Cross-Cultural Differences In Risk Tolerance: A Comparison Between Chinese And Americans

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Abstract

This research compares the risk-taking attitude and behavior between a sample of 470 Chinese workers and a sample of 2,671 Americans from the Survey of Consumer Finances. Findings show that the Chinese in the sample are more risk tolerant than Americans in their financial decisions, both in attitude and behavior. A result consistent with Weber and Hsee's (1998) cushion theory and their empirical findings. Alternative explanations such as a lack of knowledge about the relationship between risk and return among the current generation of Chinese are also explored. Theoretical and practical implications of this research are discussed.

Introduction

Risk tolerance is important when people make financial decisions. For example, a worker may have to decide how to select several investment options within a 401k plan. A more risk tolerant worker may choose an option with more stocks or stock mutual funds and a less risk tolerant worker may choose an option with more cash, bonds, or a bond mutual fund.

Risk tolerance is an extremely complex phenomenon that is studied by many disciplines such as economics, psychology, finance, and management science (Roszkowski, 1993). From a psychological perspective, risk tolerance refers to people's attitude and behavior regarding financial risk

(Roszkowski, 1993). It is an important concept when financial counseling and planning professionals help individuals and families make long-term financial decisions. It is also a key concept of the expected utility theory in economic literature. This study uses the definition from the finance literature, in that financial risk is measured by investment volatility.

Rick tolerance has been studied extensively by researchers in economics, business, and consumer science. For example, many researchers have used a subjective risk tolerance measure available in the Survey of Consumer Finances (SCF) (Chang, DeVaney, & Chiremba, 2004; Grable & Lytton, 1998; Sung & Hanna, 1996; Xiao, Alhabeeb, Hong, & Haynes, 2001; Yao, Hanna, & Lindamood, 2004; Yao, Gutter, & Hanna, 2005; Yao & Hanna, 2005). In addition, researchers have developed other risk tolerance scales to enrich the SCF measure (Grable, 2004; Grable & Lytton, 1999; Yang, 2004). The *Journal of Personal Finance* devoted a special issue in 2004 to this topic. In this issue, risk tolerance was studied from various perspectives, such as behavioral finance (Moreschi, 2004), myopic decisions (Finke & Huston, 2004), value at risk scoring (Harris, 2004), and comparability of risk tolerance between husbands and wives (Roszkowski, Delaney, & Cordell, 2004).

This study will provide a unique, cultural perspective to examine risk tolerance, as it compares risk-taking attitude and behavior between Chinese and Americans. Such an investigation has both theoretical and practical importance. Practically, the findings of this study can provide knowledge about similarities and differences in risk tolerance between Chinese and Americans. Such knowledge may be useful to American entrepreneurs doing business in China in an era of increasing economic globalization, and to American businesses and professionals working with clients who have a Chinese heritage. Theoretically, this research can help determine whether the existing research results on risk tolerance, which are predominantly generated using U.S. data, are valid when data from another culture are used. If not, then directions in future research, both theoretical and empirical, can be generated from this study. In addition, the findings of this study can provide insights to the further development of a theory of cultural comparison of risk tolerance based on the literature of economics and social psychology.

Literature Review

Cultural Differences in Risk Tolerance

Douglas and Wildavsky (1982) distinguished between societies whose cultural values, perceptions, and attitudes wereshaped by either a market environment or a hierarchical bureaucratic environment. They argued that societies in which an individualistic market orientation predominates, such as in the United States, are appreciative of uncertainties as providing

opportunities and thus fostering more risk-taking. More hierarchical and bureaucratic societies, such as China, were described as making decisions based on standard operating procedures, and consequently, were more cautious and risk-averse.

Based on multiple psychological theories pertaining to temperament, Doyle (1999) theorized that financial risk tolerance is a result of temperament, and that temperament is related to the surviving values that are reflected by biological and social backgrounds. By analyzing the broad literature in history, religion, law, psychology, anthropology, and other social sciences, Doyle divided the world cultures into four groups: drivers (most Europeans), amiables (most South Americans), expressives (most Africans), and analytics (most Asians). According to Doyle's research, competence characterizes the temperament of drivers (acquisitiveness, determination, and appreciation of risk), while analytics arecharacterized by security (caution, restraint, and aversion of risk).

