



香 港 樹 仁 大 學

The Behaviour of Small Investors on Hong Kong

Derivatives Markets: Factor Analysis

Tai-Yuen Hon

August 2012

經濟及金融學系

Working Paper Series

Department of Economics and Finance

Hong Kong Shue Yan University

Working Paper Series
August 2012

All Rights Reserved
ISBN: 978-988-18445-7-6
Copyright © 2012 by Hong Kong Shue Yan University

Information on the Working Paper Series can be found on the last page. Please address any comments and further inquiries to:

Dr. Shu-kam Lee
Working Paper Coordinator
Department of Economics and Finance
Hong Kong Shue Yan University
10 Wai Tsui Crescent
Braemar Hill Road
North Point
Hong Kong
Fax: 2806-8044
Tel: 2806-5179 (Mr. Ken Tsui)
Email: sklee@hksyu.edu

The Behaviour of Small Investors on Hong Kong Derivatives Markets:

Factor Analysis

Introduction

The global economic crisis has drawn increasing attention of many small investors throughout the world. In particular, they feared that some European countries, including the PIIGS (i.e., Portugal, Ireland, Italy, Greece and Spain) would encounter great difficulty in meeting their financial obligations and repaying their sovereign debts, or some even believe that they would default their debts either partially or completely. Hong Kong is a small open economy. Such a grand macroeconomic uncertainty and grave financial risk negatively impacted most if not all small investors' confidence in financial markets. Unavoidably, small investors do less-rational things in financial markets, especially when investing financial derivatives. In the present study, we attempt to analyse and study the importance factors affecting the behaviour of the small investors on derivatives markets in Hong Kong. Essentially, the purpose of this exploratory study is to find out whether small investors have adopted the behavioural finance concept which is a new approach to the study of financial markets. Exploratory factor analysis is employed to assess the reliability of the results. The data were collected from 524 respondents via a survey questionnaire. By doing so, we hope to contribute to the study of behavioural finance in the setting of an Asian financial centre, Hong Kong.

This paper is organized as follows. Section 2 provides the background of the study. Section 3 reviews the related literature, followed by Section 4 that explains the methodology of the present study and data. Section 5 reports the results, and the last section contains the conclusion.

Study Background

The Hong Kong Exchange and Clearing Limited's (HKEx) survey (2011) revealed that in 2010/11, market turnover increased 27% to 127 million contracts from 2009/10. The Hong Kong Exchange and Clearing Limited (2006) revealed that the typical Hong Kong retail derivatives investor is a 42-year-old white-collar worker, with tertiary or above education, a monthly personal income of \$22,500 and a monthly household income of about \$45,000. Compared with stock investors, derivatives investors comprise a larger proportion of males and individuals with a higher education level, higher work status, higher personal income and higher household income. Tsoi (2004) revealed that stock investors who invest also in derivatives (i.e., stock-and-derivatives investors) tend to be more active stock traders, in both bullish and bearish times. Tsoi (2002) revealed that derivatives investors tend to be younger and have higher income than stock investor. According to Park and Park (2003), and the activeness of small investors are keep on growing because of the leverage from purchasing the financial derivatives leads to a small requirement on capital base and the relatively extremely high return from financial derivatives makes the investment on these kinds of products a lot attractive for small investors.

Literature Review

Despite the importance of the factors affecting the behavior of small investors on derivatives markets, research on this segment is sparse. It is noted that interpersonal influence (Hoffmann and Broekhuizen, 2009), knowledge (Wang, 2009), and other personal factors such as psychological gender and personality traits (Duran et al., 2008) are crucial factors for investment behaviour; it is very important to examine whether and how understanding of investment (perceived level of knowledge about an

investment), which is affected by education level, influences financial risk perception of derivative instruments in the view of Hong Kong small investors. Graham et al. (2009) found that male investors, and investors with larger portfolios or more education, are more likely to perceive themselves as competent than are female investors, and investors with smaller portfolios or less education. Hoffmann and Post (2012) found that past returns positively impact investors' return expectations and risk tolerance, and negatively impact their risk perception. Some, like Korniotis and Kumar (2011), considered that older people make better investment choices as they gain more investment knowledge and experience, or whether their investment skill deteriorates with age due to the adverse effects of cognitive aging.

