



香 港 樹 仁 大 學

**Investment Risk Tolerance:
A Survey in Hong Kong**

Thomas Wai-kee YUEN
Chris Wang-Wai CHEN

April 2008

經 濟 學 系

Working Paper Series

**Economics Department
Hong Kong Shue Yan University**

Working Paper Series
April 2008

All Rights Reserved
ISBN: 978-962-8719-85-3
Copyright © 2008 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
Hong Kong Shue Yan University
10 Wai Tsui Crescent
Braemar Hill Road
North Point
Hong Kong
Fax: 28068044
Tel: 25707110
Email: sklee@hksyu.edu

Investment Risk Tolerance: A Survey in Hong Kong

Thomas Wai-kee YUEN
Department of Economics
Hong Kong Shue Yan University
Braemar Hill
Hong Kong, CHINA

Tel: (852) 2806-5171
Fax: (852) 2806-8044
Email: wkyuenhksyu@yahoo.com.hk,
wkyuen@hksyu.edu

Chris Wang-Wai CHEN
Department of Accounting
Hong Kong Shue Yan University
Braemar Hill
Hong Kong, CHINA

Tel: (852) 2570-7110
Fax: (852) 2806-8044
Email: wwchen@hksyu.edu

Abstract

This paper investigates some of the determinants of investment risk tolerance. Data was collected by means of a survey conducted by “Shue Yan Economics and Well-being Research” during the first two weeks of March 2007. A total of 2,994 randomly selected respondents participated in interviews. Among these respondents, 2,446 had participated in some type of investment in the last year while 548 respondents had not participated in investment activity last year. The results of the survey show that: 1) the investment risk tolerance of those respondents who did not participate in investment activity was much lower than the risk tolerance of those respondents who participated in investment activities last year, 2) the investment risk tolerance of the friends and family of the respondents affect the investment risk tolerance of the respondents, and 3) those in a high income group tend to have the highest investment risk tolerance of the respondents. These empirical findings provide important information for financial planners as well as individuals in preparing investment profiles.

Keywords: “investment risk tolerance” and “survey”

JEL: D81, G14, G10

Investment Risk Tolerance: A Survey in Hong Kong

1. Introduction

From 2006 to 2007, stock markets experienced very high turnovers, and many investment financial indexes such as the Dow Jones index, the Australia stock market index, and the Hong Kong Hang Seng Index reached historic high points. Many raw materials along with petroleum also hit peak prices. In such an active investment atmosphere, data collection is vital to analysing investor behaviour. Understanding risk tolerance is a pre-requisite in constructing an optimal portfolio; therefore a golden opportunity is herein presented to do a quantitative research on the relationship between risk tolerance and demographic, socioeconomic, community, and economic factors.

2. Literature Review

With risk tolerance as an important factor in portfolio construction and assets previous studies have already focused on the following points:

- Which type of individual is relatively risk averse?
- How do individuals make investment decisions?
- What factors determine risk tolerance?
- Do different income groups have different levels of risk tolerance?
- Do gender and marital status hold any influence?

These research questions have been extensively discussed in the literature and numerous studies have also identified many demographic factors to be the determinants of risk tolerance. Thus, a prospect theory of behavioural finance assuming that individual investment decisions are affected by past experiences and

thought presents a very interesting topic of study. As risk tolerance is important to investor assets allocation, the determinants of risk tolerance should also be closely related to the behavioural finance arena.

Portfolio theory contends that risk tolerance is an important factor in portfolio construction and assets allocation. What determines risk tolerance? This literature review will briefly examine existing literature that addresses this question.

Geoff Davey (2004) defines risk tolerance as the extent to which a person chooses to risk experiencing a less-favourable outcome in the pursuit of a more-favourable outcome. Previous studies of risk tolerance suggest that demographic and socioeconomic factors such as age, gender, education level, marital status, number of dependents, wealth, and income are very important determinants (Wang & Hanna 1997; Grable & Joo, 1997; Grable & Lytton, 1998; Hanna, Gutter, & Fan, 1998; Grable 2000, Grable & Lytton, 2000; Hariharan, Chapman, & Domain, 2000; Gollier & Zeckhauser, 2002). Financial planners often find it convenient to use these factors to segregate individuals into different level of risk tolerance.

Empirical studies in the literature focus largely on the influence of demographic and socio-economic factors. Among them, an often-cited factor is age. Earlier studies generally suggest a negative relationship between age and risk tolerance. Wallach and Kogan [1961], for example, conclude that older people are more conservative in risk-taking than younger people. In other words, young people and elderly people show different attitudes towards risks. Cohn and Koger [1975] also find that the proportion of risk assets in one's portfolio is positively correlated with income and age, and negatively correlated with marital status. Lease, Lewellen and Schlarbaum [1974] report that there is a positive correlation between age and the proportion of assets invested in the "dividend income" securities, which are thought to

be safer. Besides these examples, many other studies also find that risk tolerance decreases with age (McInish [1982]; Morin & Suarez [1983]; Riley and Chow [1992]; Palsson [1996]; Sung and Hanna [1996]).