Both these theories would predict that Chinese are more risk averse than Americans in making decisions under uncertainty. Additionally, empirical studies on risk-taking attitude using U.S. data have consistently found a positive relationship between economic resources (e.g. income, net worth, etc.) and risk tolerance level (Sung & Hanna, 1996; Grable & Lytton, 1998). If such a relationship holds cross-nationally, then Chinese are expected to be less risk tolerant than Americans, because on average, Chinese have a lower level of economic resources than Americans.

However, several empirical studies using samples of both Chinese and Americans found the opposite. In a study comparing Chinese and American college students' attitudes toward free markets, two questions were asked about risk-taking attitudes in job markets and investments (Fan, Xiao, & Xu, 1998). American students were more likely to report being willing to take risks in job markets but Chinese students were more likely to report being willing to take risks in financial investments. In another study on the differences in saving motives between Chinese and Americans, Xiao and Fan (2002) found that Chinese workers in their sample were more likely than Americans to report a motive of saving for investment, suggesting that Chinese may be more risk tolerant in financial investment decisions than Americans.

Using buying prices for risky financial options as a measurement for risk preference, Weber and Hsee (1998) found that Chinese students in their sample were significantly more risk tolerant in their pricing than American students. However, these apparent differences in risk preference were associated primarily with cultural differences in the perception of risk of the financial options rather than with cultural differences in attitude towards perceived risk. Weber and Hsee (1998) then proposed a "cushion hypothesis", which suggests people in a collectivist society, such as China, are more likely to receive financial help from their social networks if they are in need.

Consequently, they are less risk averse in financial decisions than those in an individualistic society such as the U.S. This hypothesis also suggests that because social and family networking is so important in a collectivist society, Chinese are likely to be more risk averse in social decisions.

Two subsequent studies supported the cushion hypothesis. In the first study, Weber, Hsee, and Sokolowska (1998) conducted a content analysis of American, German, and Chinese proverbs related to risk and risk-taking. They found that Chinese and German proverbs provide more risk-seeking advice than American proverbs. They also found that, regardless of national origin of proverbs, Chinese raters perceived proverbs to advocate greater risk-seeking than American raters, but only for financial risks, not social risks. In the second study, Hsee and Weber (1999) reported two experiments. In the first experiment, they asked a sample of Chinese and American students to choose sets of sure versus risky options. An example of a sure option is to "receive $400 for sure"; and an example of a risky option is to "flip a coin; receive $2000 if heads or $0 if tails". They found that the Chinese were significantly more risk tolerant than the Americans. In the second experiment, they extended their questions to include a medical and an academic decision, in addition to an investment decision, and found that the Chinese were more risk tolerant than the Americans only in the investment domain, but not in the other domains.

In summary, three theories have been utilized in this study: Douglas and Wildavsky's (1982) theory on hierarchical vs. bureaucratic societies, Doyle's (1999) theory on cultural groups (drivers, amiables, expressives, and analytics) and their temperament, and Weber and Hsee's (1998) "cushion hypothesis". The first two would suggest that the Chinese are less risk tolerant than Americans in all matters, including financial risks, while the third would suggest that the Chinese are more risk tolerant than Americans in financial matters, but less risk tolerant in social matters.

The empirical evidence to date regarding cultural differences in risk tolerance between Chinese and Americans suggests that Chinese are more risk tolerant in financial decision-making than Americans. However, this evidence is far from conclusive. First, most empirical studies reviewed above used college student samples from large cities. Given the variability of knowledge, beliefs, customs, and habits within any culture, it is an oversimplification to describe the difference found in these samples as a difference between Chinese and Americans in general. This study, expands upon existing research by using a non-student sample to compare risk preference between Chinese and Americans. Second, the empirical studies reviewed above only used risk attitude as a measure of risk preference. This study, includes an additional measure of self-reported risk-taking behavior. Although the relationship between attitude and behavior has been examined in previous studies, this relationship has not been tested in a cross-cultural context. This

study, expands upon existing research by investigating whether Chinese are more risk tolerant in their self-reported financial behavior than Americans.

Factors Associated with Risk Tolerance

Another aspect of this research is to investigate factors associated with financial risk-taking attitude and behavior, and how such factors may work differently for the Chinese and the Americans. While there is a substantial body of literature on how socio-economic characteristics affect risk tolerance using U.S. data, such analysis, to date, is not available using Chinese data.

