence. *Organizational Behavior and Human Decision Processes*, 103(2), 277-290.
- Hong, S. J. (2000). Information-processing costs in online stock trading. *Electronic Markets*, 10(3), 192-196.
- Hurley, M. P. (2000). The Urge to Trade One of the great challenges planners face today is reining in their clients' urge to trade on their own-and trade too much. *Journal of Financial Planning-Denver-*, 13(10), 40-43.
- Montier, J. (2009). *Behavioral investing: A practitioner's guide to applying behavioral finance*. John Wiley & Sons.
- Kaiser, H. F. (1958). The Varimax criterion for analytic rotation in factor analysis. *Psychometrika*, 23(3), 187-200.
- Keller, K. L., and Staelin, R. (1987), "Effects of Quality and Quantity of Information on Decision Effectiveness," *Journal of Consumer Research*, 14, 200-213.
- Langer, Ellen J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, 32(2), Aug 1975, 311-328.
- Langer, E., & Roth, J. (1975). Heads I Win, Tails It's Chance. *Journal of Personality and Social Psychology*, 32(6), 951-955.
- Nunnally, J. C. (1978). *Psychometric theory*. (2nd Ed.). New York: McGraw-Hill.
- Oskamp, S. (1965). Overconfidence in case-study judgments. *Journal of Consulting Psychology*, 29(3), 261–265.



Stewart, T. R., Heideman, K. F., Moninger, W. R., and Reagan-Cirincione, P. (1992), "Effects of Improved Information on the Components of Skill in Weather Forecasting," *Organizational Behavior and Human Decision Processes*, 53, 107-134.

Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. F. (1977). Assessing reliability and stability in panel models. In Heise, D. R. (Ed.), *Social Methodology*, 8, 84-136. San Francisco: Jossey-Bass.

Wortzel, R. (1979). *Multivariate analysis*. New Jersey: Prentice Hall.

## **BIOGRAPHY**

Dr. Ya-Hui Wang is an assistant professor of Business Administration at National Chin-Yi University of Technology in Taiwan. She received her Ph.D. degree in financial management from the National Central University in Taiwan. She can be contacted at: Department of Business Administration, National Chin-Yi University of Technology, No. 57, Sec. 2, Zhongshan Rd., Taiping Dist., Taichung 41170, Taiwan, R.O.C. Phone: +886-4-2392-4505 ext. 7783. E-mail: yhwang@ncut.edu.tw.