However, the emphasis on age does not go unchallenged. Grable & Lytton (1998), for instance, add an objectivity assessment and find that age is not the sole factor in measuring risk tolerance. However, their conclusion is based only on simple statistics such as mean and standard deviation of a small sample. More rigorous studies have to be done to substantiate their findings. Along this vein, though the results are based on a much smaller sample, many other studies (Wang & Hanna 1997; Grable & Joo, 1997; Hanna, Gutter, & Fan, 1998; Grable 2000, Hariharan, Chapman, & Domain, 2000; Gollier & Zeckhauser, 2002) also find that age is not the sole factor influencing risk tolerance.

In sum, there was an undue emphasis on the factor of age. Recent studies suggest factors such as gender, marital status, wealth, income, education, and occupation should also be taken into consideration when segregating investors into different risk tolerance categories.

Gender is another demographic factor that has been extensively analysed in the literature. Research generally shows that men take greater risks than women. Thus, they conclude that gender is one of the factors that influence risk tolerance (Bajtelsmit & Bernasek, 1996; Bajtelsmit & VanDerhei, 1997; Sung & Hanna, 1996b; Powell and Ansic, 1997, Hallahan, Faff and McKenzie, 2004; Roszkowski and Grable, 2005; Watson and Mchaughton, 2007). For instance, Watson and Mchaughton [2007] examine the impact of gender on the retirement fund risk tolerances of staff and, after controlling for age and income, report that women generally choose less risky assets. Marital status and the number of dependents are also commonly used by investment

advisors as factors that influence risk tolerance. Roszkowski (1993) identifies marital status as an effective factor in distinguishing risk tolerance among investors. Cohn and Koger (1975) find that single individuals hold a larger portion of risky assets rather than married couples do. Terrence, Robert and Michael (2004), mentioned above, also agree that marital status is a significant determinant of risk-taking. The possible rationale behind it is that married couples have greater responsibilities with heavier burdens of a family. Therefore, they are less likely to invest in riskier assets. Yet again, not all researchers agree on the importance of marriage on risk tolerance. For instance, Haliassos & Bertaut (1995), Masters (1989) and McInish (1982) report that they could not find any statistically significant relationship between marital status and risk tolerance. Marital status, like gender and other demographic factors, should at most be considered as only one of the factors that influence risk tolerance.

Some studies suggest that the education level of investors also influences their risk tolerance. Individuals with higher education are found to take more risk (MacCrimmon & Wehrung, 1986; Baker & Haslem, 1974; Haliassos & Bertaut, 1995; Sung & Hanna, 1996; Terrence, Robert and Michael, 2004). However, it could be argued that individual financial knowledge is actually more important than general education achievement in influencing risk-taking attitude. For example, a person with a Master's degree in geography may be more risk adverse than an eighth grader with greater investment experiences. Yet, there is not sufficient research on this front.

In the literature, income and wealth are often considered as key indicators of risk tolerance (Blume, 1978; Cicchetti & Dubin, 1994; Cohn, Lewellen, Lease & Schlarbaum, 1975; Friedman, 1974; Riley & Chow, 1992; Schooley & Worden, 1996; Shaw, 1996; Xiao & Noring, 1994). Researchers generally conclude that richer investors can afford greater loss. Therefore, their investment would be more

aggressive. For example, Cohn, Lewellen, Lease & Schlarbaum, (1975) discovered that wealthier individuals in 1970 with over US\$350,000 in assets allocated 75% or above of their savings to risky assets. Clearly, individual risk tolerance can be measured by using income and wealth as a predictor. Investment advisors can use this factor to judge their clients' ability to accept risk.

However, it should be noted that wealth is often correlated with other demographic factors. For instance, it is highly conceivable that wealth is positively correlated with age. Without the proper procedures to distinguish them, the studies cited above probably have identification problems and may have overstated the importance of wealth in risk-tolerance determination.

In summary, there have been numerous studies on the determinants of risk tolerance. One of the contributions of this paper is to update the existing literature and check if previous results are still applicable to the current generation.

To our knowledge, no academic studies have been carried out on an Asian sample to study risk tolerance. Differences in values and societal hierarchy in different cultures could possibly alter the structural relationship between risk tolerance and demographic and socio-economic factors. A study based on an Asian sample has long been needed to confirm whether previous results are applicable across different cultures.

3. Survey

Data for this study was collected by means of a survey conducted by “Shue Yan Economics and Well-being Research” during the first two weeks of March 2007. A total of 2,994 randomly selected respondents participated in interviews. Among these respondents, 2,446 had participated in some type of investment in the last year

while 548 respondents had not participated in investment activity last year. The margin of sampling error was estimated to be $\pm 1.83\%$ at a 95% confidence level. Since the majority of Hong Kong's population is Cantonese speaking, the original questionnaire was written in Chinese.