As risk tolerance is important to investor's assets allocations. The determinants of risk tolerance should also be closely related to the behavioral finance area. Portfolio theory contends that risk tolerance is an important factor in portfolio construction and asset allocation. What determine risk tolerance? Risk tolerance, reflecting a person's attitude towards taking on risk, is a complex psychological concept. Jackson et al. (1972) contend that risk tolerance has four dimensions: financial, physical, social, and ethical. Hoffmann et al. (2011) showed for the first time how individual investor perceptions change, drive trading and risk-taking behavior, and impact investment performance during the 2007-2009 financial crises. They noted that revisions in return expectations and risk tolerance are positively, and revisions in risk perceptions negatively, related to overall market developments. Successful investors had higher return expectations and lower risk tolerance, which led them to trade less, take less risk, and have lower buy-sell ratios. Vlaev et al. (2009) stated that salary/job uncertainty can sufficiently influence the risk tolerance (risk-taking propensity) of Hong Kong small derivative investors. Hallahan et al.

(2004) found that peoples self-assessed risk tolerance and ProQuest risk tolerance score (RTS) generally accord; there is considerable variation with a tendency for respondents to underestimate their risk tolerance. Wang and Hanna (1997) showed that risk tolerance increases with age when other variables are controlled.

According to Shefrin (2000), the financial community ignores the psychology of investing at its own peril. *Beyond Greed and Fear* illuminate behavioural finance for today's investor. It will help practitioners to recognize and avoid bias and error in their decisions, and to modify and improve their overall investment strategies.

Tversky and Kahneman (1974) defined availability as the situation which people assess the frequency or probability of an event by the ease with which instances can be brought to mind. Generally speaking, availability is the degree to which information is readily available. Availability bias exists when the investors wrongly weight the importance or relies upon available information for decision making without examining other alternatives (Shefrin, 2000; Sewell, 2010). Availability bias happens quite commonly, and it leads to less return or poor results (Kannadhasan, 2006). Singh (2012) argues that understanding of the findings of his research benefits individuals the most as it seeks to create awareness of the various human biases and the high costs they impose on their portfolio. Law (2010) argued that traditional risk disclosure requirements, which are classified in his article as financial risk disclosure, cannot sufficiently protect retail investors from cognitive and psychological biases. Wang et al. (2011) are also interested in examining whether Hong Kong small derivative investors have familiarity bias or not. Familiarity bias means investors perceive those easier-to-understand products as less risky. Kannadhasan (2006) found that an optimum investment plays an active role and is a significant consideration. There is suggestive evidence that the experience of the investor has an explanatory

role in his regard with less experienced investors being prone to extrapolation (representativeness) while more experienced investors commit gambler fallacy. Misconception of chance, it also refers to the gambler's fallacy. Gambler's fallacy is one of the representative biases (Ott, 2011). Tversky and Kahneman (1971) defined gambler's fallacy as a misconception of the fairness of the law of chance. Under gambler's fallacy, people apply small samples as well as to large samples.

Methodology

In the factor analysis, a standard score on a data item can be expressed as a weighted sum of the common factor scores, the specific factors scores, and the error factor scores. That is,

$$Z_{ik} = a_{i1}F_{1k} + a_{i2}F_{2k} + \dots + a_{im}F_{mk} + a_{is}S_{ik} + a_{ie}E_{ik} \quad (1)$$

Where

Z_{ik} is a standard score for small investor k on data item i,

a_{i1} is a factor loading for data item i on common factor 1,

a_{i2} is a factor loading for data item i on common factor 2,

a_{im} is a factor loading for data item i on the last common factor,

a_{is} is a factor loading for data item i on specific factor i,

a_{ie} is a factor loading for data item i on error factor i,

F_{1k} is a standard score for small investor k on common factor 1,

F_{2k} is a standard score for small investor k on common factor 2,

F_{mk} is a standard score for small investor k on common factor m, the last common factor,

S_{ik} is a standard score for small investor k on specific factor i,

E_{ik} is a standard score for small person k on error factor i.