Previous studies indicate that the following factors affect consumer risk-taking attitudes or behavior: gender, marital status, age, education, income, having children, professional occupation, self-employment, and home ownership (Grable & Lytton, 1998; Jianakoplos & Bernasek, 1998; Roszkowski, 1993; Schooley & Worden, 1996; Sung & Hanna, 1996; Xiao, 1996; Xiao, Alhabeeb, Haynes, & Hong, 2001; Xiao & Anderson, 1997; Yao & Hanna, 2005; Zhong & Xiao, 1995) a detailed summary table is available from the authors. All the empirical results reported in previous studies are based on data from various years of the Survey of Consumer Finances (SCF). For the measurement of risk-taking attitudes, the question available in the SCF asks respondents about their choice regarding the expected financial returns and risks they are willing to take for such returns. For the measurement of risk-taking behavior, household holdings of stock and other risky assets are commonly used. While it is important to note that risk tolerance is a complex construct and has been conceptualized and measured in many different ways in the literature (see Hanna, Gutter, & Fan, 2002 for a thorough discussion on this subject), for this study, the SCF measure was the best among available alternatives.

Hypotheses

The purpose of this study is to (1) use a non-student sample to compare risk-taking attitudes and behavior between Chinese and Americans; and (2) to investigate country differences in factors associated with risk-taking attitude and behavior. The research seeks to further the understandin of the concept of risk tolerance in general, and the cultural differences between Chinese and Americans in particular.

In light of the available evidence in the literature, the following hypotheses are proposed regarding country differences in risk tolerance between Chinese and Americans:

H1: Chinese are more risk tolerant than Americans in financial risk-taking attitude.
H2: Chinese are more risk tolerant in their behavior than Americans when stock ownership is used as a measure of financial risk-taking behavior.
H3: There is no difference between Chinese and Americans in how socio-demographic characteristics affect their financial risk-taking attitude.
H4: There is no difference between Chinese and Americans in how socio-demographic characteristics affect their financial risk-taking behavior.

Hypothesis 1 is proposed based on the available evidence in the literature reviewed in the previous section. If this hypothesis is supported, then the empirical evidence would be consistent with Weber and Hsee's cushion hypothesis (1998) while rejecting Douglas and Wildavsky's (1982) theory on hierarchical vs. bureaucratic societies and Doyle's (1999) theory on cultural groups and their temperaments. Hypothesis 2 is based on the assumption that attitude and behavior should be consistent. Hypotheses 3 and 4 are null hypotheses because there is no existing literature suggesting otherwise.

Method

Data

The Chinese data were collected in 1998 from workers in Guangzhou, a major city and capital of Guangdong province in Southern China. A quota matrix of gender, age, and enterprise ownership was developed for this survey. Enterprises were classified into five categories: (1) state-owned, (2) collectively-owned enterprises that include various forms of publicly-traded enterprises and traditional collectively-owned enterprises; (3) foreign-owned enterprises that are invested by foreign capital, especially capital from developed countries and regions such as the U. S., Japan, Hong Kong, and Taiwan; (4) joint-ventures that are invested by both Chinese and foreign capital; and (5) privately-owned enterprises owned by one or more private Chinese citizens. Based on this quota matrix, trained research assistants collected information from workers with specific characteristics. Among the 500 workers who participated in the survey, 50% were from each of the two gender groups, 20% from each of the five age groups (29 years or younger, 30-39, 40-49, 50-59, 60 years or older), and 20% from each of the five types of enterprises. For this study, observations were excluded that had missing values in the variables needed in the multivariate analyses. Thus, the final

sample size used in this study is 470. Compared to nationally representative statistics, the Guangzhou sample over-represents workers from foreign-, joint-, and private-owned companies and those with higher educational levels (China Statistical Information Network, 2001). As these characteristics may relate to risk tolerance, caution is exercised in interpreting the findings presented in later sections.

The American data were collected in 1998 by the National Opinion Research Center at the University of Chicago and sponsored by the U. S. Federal Reserve Board. This data set is one of the triennial surveys (Kennickell, Starr-McCluer, & Surette, 2000). The original data set had 4,309 observations. To make the sample comparable with the Chinese data, only full time workers who were not in the farming, forestry or fishing industries at the survey time were selected. The final sample size used in this study is 2,671.