3.1 Questionnaire Design and Statistical Summary

The questionnaire consisted of two main sections and all answers were ranked in an ordinal scale. Section 1 collected personal information on the respondents, such as: gender, marital status, education level, age, and household income.

Table 1: Distribution of respondents that participated in investment activities last year

| Gender | | Age | | Education | | Monthly Household Income | |
|--|--------------------|-------------|--------------------|-------------------------------------|--------------------|--------------------------------|--------------------|
| Male | 52.21% (40.33%) | 18-24 | 32.50% (55.11%) | Primary | 6.50% (13.14%) | below \$8000 | 2.66% (6.57%) |
| Female | 47.79% (59.67%) | 25-34 | 28.25% (14.60%) | Secondary | 32.34% (25.36%) | \$8,000-\$15,999 | 17.95% (29.20%) |
| Marital Status | | 35-44 | 16.64% (7.85%) | Post-Secondary school or equivalent | 16.35% (16.42%) | \$16,000-\$29,999 | 37.00% (39.60%) |
| Single | 52.17% (62.96%) | 45-55 | 13.57% (9.49%) | University | 44.81% (45.07%) | \$30,000-\$49,999 | 28.66% (16.61%) |
| Married | 43.79% (32.66%) | 55-65 | 6.91% (6.20%) | | | \$50,000 or above | 13.74% (8.03%) |
| Other | 4.05% (4.38%) | 65 or above | 2.13% (6.75%) | Number of Family Members | | Monthly Personal Income | |
| | | | | 1 | 1.64% (1.46%) | below \$5000 | 20.40% (56.20%) |
| Notes: 1. () data describing respondents with no investment in the last year 2. Total number of respondents with investment in the last year: 2446 3. Total number of respondents with no investment in the last year: 584 4. Income in Hong Kong Dollars | | | | 2 | 10.79% (6.20%) | \$5,000-\$14,999 | 44.48% (32.66%) |
| | | | | 3 | 24.41% (22.81%) | \$15,000-\$29,999 | 25.63% (8.76%) |
| | | | | 4 | 38.14% (41.06%) | \$30,000-\$49,999 | 7.11% (1.82%) |
| | | | | 5 or more | 25.02% (28.47%) | \$50,000 or above | 2.37% (0.55%) |

Table 1 reports the distribution of the respondents. Table 1 shows that the distributions of the respondents that did not participate in investment activities in the last year, in general, are of low personal income, low education, and are younger than those that participated in investment activities in the last year.

The second part of the questionnaire asked questions related to risk tolerance. Questions 1 and 2 in Section 2 asked respondents to describe the investment risk tolerance of their family members and friends. Table 2 shows that in general more than 75% of the respondents reported that their family members and friends have moderate, low, or very low risk tolerance. In addition, respondents that did not participate in any investment activities in the last year, in general, report that their friends and family members have lower investment risk tolerance than those that participated in investment activities in the last year.

Table 2: Self-reported investment risk tolerance

| Q1) In general, how would you describe the investment risk tolerance of your family members? | | | | | |
|--|-------------------------|--------------------|-------------------------|---------------------|--------------------------|
| Investment in last year | Very low risk tolerance | Low risk tolerance | Moderate risk tolerance | High risk tolerance | Very high risk tolerance |
| Yes | 8.42% | 33.16% | 46.20% | 11.24% | 0.98% |
| No | 19.71% | 40.88% | 33.21% | 5.11% | 1.09% |
| Q2) In general, how would you describe the investment risk tolerance of your friends? | | | | | |
| Investment in last year | Very low risk tolerance | Low risk tolerance | Moderate risk tolerance | High risk tolerance | Very high risk tolerance |
| Yes | 3.97% | 21.10% | 49.02% | 22.44% | 3.48% |
| No | 14.78% | 28.65% | 38.14% | 15.51% | 2.92% |

Question 3 of Section 2 reviews that the type of information source provided most affects the respondents' decision to make investments. Table 3 shows that a large portion of the respondents that participated in investment activities in the last

year, tend to rely on information provided by mass media (around 24%) or by family members or friends (around 28%) to make their investment decisions. In addition, over 35% of respondents that did not participate in investment activities in the last year, never consider any investment information.

Table 3: Main information to make decisions on investments

| Q3) What type of information source provided most affects your decision to make investments? | | | | | | | |
|--|-----------------------------------|---------------|------------------------------|-------------|-------------------------------------|-----------------------|---------------------------------|
| Investment in last year | 1= Never consider any information | 2= Mass media | 3= Family members or friends | 4= Internet | 5=Investment consultants or brokers | 6= Company prospectus | 7= Other sources of information |
| Yes | 6.09% | 24.45% | 28.70% | 10.14% | 18.23% | 6.99% | 5.40% |
| No | 35.77% | 18.25% | 24.09% | 5.47% | 9.67% | 3.10% | 3.65% |

Since economic perspective in general will affect the investment decisions, Question 4 of Section 2 asked the respondents to forecast the economic perspective of Hong Kong in the next year. Table 4 shows that most of the respondents (around 90%) forecast that the economic perspective will be the same as or better than this year.