Equation (1) may be represented in schematic matrix form for all values of i and k simultaneously, that is, for all data items and all small investors or other data-producing objects. The schematic matrix equation may be represented by the following matrix equation:

$$\mathbf{Z} = \mathbf{A}_u \mathbf{F}_u \quad (2)$$

Equation (2) states that the matrix of data-item scores $\mathbf{Z}$ may be obtained by multiplying the matrix of factor loading $\mathbf{A}_u$ by the matrix of factor scores $\mathbf{F}_u$. The common factor portion of $\mathbf{A}_u$ will be called matrix $\mathbf{A}$ (without the subscript u), and the common factor portion of $\mathbf{F}_u$ will be called matrix $\mathbf{F}$. We make the factor structure more interpretable. The initial extracted factor matrix must be rotated before the final factor solution is achieved. A factor matrix may be transformed to a rotated factor matrix by matrix operation $\mathbf{V} = \mathbf{A}\Lambda$, where $\mathbf{V}$ is rotated matrix, $\mathbf{A}$ is the un-rotated matrix, and Λ is an orthogonal transformation matrix in which rows and columns have sums of squares equal to 1.0 and inner products of non-identical rows or columns equal to zero. Such a transformation does not affect the capacity of the factor matrix to reproduce the original correlation matrix because

$$\mathbf{V}\mathbf{V}' = (\mathbf{A}\Lambda)(\mathbf{A}\Lambda)' = \mathbf{A}\Lambda\Lambda'\mathbf{A}' = \mathbf{A}\mathbf{I}\mathbf{A}' = \mathbf{A}\mathbf{A}' = \mathbf{R} \quad (3)$$

In other words, the transformed or rotated matrix $\mathbf{V}$ when multiplied by its transpose $\mathbf{V}'$ will reproduce the $\mathbf{R}$ matrix just as well as $\mathbf{A}$ multiplied by its transpose $\mathbf{A}'$ does. These rotations are carried out using “positive manifold” and “simple

structure,” rotational criteria that have been traditional guides in carrying out the rotation process in factor analysis. Trying to rotate to obtain nonnegative loadings is known as rotating to “positive manifold”. The idea behind positive manifold is that if the entire data item in a matrix have inter-correlations that are either zero or positive, it is unreasonable to anticipate an underlying factor with substantial negative loadings for any of data items. Thurstone (1947) developed the criterion of “simple structure” to guide the investigator in carrying out rotations of factor axes to positions of greater “psychological meaningfulness.” Bartlett’s test of sphericity and Kaiser-Meyer-Olkin measure of sampling adequacy are both tested that can be used to determine the factorability of the matrix as a whole. If Bartlett’s test of sphericity is large and significant and the Kaiser-Meyer-Olkin measure is greater than 0.6, then factorability is assumed. If the sums of squares of the loadings on the extracted factors are no longer dropping but are remaining at a low and rather uniform level, factor extraction may be reasonably terminated. Cattell’s (1966) Scree test is based on this principle. SPSS use a default option of extracting all principal factors with eigenvalues of 1.0 or more (the Kaiser-Guttman rule). The main thing to consider in deciding when to stop factoring is that it is better to err on the side of extracting too many factors rather than too few. One of the most commonly used is Cronbach’s coefficient α , which is based on the average correlation of items within a reliability test if the items are standardised. Cronbach’s coefficient α can be interpreted as a correlation coefficient; it ranges in value from 0 to 1.

Data

The data for the present study were collected from small investors in Hong Kong through a survey questionnaire. Its main purpose is to collect their opinions,

investment behaviour, and financial decision making in the derivatives market. The survey was conducted during the survey period of January to March 2012. Since the majority of Hong Kong's population is Chinese, the questionnaire was written in Chinese. After a pilot test on nineteen respondents, some amendments (such as rewording of some questions to eliminate ambiguities) were made before we finalized the questionnaire. Since some respondents did not reply to all the questions in the questionnaire, we only used the number of replies (i.e., the questions that respondents did not answer were not counted) to calculate the total number of and the percentage of the total for the individual entries.

We selected the respondents using non-probability sampling¹. A group of undergraduate students helped to distribute the questionnaires to the respondents. The target population is the small investors on derivatives markets in Hong Kong. Finally, there were 524 selected respondents who completed and returned the survey. The respondents were requested to provide an estimated percentage breakdown of their average return on investment of derivative product under study during the study period. The data set is fulfilled the assumption. A minimum of five subjects per item is required for factor analysis. As sample of 100 subjects is acceptable but sample sizes of 200+ are preferable.