For the purpose of comparing risk tolerance between Chinese and Americans, the data sets used in this study have both advantages and limitations. The two data sets include variables that are directly comparable since the Chinese questionnaire has questions regarding saving attitude and behavior similar to those in the U.S. Survey of Consumer Finances. The two surveys also were conducted at about the same time. However, the Chinese data were obtained using a quota sampling approach in one Chinese city, while the U.S. data were collected using a random sampling approach nationwide. Nevertheless, because of the uniqueness of this topic, these are the best data available at this time. As an acknowledged exploratory study, it will lay a foundation for future research that uses more comparable data.

Dependent and Independent Variables

The two dependent variables examined are risk-taking attitude and risk-taking behavior. Risk-taking attitude is measured by a categorical variable with four levels: (1) take *substantial* financial risks expecting to earn substantial returns; (2) take *above average* financial risks expecting to earn above average returns; (3) take *average* financial risks expecting to earn average returns; and (4) n*ot willing* to take any financial risks. Risk-taking behavior is measured by stock ownership. This variable has two attributes: owning stock or not. This variable is a very crude measure of financial risk-taking behavior. Because it is dichotomous, it cannot capture the quantitative differences in stock ownership. Also, it is a self-report measure that may or may not be consistent with actual behavior. Such limitations need to be kept in mind when the results are interpreted.

Independent variables include gender, age, marital status, education, relative income, household size, presence of children, occupation, and homeownership status. Because risk-taking attitude is relevant to an individual instead of a household, the individual level measures were used for the

demographic variables of gender and marital status. On the other hand, stock ownership is likely to be a household instead of individual decision. While most of the variables used are those of the reference person, a household level measure of family type with three categories: single female headed, single male headed, and married was used. In addition, the risk-taking attitude is included in the stock ownership model.

The descriptive statistics of these variables are presented in Table 1. Compared to Americans, the Chinese in the sample were more likely to be married, have a lower educational level, and have a larger household size. The income variable was coded as a categorical variable indicating income percentiles because only bracket monthly income information was collected for the Chinese data. This income measure can be considered as a measure of relative income within each country.

Table 1
Descriptive Statistics of the Samples by Country

	Chinese (%)	American (%)	X^2
Gender and marital status			56.41***
Married family	83.0	66.2	
Single male headed	10.0	14.7	
Single female headed	7.0	19.1	
Age			55.48***
35 years or younger	20.9	19.4	
36-45	32.8	46.0	
46-55	24.9	24.0	
56-65	21.5	10.6	
Education			
Grade 1-9	21.7	4.5	189.63***
Grade 10-12	21.5	34.8	
Occup. sch./some coll.	20.4	22.5	
College	36.4	38.2	
Household size			238.72***
1 person	2.6	18.6	
2 persons	6.8	28.4	
3 persons	32.3	19.9	
4 to 5 persons	48,3	28.8	
6 persons or more	10.0	4.3	
Presence of children	76.4	55.7	70.65***
Professional occupations	54.0	65.1	21.01***
Self employed	3.2	13.0	37.61***
Homeowner	46.6	66.1	65.62***
Income rank [a]			
Bottom 30%	<2.5k yuan	<$32k	
Lower middle 25%	2.5k-3.5k yuan	$32k-$63k	
Upper middle 20%	3.5k-4.5k yuan	$63k-$130k	
Top 25%	>4.5k yuan	>$130k	
Substantial risk/return	8.9	6.4	14.21***
Above average risk/return	19.8	23.6	
Below average risk/return	36.8	41.8	
No risk	34.5	28.2	
Own Stock	24.5	21.2	2.46

* p<.10, ** p<.05, *** p<.01.
a. For the Chinese sample, income is measured as monthly income in Chinese yuan. For the American sample, income is measured as annual income in U.S. dollars. The exchange rate of Chinese yuan for US dollar was about 8 to 1 in 1998, the year both surveys were conducted.

Analyses

Chi-square tests were first conducted to test if there were associations between risk-taking attitude and the country variable, and between stock ownership and the country variable. Logistic regressions were then performed to test if the differences still existed when demographic variables were controlled. For the risk-taking attitude models, unordered multinomial logistic regression was used because there are four levels of risk-taking attitude, and because the assumption of proportional odds was rejected. Binomial logistic regression was used for the stock ownership models as there are only two attributes for this dependent variable.