Table 4: Economic perspective in the next year

| Q4) What is your forecast of the economic perspective of Hong Kong in the next year? | | | | | |
|--|--------------------------------|-----------------------------|-----------------------|------------------------------|---------------------------------|
| Investment in last year | Certainly worse than this year | May be worse than this year | The same as this year | May be better than this year | Certainly better than this year |
| Yes | 1.10% | 10.79% | 39.04% | 42.72% | 6.34% |
| No | 1.64% | 7.66% | 46.35% | 38.87% | 5.47% |

Question 5 of Section 2 asked the respondents whether their risk tolerance would affect their investment decisions. This variable served as the proxy for the importance of investment risk tolerance in respondents' investment decisions. Table 5

shows that around 60% of the respondents reported that risk tolerance affects their investment decisions.

Table 5: Relationship between investment decisions and investment risk tolerance

| Q5) Will your risk tolerance affect your investment decision? | | | | | |
|---|--------------------|---------|---------|--------|----------------|
| Investment in last year | Certainly will not | May not | neutral | May | Certainly will |
| Yes | 3.11% | 8.14% | 18.85% | 46.08% | 23.83% |
| No | 5.29% | 3.83% | 27.19% | 31.93% | 31.75% |

Question 6 of Section 2 asks the respondents whether they are satisfied with their investment yield of the last year. Table 6 shows that, in general, only around 10% of respondents that participated in investment activities in the last year were not satisfied with their yield.

Table 6: Satisfaction of investment yield in the last year

| Q6) Are you satisfied with your investment yield of the last year? | | | | | |
|--|---------------------|------------------|---------|----------------------|-------------------------|
| No Investment in last year | Certainly satisfied | May be satisfied | Neutral | May not be satisfied | Certainly not satisfied |
| 18.30% | 5.24% | 28.16% | 37.64% | 9.15% | 1.50% |

Questions 7 to 12 of Section 2 intend to calculate an objective indication or proxy for the investment risk tolerance of the respondents. Table 7 summarizes the questions and the answers.

Table 7: Summary of questions¹ 7 to 12

| | | | | |
|---|--|--|--|--|
| Q7) In general, how would your best friend describe you as a risk taker? | | | | |
| 1= A real risk avoider | 2= Cautious about risk | 3=Take action after completing adequate research | 4= A real gambler | |
| Q8) In general, how would you describe your attitude toward investment risk and return? | | | | |
| 1= do not accept risk | 2=low risk and low return | 3= Moderate risk and moderate return | 4= high risk and high return | 5= very high risk and very high return |
| Q9) You are on a TV game show and can choose one of the following. Which would you take? | | | | |
| 1= \$1,000 in cash | 2= A 75% chance at winning \$1,500 | 3= A 50% chance at winning \$5,000 | 4= A 25% chance at winning \$10,000 | 5= A 5% chance at winning \$100,000 |
| Q10) When you think of the word “risk” which of the following words comes to mind first? | | | | |
| 1= Loss | 2= Uncertainty | 3= Opportunity | 4= Thrill | |
| Q11) If you unexpectedly received \$20,000 to invest, what would you do? | | | | |
| 1= Deposit it in a bank account, money market account, or an insured CD | 2= Invest it in safe high quality bonds or bond mutual funds | 3= Invest it in stocks or stock mutual funds | 4= Using financial derivative and/or hedge funds | |
| Q12) Given the best and worst case returns of the investment choices below, which would you prefer? | | | | |
| 1= \$200 gain best case; \$0 loss worst case | 2= \$800 gain best case; \$200 loss worst case | 3= \$2600 gain best case; \$800 loss worst case | 4= \$4800 gain best case; \$2400 loss worst case | |

The scores from questions 7 to 12 are added up to calculate the scores of risk tolerance levels which serve as a proxy for the respondents’ investment risk tolerance.

Table 8 summarizes the results.

Table 8: Scores of risk tolerance levels

| Scores | 6 to 9 | 10 to 13 | 14 to 17 | 18 to 21 | 22 to 26 |
|-------------------------|-------------------------|--------------------|-------------------------|---------------------|--------------------------|
| Investment in last year | Very low risk tolerance | Low risk tolerance | Moderate risk tolerance | High risk tolerance | Very high risk tolerance |
| Yes | 4.37% | 18.15% | 41.74% | 30.46% | 5.27% |
| No | 21.35% | 37.77% | 28.28% | 12.41% | 0.18% |

¹ Questions are modified from Grable, J. E., & Lytton, R. H. (1999). Financial risk tolerance revisited: The development of a risk assessment instrument. *Financial Services Review*, 8, 163-181.