Results

The results of the sampling survey questionnaire with 11 items and 524 entries collected from small investor on derivatives markets in Hong Kong during the survey period January-March 2012 are depicted in Table 1.

(Table 1 is above here)

¹ See Cochran, Mosteller, and Tukey (1954).

The importance of the 11 items in highlighting the factor of behaviour of small investor on derivatives markets in Hong Kong is presented in Table 2 and shows that all the items are statistically significant and with items showing high mean values.

(Table 2 is above here)

In order to identify the underlying dimensions of the items, which are perceived to be important by the respondents, the 11 items were then factor analysed. Initial visual assessment of the correlation matrix indicated considerable degree of inter-factor correlation (see Table 3). In addition, from the correlation matrix, the Barlett test of Sphericity ($p < 0.0000$) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy index (value of 0.612) confirm the appropriateness of the data for exploratory factor analysis (EFA).

(Table 3 is above here)

Given that the aim was to identify the minimum number of factors that would account for the maximum portion of variance of original items, the principal component analysis was selected (Nunnally, 1978) to reduce the number of factors where the eigenvalue greater than 1 and a cumulative percentage of variance explained being greater than 50 per cent were the criteria used in determining the number of factors. On the basis of the criteria five factors were extracted (see Table 4). The five factors, collectively, accounted for a satisfactory 68.342 per cent of the variance. Communality values in between 1.0 and 0 indicate partial overlapping between the items and the factors in what they measure. Furthermore, the communality column, provides further evidence of the overall significance, albeit, moderate, of the solution.

(Table 4 is above here)

The underlying rationale for the Scree test is based on the fact that within a set of items, a limited number of factors are measured more precisely than the others. By graphing the eigenvalues, we found that the smaller factors form a straight line sloping downward. The dominant factors will fall above the line. Figure 1 demonstrates a five factor solution.

(Figure 1 is above here)

Having established that the analysis has provided a stable solution, examination of the varimax-rotated factor loading was performed (see Table 5). The cumulative factors revealed that the first factor accounts for 21.07 per cent of the solution. The second factor accounts for 37.547 per cent of the variance. The third factor accounts for 49.067 per cent of the variance. The fourth factor accounts for 59.097 per cent of the variance. Finally, the fifth factor accounts for 68.342 per cent of the variance.

(Table 5 is above here)

After the rotation, there are no negative loadings on of any consequence on either factor I, factor III or factor V. The rotated factors that represent the meaningful constructs ordinarily should not exhibit these large negative loadings. So, we eliminated item 5 in factor II and item 8 in factor IV. Then, we found five factors affecting the behavior on derivatives markets in Hong Kong as follows: factor A might be interpreted as personal background (including age, personal income and investment experience); B as return performance (including average income on investment of derivative products); C as risk tolerance (including personal level of tolerance for investment risk and the total amount in small investor's portfolio of derivative products); D as cognitive style (including cognitive of small investor sell or close their position of time length in derivative products and the cognitive of investor education provide by the related government); later factor E as reference group

(including commentators' recommendations from newspapers/TV/magazines, relatives/friends, Internet, investment consultants, companies' annual reports). The specific name given to each factor is designed to reflect an item or notion that conceptually relates to the rest of the items under a particular factor.

(Table 6 is above here)

Also, reliability test is reported in Table 6. At this point only initial of internal reliability of the expected factors was performed in the form of Cronbach's coefficient α . For the purposes of this study, the cut off value adopted was 0.5 (Nunnally, 1978) and the acceptable benchmark level of item-to-total correlation was set above 0.3. Following the decision relating to the internal reliability and in line with Hair et al. (1988), the factors were re-specified. This was undertaken to further reduce the number of factors. The internal reliability of the first structure was tested and the decision results provide evidence as to the weakness of the structure since one factor (factor A) exceeded the adopted criteria. It is found that factor A contains three items and relates to "personal background". Factor C is made up of two items and refers to "risk tolerance". Finally, factor D comprises two items and deal with "cognitive style". The derived scales appear to possess moderate to weak internal consistency. So, we eliminated factor C and D.