Two sets of logistic regression models were estimated for each dependent variable: (1) using the Chinese sample only; and (2) using the American sample only. These two models were estimated to investigate whether demographic variables affected the risk-taking attitude and stock ownership differently for Chinese and for Americans. Log-likelihood ratio tests (Maddala, 1992) were conducted to test the overall statistical significance between Chinese and Americans by estimating the same model using the pooled sample without any country dummy or interaction terms (restricted model) and using the pooled sample with a country dummy and interaction terms between the country dummy and all other independent variables (full model)[1]. Simulations were then conducted to predict the probabilities of having each of the four levels of risk attitude and the probability of stock ownership for the sample, holding other things equal. In the simulations, the Chinese households in the sample were treated as if they were American households, and their probabilities of having each of these four levels of risk-taking attitude and owning stock were predicted using the logistic regression results. These predicted probabilities were then compared with the actual probabilities for the Chinese sample. The comparison was done on the same group of people (in this case, the Chinese sample) with whom different nationalities were attached for the purpose of simulation (Fan, 1997; Xiao & Fan, 2002). Note that the simulation could also be conducted using the American sample instead.

Results

Table 1 shows that for the risk-taking attitude variable, more Chinese in the sample were at the two extreme ends than Americans. While 8.9% of the Chinese are willing to take substantial financial risks expecting to earn

substantial returns, only 6.4% Americans are willing to do so. And while 34.5% Chinese are not willing to take any financial risks, only 28.2% of Americans are in this category. Americans are more likely to be willing to take either above average or average financial risks (23.6% and 41.8%, respectively) compared to their Chinese counterpart (19.8% and 36.8%, respectively). For both countries, the mode category is "average risk". The Chi-square test statistic shows that this country difference is statistically significant. On the other hand, country difference in stock ownership is not statistically significant at conventional levels. While 24.5% of the Chinese in the sample own stocks, only 21.2% of Americans do.

Table 2 presents results from the Logistic regression analysis with risk-taking attitude as the dependent variable, for the Chinese sample and the American sample, respectively. For ease of interpretation, average marginal effects are presented in the table, together with their statistical significance levels.

Table 2
Multinomial Logit Regression Results on Risk Attitude for the Chinese Sample and the American Sample: Average Marginal Effects and Overall Significance Levels

Variable	Substantial risk (%)	Above-average risk (%)	Average risk (%)	No risk (%)	Overall X^2	
Chinese						
Male	2.9	1.4	-1.2	-3.1	1.52	
Married	5.7	-11.9	3.7	2.5	3.29	
Age	-0.3	-0.4	0.1	0.6	11.84	***
Grade 1-9	-4.3	-0.7	-11.6	16.6	6.30	*
Grade 10-12	-9.3	3.2	-6.6	12.8	7.73	*
Some college	-4.8	-1.6	1.3	5.1	2.47	
Bottom 30% income	0.1	-11.6	-3.9	15.5	8.10	**
Lower middle 25% income	0.9	-5.6	2.9	1.8	1.16	
Upper middle 20% income	1.3	-5.7	10.4	-6.1	2.91	
Household size	-1.2	3.3	-0.6	-1.5	3.80	
Presence of dependent children	-4.6	-3.9	5.1	3.4	1.54	
Professional occupation	2.0	-6.5	9.4	-4.9	5.02	
Self employed	9.6	22.3	-0.5	-31.4	7.54	*
Home owner	-4.2	2.0	10.4	-8.3	7.93	**
Americans						
Male	1.6	5.7	0.3	-7.7	10.65	**
Married	-4.5	-5.9	2.0	8.5	20.63	***
Age	-0.1	-0.6	0.3	0.4	66.48	***
Grade 1-9	-6.2	-7.7	-12.7	26.6	44.02	***
Grade 10-12	-0.4	-13.6	-1.9	15.1	66.79	***
Some college	-1.2	-7.4	-1.9	9.4	22.88	***
Bottom 30% income	-6.9	-26.6	-24.7	58.2	42.11	***
Lower middle 25% income	-4.6	-17.0	-23.6	45.3	21.42	***
Upper middle 20% income	-4.6	-10.4	-18.7	33.7	11.25	***
Household size	-0.2	-0.9	-0.8	1.8	5.07	
Presence of dependent children	2.4	2.6	-3.0	-2.1	5.02	
Professional occupation	2.3	2.9	-4.1	-1.1	6.79	*
Self employed	2.1	-3.3	1.7	-0.5	3.83	
Home owner	0.8	10.6	-2.8	-8.6	37.19	***