Table 8 shows that over 35% of the respondents that participated in investment activities in the last year have a score of high or very high risk tolerance. In contrast, over 58% of the respondents that did not participate in investment activities in the last year have a score of low or very low risk tolerance. In general the investment risk tolerances of those respondents that did not participate in investment activity are much lower than those respondents that participated in investment activities last year.

3.2. The Empirical Ordered Probit Model

This paper adopts the commonly used ordered probit model² as the workhorse to manipulate the ordinal scale dependent and independent variables (see: Miyata 2003, Greene 2000). Brodaty et al (2006) study the risk aversion and human capital using ordered probit model. Ito and Yabu (2007) estimate the reaction function of Japanese intervention in the foreign exchange markets with the ordered probit model.

This paper investigates the investment risk tolerance functions for those respondents that have participated in investment activities in the last year, using scores of risk tolerance levels from Table 8 as the dependent variable.

Model 1

$$\text{RISKT} = f(\text{GENDER, EDU, AGE, HINCOME, HOUSEMEM, MARTIAL, OECON, RETURNS, RISKAF, PINCOME, FRIRISK, FAMRISK, NOINFD1, FAMINFD3, NEWSINFD2, WEBINFD4, BOKERINFD5, COMPINFD6})$$

Model 1 investigates some of the determinants of the investment risk tolerances of the respondents that have participated in investment activities in the last year. Table 9 following summarizes the notation of the variables.

² A detailed description of the ordered probit model can be found in the technical appendix.

Table 9: Notation of variables

| | |
|------------------------|--|
| Dependent Variables | |
| RISKT | Investment Risk Tolerance of respondents that participated in investment activities last year (5 = Very low risk tolerance to 26= Very high risk tolerance) |
| Independent Variables | |
| Demographic factors | |
| AGE | Age (1=18-24, 2=25-34, 3=35-44, 4=45-54, 5=55 to 64, 6=65 or above) |
| EDU | Education (1=Primary school or below, 2=Secondary school, 3=Post-Secondary or equivalent, 4=College or University) |
| MARTIAL | Martial status (1=Married, 2= Unmarried, 3=other) |
| GENDER | Gender (1=Male, 2=Female) |
| Socio-economic factors | |
| HINCOME | Monthly household income in HK\$ (1= below \$8000, 2 = \$8,000-\$15,999, 3=\$16,000-\$29,999, 4=\$30,000-\$49,999, 5=\$50,000 or above) |
| PINCOME | Monthly personal income in HK\$ (1= below \$5000, 2 = \$5,000-\$14,999, 3 = \$15,000-\$29,999, 4=\$30,000-\$49,999, 5=\$50,000 or above) |
| RISKAF | Will your risk tolerance affect your investment decision?(1=Certainly will not, 2=May not, 3=Neutral, 4=May, 5=Certainly will) |
| HOUSEMEM | Number of household members (minimum=1, maximum=13) |
| Economic Factors | |
| OECON | Forecasting of the economic perspective of Hong Kong in the next year (1=Certainly worse than this year, 2=May be worse than this year, 3=The same as this year, 4= May be better than this year, 5=Certainly better than this year) |
| RETURNS | Are you satisfied with your investment yield in the last year? (1=Certainly satisfied, 2=Maybe satisfied, 3=Neutral, 4=May not be satisfied, 5=Certainly not satisfied) |
| Community Factors | |
| FAMRISK | In general, how would you describe the investment risk tolerance of your family members? (1= Very low risk tolerance, 2=Low risk tolerance, 3=Moderate risk tolerance, 4=High risk tolerance, 5=Very high risk tolerance) |
| FRIRISK | In general, how would you describe the investment risk tolerance of your friends? (1= Very low risk tolerance, 2=Low risk tolerance, 3=Moderate risk tolerance, 4=High risk tolerance, 5=Very high risk tolerance) |
| Information Dummies | |
| NOINFD1 | Dummy of never consider any information |
| NEWSINFD2 | Dummy of mass media as the most important source of information affecting the respondents' decision to make investment. |

| | |
|------------|---|
| FAMINFD3 | Dummy of information from family and friends as the most important source of information affecting the respondents' decision to make investment. |
| WEBINFD4 | Dummy of information from Internet as the most important source of information affecting the respondents' decision to make investment. |
| BOKERINFD5 | Dummy of information from Investment consultants or brokers as the most important source of information affecting the respondents' decision to make investment. |
| COMPINFD6 | Dummy of information from company prospectus as the most important source of information affecting the respondents' decision to make investment. |

It is worth mentioning that the estimated coefficients only influence the conditional probability that a certain value of the dependent variable will appear. A positive estimated coefficient indicates that: an increase in the ordinal scale of the independent variable influences the dependent variable so that when the conditional probability of the dependent variable (falling into a higher ordinal scale) increases, the inverse occurs with a negative estimated coefficient. (See: Boccaletti and Moro, 2000). In the cases where the independent variables are discrete, the discrete change in the conditional probability can be evaluated at the average of the independent variables. (See: Rivera, 2001).