(Table 7 is above here)

In order to examine possible differences in the perceived importance of five factors, the results indicate that out of four criteria (rotated principal component loadings, scree test, KMO and Bartlett's test, reliability test) examined, only three factors (personal background, return performance, reference group) are significant. Based on these results, one can derive the following ascending order of importance:

1. Return performance

2. Reference group
3. Personal background

Conclusion

By the factor analysis, we point out the five factors affecting the behavior of small investors on derivatives markets in Hong Kong. The factors are personal background, reference group, return performance, risk tolerance and cognitive style.

The factor of personal background includes age, personal income and investment experience; the factor of reference group includes commentators' recommendations from newspapers/TV/magazines, relatives/friends, Internet, investment consultants, companies' annual reports; the factor of return performance includes average income on investment of derivative products; the factor of risk tolerance includes personal level of tolerance for investment risk and the total amount in small investor's portfolio of derivative products; the factor of cognitive style includes cognitive of small investor sell or close their position of time length in derivative products and the cognitive of investor education provide by the related government.

In order to examine possible differences in the perceived importance of five factors, the results indicate that out of four criteria (rotated minimum residual solution, scree test, KMO and Bartlett's test, reliability test) examined, only three factors (personal background, reference group, return performance) are significant. Consequently, it can be concluded that the behavior of small investor on derivatives markets in Hong Kong have uniform views as to the ascending order of importance of return performance, reference group and personal background.

References

- Cattell R. B., 1966. Handbook of Multivariate Experimental Psychology. Chicago: Rand McNally, 1966.
- Cochran, Mosteller, and Tukey, 1954. Principles of Sampling. Journal of the American Statistical Association, Vol. 49, pp. 13-35. The paper was reproduced in Cochran, William G., 1982. Contributions to Statistics. John Wiley & Sons, 55.32.
- Comrey A. L. and Lee H. B., 1992. A First Course in Factor Analysis. Second edition, Lawrence Erlbaum Associates, Publishers.
- Durand R.B., Newby R. and Sanghani J., 2008. An Intimate Portrait of the Individual Investor. The Journal of Behavioral Finance, 9, pp.193-208.
- Graham J. R., Harvey C. R. and Huang H., 2009. Investor Competence, Trading Frequency and Home Bias. Management Science, Vol. 55, No. 7, pp. 1094–1106, July.
- Hair J.F., Anderson R. E., Tatham R.L. and Black W.C., 1998. Multivariate Data Analysis. 4th ed., Macmillan Publishing Company, New York, NY.
- Hallahan T. A., Faff R. W., and McKenzie M.D., 2004. An Empirical Investigation of Personal Financial Risk Tolerance. Financial Services Review, 13, pp.57-78.
- Hoffmann A. O. I. and Broekhuizen T. L. J., 2009. Susceptibility to and Impact of Interpersonal Influence in An Investment Context. Journal of the Academy of Marketing Science, 37, pp. 488-503.
- Hoffmann A. O. I. and Post T., 2012. What Makes Investors Optimistic? What Makes Them Afraid? Working paper, Maastricht University and Netspar, The Netherlands, March.
- Hoffmann A. O. I., Post T. and Pennings J. M. E., 2011. Individual Investors and the Financial Crisis: How Perceptions Change, Drive Behaviour, and Impact Performance. Working paper, Maastricht University and Netspar, July.
- Hong Kong Exchanges and Clearing Limited, 2006. Online Trading Becomes More Popular – Findings of Retail Investor Survey 2005. Research & Planning Department, April.
- Hong Kong Exchanges and Clearing Limited, 2011 Derivatives Market Transaction Survey 2010/11. Research & Corporate Development, November.
- Jackson D. N., Hourany L. and Vidmar N. J., 1972. A four dimensional interpretation of risk-taking. Journal of Personality, 40, pp.483-505.
- Kannadhasan M., 2006. Role of Behavioural Finance in Investment Decisions. Working paper, Bharathidasan Institute of Management.

Korniotis G. M. and Kumar A., 2011. Do Older Investors Make Better Investment Decision? *The Review of Economics and Statistics*, 93(1): pp.244-265.

Law M.K.H., 2010. Behavioural Risk Disclosure and Retail Investor Protection: Reflections on the Lehman Brothers Minibonds Crisis. *Hong Kong Law Journal*, pp.15-42

Nunnally J. C., 1978. *Psychometric Theory*. McGraw-Hill Publishing, New York. N.Y.