4. Empirical Results

Table 10 displays the empirical results and shows only the coefficients that are significantly different from zero at a 5% significant level.

Table 10: Empirical results

| Dependent Variables (Score of Risk Tolerance) | |
|---|--------------------------|
| | Model 1 |
| | RISKT |
| Independent Variables | Coefficient (Std. Error) |
| Demographic Factors | |
| AGE | -0.1417 (0.0162) |
| GENDER | -0.2581 (0.0422) |
| EDU | - |

| | |
|--|------------------|
| MARTIAL | - |
| Socio-economic Factors | |
| HINCOME | 0.1042 (0.0243) |
| RISKAF | -0.0567 (0.0206) |
| PINCOME | 0.0945 (0.0268) |
| HOUSEMEM | - |
| Community Factors | |
| FRIRISK | 0.3038 (0.0268) |
| FAMRISK | 0.2510 (0.0274) |
| Economic Factors | |
| OECON | - |
| RETURNS | - |
| Information Dummies | |
| NOINFD1 | -0.8583 (0.0945) |
| NEWSINFD2 | -0.3055 (0.0561) |
| FAMINFD3 | -0.4211 (0.0550) |
| WEBINFD4 | -0.1696 (0.0747) |
| BOKERINFD5 | - |
| COMPINFD6 | - |
| Note: Only report the coefficients that are significantly different from zero at 5% significantly level. | |

Table 10 shows the determinants that affect the investment risk tolerances of the respondents. Model 1 shows that the determinants of investment risk tolerance for those respondents that participate in investment activities, are age, gender, family member's risk tolerance, friend's risk tolerance, household income, personal income, information dummies and proxy for the importance of risk tolerance on investment decisions.

For the demographic factors, the coefficient for age is negative indicating that as respondents get older the conditional probability of them having a low investment risk tolerance increases. The coefficient for gender is negative indicating that the conditional probability of females having lower investment risk tolerance is higher than males.

For socioeconomic factors, the coefficient for both household income and personal income are positive and significant, indicating that as respondents' income level increases, the conditional probability of having high risk tolerance increases.

For the community factors, the coefficients for the description of the investment risk tolerance of family members and friends are significant and positive, indicating that as the respondents think that their family members and friends have high or low investment risk tolerance, the conditional probability of the respondents having respectively high or low investment risk tolerance increases. The coefficients for the claim that investment risk tolerance affects investment decision is significant and negative, indicating that if the respondents claim that investment risk tolerance affects their investment risk decision, the conditional probability of the respondents having a low investment risk tolerance increases.

For the information dummies: information from family members, not considering any information, and the Internet as the most important source of information are significant.

5. Conclusion

Table 8 shows that in general the investment risk tolerances of those respondents who did not participate in investment activity are much lower than those respondents who participated in investment activities last year. In addition, consistent with the literature, the empirical results of this paper show that age is not the sole determinant of investment risk tolerance. (See Wang & Hanna 1997; Grable & Joo, 1997; Hanna, Gutter, & Fan, 1998; Grable 2000, Hariharan, Chapman, & Domain, 2000; Gollier & Zeckhauser, 2002, Terrence, Robert and Michael, 2004.)

The empirical results of this paper show that four demographic and socioeconomic factors, namely age, gender, household income and personal income, are significant determinants for investment risk tolerance in Hong Kong. Extending the literature, the empirical results show that, in the case of Hong Kong, education, marital status and number of household members do not exhibit significant influence on risk tolerance. Since the majority of the population in Hong Kong are Chinese, this study provides policy implications for financial planners who would like to explore the market of China. Financial planners who prepare investment plans for Chinese should take into account the findings of this paper and focus on the demographic and socioeconomic factors of age, gender, household income, and personal income.

This paper extends the literature by showing that the attitude of family members and friends toward investment risk significantly influence the investment risk tolerance of investors. The significance of the two community factors (respondents' feeling about the attitude of family members and attitude of friends towards risk tolerance) considered in this paper suggest that the awareness of risk tolerance tends to reduce the risk tolerance of investors.

Reference:

- Bajtelmsmit, V. L., & VanDerhai. J. L. (1997). Risk aversion and pension investment choices. In Positioning Pensions for the Twenty-first century. Edited by M. S. Gordon, O. S. Mitchell, & M. M. Twinney Philadelphia, PA: University of Pennsylvania Press.
- Bajtelmsmit. V. L., & Bemasek, A. (1996). Why do women invest differently than men? *Financial Counseling and Plannin*, vol.7, no.1:1-10.
- Baker, H. K., & Ha.slem. J. A. (1974). The impact of investor socioeconomic characteristics on risk and return preferences. *Journal of Business Research*. 2. 469-476.
- Begen, W.P. (1996, July). One formula fits all. *Financial planning*, 26, 75-84.*Biennial*. 3. 80-88.
- Blume, M. (1978). The changing role of the individual investor. New York: John Wiley and Sons, Inc.
- Boccaletti S. and Moro D. (2000) *Consumer Willingness-To-Pay for GM Food Products in Italy*, *AgBioForum*, Volume 3, Number 4, 259-267
- Brodaty, Thomas; Gary-Bobo, Robert J.; Prieto, Ana (2006) *Risk Aversion and Human Capital Investment: A structural Econometric Model*, C.E.P.R. Discussion Papers, CEPR Discussion Papers: 5694
- Carlsson, F., Daruvala, D., Johansson-Stenman, O. (2005). Are People Inequality-Averse, or Just Risk-Averse? *Economica*, August 2005, Vol. 72 Issue: Number 3 p375-396.
- Cicchetti, C. J., & Dubin, J. A. (1994). A microeconomic analysis of risk aversion and the decision to self-insure. *Journal of Political Economy*, 102, 169-186.
- Cohn, R. A., Lewellen, W. G., Lease, R. C., Schlarbaum, G. G. (1975). INDIVIDUAL INVESTOR RISK AVERSION AND INVESTMENT PORTFOLIO COMPOSITION. *Journal of Finance*, May 1975, Vol. 30 Issue 2, p605-621.
- Dreze. J. H. (1981). Inferring risk tolerance from deductibles in insurance contracts. *The Geneva papers on risk and Insurance*, 20, 48-52.
- Filbeck, G., Hatfield, P., Horvath, P. (2005). Risk aversion and Personality Type. *Journal of Behavioral Finance*, Vol 6(4), 2005. pp. 170-180.
- Friedman, B. (1974). Risk aversion and the consumer choice of health insurance option. *Review of Economics and statistics*, 56, 209-214.
- Gitter, M. (1995, July). Risk management for retirees. *Financial Planning*, 24, 134-137.

- Gollier, C. & Zeckhauser, R. J. (2002). Horizon length and portfolio risk. *Journal of Risk and Uncertainty*. 24,19S-212.
- Grable, J. E., & Lytton, R. H. (1998). Investor risk tolerance: Testing the efficiency of demographics as differentiating and classifying factors. *Financial Counselling and Planning* 9(1), 61-74.
- Grable, J. E.. & Joo, S. (1997). Determinants of risk preference: implication for the family and consumer science professionals. *Family Economics and Resource Management Biennial*. 2. 19-24.
- Grable, J. E.. & Joo, S. (1999). Factors related to risk tolerance: a further examination. *Consumer Interests Annual*. 45. 53-58.
- Grable, J. E.. & Lytton, R. H. (1998). Investor risk tolerance: testing the efficiency of demographics as differentiating and classifying factors. *Financial Counseling and Planning* 9. 61-74.
- Grable, J., Lytton, R. H. (1999) Financial risk tolerance revisited: The development of a risk assessment instrument. *Financial Services Review*, 1999, Vol. 8 Issue 3, p163-182.
- Grable, J. E. (2000). Financial risk tolerance and additional factors that affect risk taking in everyday money matters. *Journal of Business and Psychology*, 14, 625-630.
- Grable, J. H.. & Lytton, R. H. (1999). Assessing financial risk tolerance: do demographic, socioeconomic and attitudinal factors work? *Family Relations and Human Development/Family Economics and Resource Management*
- Greene, W. H. (2000) *Econometric Analysis*, 4th edition, Prentice-Hall International
- Haliassos, M.. & Bertaut, C. C. (1995). Why do so few hold stocks? *Economic Journal*. 105. 1110-1129.
- Hallahan, T. A., Faff, R. W., & McKenzie, M. D. (2004). An empirical investigation of personal financial risk tolerance. *Financial Services Review*, 13, 57-78.
- Hanna, S., Gutter, M., & Fan, J. (1998). A theory based measure of risk tolerance. *Proceedings of the Academy of Financial Services*. 10-11.
- Hariharan, G., Chapman, K, S., & Domian, D. L. (2000). Risk tolerance and asset allocation for investors nearing retirement. *Financial Services Review*. 9. 159-170.
- Ito, Takatoshi; Yabu, Tomoyoshi (2007) What Prompts Japan to Intervene in the Forex Market? A New Approach to a Reaction Function, *Journal of International Money and Finance*, March 2007, v. 26, iss. 2, pp. 193-212
- Jackson, D.N., Hourany, L., & Vidmar, N. J. (1972). A four dimensional interpretation of risk taking. *Journal of Personality*, 40, 483-501.