Ott D., 2011. *Behavioral Finance Series: Representative Bias*. Acropolis, May.

Park Y.C. and Park D., 2003. Creating Regional Bond Markets in East Asia: Rationale and Strategy. The 2nd Annual Conference of PECC Finance Forum, Issues and Challenges for Regional Financial Cooperation in the Asia-Pacific, July.

Shefrin H., 2000. *Beyond Greed and Fear- Understanding Behavioral Finance and the Psychology of Investing*. Financial Management Association Survey and Synthesis Series, Harvard Business School Press.

Sewell M. 2010. *Behavioural Finance*. Working paper, University of Cambridge.

Singh S., 2012. Investor Irrationality and Self-Defeating Behavior: Insights from Behavioral Finance. *The Journal of Global Business Management*, Vol. 8, No. 1, February.

Thurstone L.L., 1947. *Multiple Factor Analysis*. Chicago: University of Chicago Press.

Tsoi E., 2002. Increasing Investor Participation: Insights from HKEx Surveys. *SFC Quarterly Bulletin*, Summer.

Tsoi E., 2004. Understanding Investors in the Hong Kong Listed Securities and Derivatives Markets. *SFC Quarterly Bulletin*, Summer.

Tversky A. and Kahneman, D., 1971. Belief in the Law of Small Numbers. *Psychological Bulletin*, American Psychological Association, Vol. 76(2), pp.105-110.

Tversky A. and Kahneman D., 1974. Judgment under Uncertainty: Heuristics and Bias. *Science* 185, No.415, pp.1124-1131.

Wang A., 2009. Interplay of Investors' Financial Knowledge and Risk Taking. *The Journal of Behavioral Finance*, 10, pp.204-213.

Wang H. and Hanna S., 1997. Does Risk Tolerance Decrease With Age? *Financial Counselling and Planning*, Vol. 8 (2).

Wang M., Keller C. and Siegrist M., 2011. The Less You Know, the More You Are Afraid of-A Survey on Risk Perceptions of Investment Products. *The Journal of*

Behavioral Finance, 12, pp.9-19.

Vlaev I., Chater N. and Stewart N., 2009. Dimensionality of Risk Perception: Factors Affecting Consumer Understanding and Evaluation of Financial Risk. The Journal of Behavioral Finance, 10, pp.158-181.

Table 1: Responses to various items

Items and responses	No. of counts	% to total
1. Age group:		
18 – 24 years old	172	33.0
25 – 34 years old	156	29.8
35 – 44 years old	76	14.5
45 – 54 years old	79	15.3
55 – 64 years old	34	6.5
over 65 years old	5	1.0
2. Average monthly income:		
Below HK\$5,000	110	21.1
HK\$5,000 -HK\$9,999	71	13.6
HK\$10,000 - HK\$14,999	88	16.9
HK\$15,000 - HK\$19,999	94	18.0
HK\$20,000 - HK\$24,999	77	14.8
HK\$25,000 - HK\$29,999	32	6.1
HK\$30,000 - HK\$49,999	38	7.3
HK\$50,000 or above	12	2.3
3. How long have you invested in financial market?		
Nil	43	8.2
Less than 1 year	95	18.1
1 – 3 years	178	34.0
3 – 5 years	92	17.6
5 – 10 years	71	13.5
Above 10 years	45	8.6
4. What is your average return on investment of derivative products?		
Loss	76	18.2
Average Return less than 10%	143	34.2
Average Return 10 – 30%	137	32.8
Average Return 30 – 50%	48	11.5
Average Return 50 – 100%	12	2.9
Average Return more than 100%	2	0.5
5. During January 2011 to January 2012, do you satisfy with average returns of your financial derivatives investment?		
Very satisfied	9	2.2
Satisfied	127	30.4
Normal	157	37.6
Dissatisfied	89	21.3
Very dissatisfied	36	8.6