- Kapiloff, H. (1994, March). Are your client's assets as diversified as you think? *Financial planning*, 23, 82-85.
- Lease, R. C., Lewellen, W. G. & Schlarbaum, G. G. (1974). The individual investor: Attributes and attitudes. *The Journal of Finance*, 29, 413-433.
- MacCrimmon, K. R., Wehrung, D. A., & Stanbury, W. T. (1986). *Taking risks*. New York: The Free Press. McGinnis, S. K. (2004, August). Cleaning up Dodge. *Financial Planning*, 8, 62-63.
- Masters. R. (1989). Study examines investors' risk-taking propensities. *Journal of Financial Planning*. 36. 151-155.
- McInish, T. H. (1982). Individual investors and risk-taking. *Journal of Economic Psychology*. 2. 125-136.
- Miyata S. (2003) Household's risk attitudes in Indonesian villages, *Applied Economics*, 35, 573-583
- Morin. R. A.. & Suarez, A. F. (1983). Risk aversion revisited. *Journal of Finance*, 38, 1201-1216.
- Palsson. A. M. (1996). Does the degree of risk aversion vary with household characteristics. *Journal of Psychology*. 17. 771-787.
- Powell, M.. & Ansic. D. (1997). Gender differences in risk behaviour in financial decision-making: an experimental analysis. *Journal of Economic Psychology*. 18, 605-628.
- Riley. W. B.. & Chow, K. V. (1992). Asset allocation and individual risk aversion. *Financial Analysts Journal*. 48. 32-37.
- Rivera B. (2001) The effects of public health spending on self-assessed health status: an ordered probit Model, *Applied Economics*, 33, 1313 - 1319
- Roszkowski, M. J., Grable, J. (2005) Estimating risk tolerance: The Degree of Accuracy and the Paramorphic Representations of the Estimate. *Financial Counseling and Planning*, Vol 16(2), 2005. pp. 29-47.
- Rui, Y., Hanna, S. D., Lindamood, S. (2004) Changes in financial risk tolerance, 1983-2001. *Financial Services Review*, Winter 2004, Vol. 13 Issue 4, p249-266.
- Schooley. D. K., & Worden, D. D. (1996). Risk aversion measures: comparing attitudes and asset allocation. *Financial Services Review*. 5. 87-99.
- Shaw. K. L. (1996). An empirical analysis of risk aversion and *income growth*. *Journal of labour Economics*, 14, 626-653.
- Sung, J. & Hanna, S. (1996). Factors related to risk tolerance. *Financial Counseling and Planning*, 7, 11-20.

- Wallach, M. M. & Kogan, N. (1961). Aspects of judgment and decision making: interrelationships and changes with age. *Behavioral Science*. 6. 23-26.
- Wang, H., & Hanna, S. (1997). Does risk tolerance decrease with age? *Financial Counseling and Planning*. 8. 27-32.
- Watson, J., McNaughton, M. (2007). Gender Differences in Risk Aversion and Expected Retirement Benefits. *Financial Analysts Journal*, Jul/Aug2007, Vol. 63 Issue 4, p52-62.
- Xiao, J. J., Alhabeeb, M. J., Gong Soong, H., & Haynes, G. W. (2000). Risk Tolerance of Family Business Owners. *Consumer Interests Annual*. 46. 1-7.

Technical Appendix

The investment risk tolerance ordered probit model used in this paper is:

$$RISKT_i = X_i \beta' + \varepsilon \quad (A1)$$

where $RISKT$ is the investment risk tolerance (representing the dependent variable: Investment Risk Tolerance of respondents that participated in investment activities last year), X is the vector of the independent variables also in the ordinal scale, β is a vector of the coefficients to be estimated, and ε are independent and identically distributed random variables. The subscript i indicates an individual.

Table 1A: Notation of the dependent variables

| Dependent Variables | |
|---------------------|---|
| $RISKT_{INV}$ | (5 = Very low risk tolerance to 26= Very high risk tolerance) |

$$RISKT_i = \begin{cases} 0 & \text{if } RISKT_i \leq \gamma_1 \\ 1 & \text{if } \gamma_1 < RISKT_i \leq \gamma_2 \\ \vdots & \\ k & \text{if } \gamma_k < RISKT_i \end{cases} \quad (A2)$$

where γ represents the limits of $RISKT$. The empirical model to be estimated becomes an ordered probit model. The log likelihood function to be maximized is:

$$l(\beta, \gamma) = \sum_i^n \sum_j^k \log(\Pr(RISKT = j | X_i, \beta, \gamma)) \cdot l(RISKT = j) \quad (A3)$$

The conditional probabilities of observing each ordinal level of $RISKT_i$ are given by:

$$\Pr(RISKT_i = 0 | X_i, \beta, \gamma) = F(\gamma_1 - X_i' \beta) \quad (A4)$$

$$\Pr(RISKT_i = 1 | X_i, \beta, \gamma) = F(\gamma_2 - X_i' \beta) - F(\gamma_1 - X_i' \beta) \quad (A5)$$

$$\Pr(RISKT_i = k | X_i, \beta, \gamma) = 1 - F(\gamma_k - X_i' \beta) \quad (A6)$$

where F is the cumulative distribution function of ε . It is worth mentioning that the magnitude of the coefficient (β) does not reveal the effect of the independent variables (X'_i) on the dependent variable ($RISKT$).

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.



Economics Department
Hong Kong Shue Yan University