Items and responses	No. of counts	% to total
6. What is your personal level of tolerance for investment risk?		
Very Low	9	2.2
Low	62	14.8
Medium	171	40.9
High	152	36.4
Very High	24	5.7
7. Comparing to the total amount in your investment portfolio, how much do you invest in derivative products:		
Less than 10%	92	22.0
10 – 30 %	192	45.9
30 – 50 %	91	21.8
50 – 99 %	31	7.4
100%	12	2.9
8. What do you think the risk level in investing financial derivatives?		
Very Low Risk	2	0.4
Low Risk	18	3.4
Medium Risk	125	23.9
High Risk	281	53.7
Very High Risk	97	18.5
9. When did you mostly sell or close out your position when you invested in financial derivatives during January 2011 to January 2012?		
Within one day	14	3.4
Within one week	120	28.6
Within one month	170	40.8
Within three months	82	19.7
Within one year	28	6.7
More than one year	3	0.7
10. Do you think the small investor education provided by the related government department is adequate?		
Very Inadequate	72	13.8
Inadequate	233	44.6
No Opinion	165	31.5
Adequate	48	9.2
Very Adequate	5	1.0

Items and responses	No. of counts	% to total
11. Which type of information and opinion will affect your decision in investing financial derivative mostly?		
Nil	12	2.9
Newspapers, TV, magazines, etc.	108	25.8
Relatives and friends	43	10.3
Internet	158	37.8
Investment Consultants	72	17.2
Companies' Annual Reports	20	4.8
Others	5	1.2

Note: percentage not always adding up to 100 due to rounding-up.

Table 2: Descriptive statistics

Item	Item name	Mean	Std. Deviation	T	Df	Sig. (two-tailed)
1	Age	2.35	1.303	41.236	521	0.000
2	Personal Income	3.51	1.947	41.167	521	0.000
3	Investment Experience	3.36	1.369	56.152	523	0.000
4	Average Return	2.48	1.037	48.916	417	0.000
5	Satisfaction	3.04	0.974	63.793	417	0.000
6	Risk Tolerance	3.29	0.864	77.750	417	0.000
7	Investment Portfolio	2.23	0.970	47.038	417	0.000
8	Risk Level	3.87	0.761	116.120	522	0.000
9	Sell/Close out Position	3.00	0.977	62.661	416	0.000
10	Investor Education	2.39	0.869	62.880	522	0.000
11	Information/Opinion	3.60	1.307	56.278	417	0.000

Table 3: factor correlation matrix

Item	1	2	3	4	5	6	7	8	9	10	11
1	1.000										
2	0.449**	1.000									
3	0.595**	0.408**	1.000								
4	0.007	0.200**	0.109*	1.000							
5	-0.087*	-0.169**	-0.101*	-0.607**	1.000						
6	-0.028	0.035	0.045	0.101*	0.044	1.000					
7	-0.215**	-0.084*	-0.092*	0.265**	-0.022	0.305**	1.000				
8	-0.089*	-0.063	-0.080	-0.197**	0.168**	0.039	-0.136**	1.000			
9	0.065	0.158**	0.077	0.107*	-0.086*	-0.097*	-0.008	-0.168**	1.000		
10	0.094*	0.044	0.126**	0.137**	-0.161**	0.093*	0.151**	0.171**	0.146**	1.000	
11	-0.058	0.154**	-0.007	0.129**	-0.120**	-0.006	0.094*	-0.055	0.132**	0.071	1.000

Notes: *Correlation is significant at the 0.05 level (one-tailed) and **Correlation is significant at the 0.01 level (one-tailed)

Extraction method: principle component analysis, Rotation method: Varimax with Kaiser Normalization,

Kaiser-Meyer-Olkin (KMO) index: 0.612, Bartlett's test of Sphericity: $p < 0.0000$

Item name (see also Table 3) 1. Age, 2. Personal Income, 3. Investment Experience, 4. Average Return, 5. Satisfaction, 6. Risk Tolerance, 7. Investment Portfolio, 8. Risk Level, 9. Sell/Close out Position, 10. Investor Education, 11. Information/Opinion

Table 4: Principal component analysis

Item	Item name	Communality	Factor	Eigenvalue	Per cent of variance	Cumulative per cent
1	Age	0.761	1	2.319	21.077	21.077
2	Personal Income	0.653	2	1.812	16.470	37.547
3	Investment Experience	0.702	3	1.267	11.520	49.067
4	Average Return	0.810	4	1.103	10.030	59.097
5	Satisfaction	0.811	5	1.017	9.244	68.342
6	Risk Tolerance	0.717				
7	Investment Portfolio	0.656				
8	Risk Level	0.542				
9	Sell/Close out Position	0.583				
10	Investor Education	0.501				
11	Information/Opinion	0.782				

Table 5: Varimax - rotated principal component loadings

Item	Factors					Item name	Factor
	I	II	III	IV	V		
1	0.851					Age	A
2	0.713					Personal Income	A
3	0.826					Investment Experience	A
4		0.864				Average Return	B
5		-0.885				Satisfaction	B
6			0.833			Risk Tolerance	C
7			0.718			Investment Portfolio	C
8				-0.707		Risk Level	D
9				0.540		Sell/Close out Position	D
10				0.655		Investor Education	D
11					0.873	Information/Opinion	E

Factor names are A: Personal Background; B: Return Performance; C: Risk Tolerance; D: Cognitive Style; E: Reference Group.

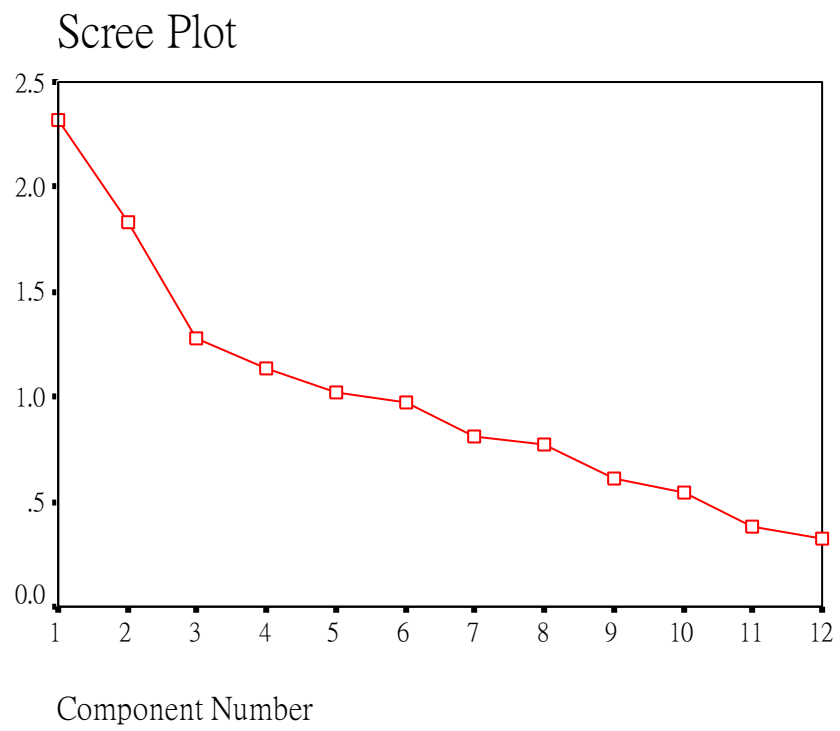
Table 6: Internal consistency and related decisions of first structure

Factors and items	Item-total correlation	α value	Decision
Factor A (Personal Background)			
Age	0.5060	0.6662	Retained
Personal Income	0.4744		
Investment Experience	0.5123		
Factor C (Risk Tolerance)			
Risk Tolerance	0.3036	0.4634	Eliminated
Investment Portfolio	0.3036		
Factor D (Cognitive Style)			
Sell/Close out Position	0.1458	0.2527	Eliminated
Investor Education	0.1458		

Table 7: Internal consistency of final revised structure

Items	Number of item	Item-total correlation	α value
Factor A (Personal Background)			
Age	3	0.5060	0.6662
Personal Income		0.4744	
Investment Experience		0.5123	
Factor B (Return Performance)			
Average Return	1		
Factor E (Reference Group)			
Information/Opinion	1		

Figure 1: A scree plot



The working paper series is a series of occasional papers funded by the Research and Staff Development Committee. The objective of the series is to arouse intellectual curiosity and encourage research activities. The expected readership will include colleagues within Hong Kong Shue Yan University, as well as academics and professionals in Hong Kong and beyond.

Important Note

All opinions, information and/or statements made in the papers are exclusively those of the authors. Hong Kong Shue Yan University and its officers, employees and agents are not responsible, in whatsoever manner and capacity, for any loss and/or damage suffered by any reader or readers of these papers.



Department of Economics and Finance
Hong Kong Shue Yan University