Note: The following are the reference categories: female, not married, college, and top 25% income. Using the variable "Bottom 30% income" for the Chinese sample as an example, this table can be interpreted as follows: Compared to those Chinese who are in the top 25% of the income distribution, those in the bottom 30% of the income distribution have 0.1% higher probability to be willing to take substantial risk, 11.6% are less likely to take above-average risk, 3.9% are less likely to take average risk, and are 15.5% more likely to take no risk, other things being equal.

p<.10, ** p<.05, *** p<.01.

Table 3 presents results from the Logistic regression analysis with stock ownership as the dependent variable. Again, average marginal effects are presented, together with their statistical significance levels. As with the risk-taking attitude regression, two sets of results are reported, one with the Chinese sample only and the other with the American sample only. Finally, the Log-likelihood ratio test results and simulation results, which are based on models using both samples (not shown, but available upon request), are reported in Table 4.

Table 3
Logistic Results on Stock Ownership: Coefficients and Average Marginal Effects

	Chinese Sample			American Sample		
Variable	Marginal effects (%)	X^2		Marginal effects (%)	X^2	
Substantial risk tolerance	8.9	1.59		25.0	49.11	***
Above-average risk tolerance	12.7	5.12	**	21.7	60.02	***
Average risk tolerance	1.6	0.11		10.3	16.12	***
Single male headed household	-1.3	0.02		-1.5	0.26	
Single female headed household	-22.6	3.66	*	0.3	0.01	
Age	-0.3	2.29		0.2	5.08	**
Grade 1-9	-22.7	8.12	***	-27.2	8.51	***
Grade 10-12	-5.9	1.18		-8.5	13.27	***
Some college	-2.5	0.26		-0.3	0.02	
Bottom 30% income	-4.4	0.60		-28.4	56.25	***
Lower middle 25% income	-5.8	1.02		-22.4	48.02	***
Upper middle 20% income	-2.8	0.23		-17.1	31.06	***
Household size	1.8	0.86		-0.3	0.11	
Presence of dependent children	-1.4	0.03		-1.6	0.41	
Professional occupation	0.9	6.04		3.4	2.51	
Self employed	-5.7	0.27		-2.9	1.45	
Home owner	-0.8	0.04		8.5	13.93	***

Note: The following are the reference categories: not willing to take any risk, married, college, and top 25% income. Using the variable "substantial risk tolerance" for the American sample as an example, this table can be interpreted as follows: Compared to those Americans who are not willing to take any risk, those who are willing to take substantial risks are 25% more likely to own stocks, other things being equal.

* p<.10, ** p<.05, *** p<.01.

Table 4
Simulation Results on Risk Attitude and Stock Ownership

	Chinese actual (%)	Simulated (%)	Log likelihood Ratio
Test			
Substantial risk	8.9	5.1	93.34 ***
Above-average risk	19.8	20.8	
Below-average risk	36.8	39.6	
No risk	34.5	34.5	
Stock Ownership	24.5	21.6	57.10***

Note: The numbers in this table can be interpreted as follows: 24.5% of the Chinese in the sample report owning stocks. If these Chinese were Americans with the same set of characteristics, 21.6% of them would have reported owning stocks.

p<.10, ** p<.05, *** p<.01.

Risk-Taking Attitude

The findings support Hypothesis 1, in that Americans are less likely than Chinese to report a risk-seeking attitude. About 8.9% of Chinese in the sample reportedly are willing to take substantial risk. The simulation results suggest that if these Chinese were Americans, only 5.1% of them would be willing to take substantial risk (Table 4). On the other hand, holding demographics and relative income equal, Chinese are less likely than Americans to be willing to take average risk expecting average returns. The probabilities of being willing to take above-average risk and to take no risk are about the same for these two samples. This country difference is statistically significant at 99% confidence level.

Rejecting Hypothesis 3, the results in Table 2 show that more demographic variables are significant in explaining the differences in risk-taking attitude among Americans than among Chinese. Out of 14 independent variables, 11 are significant at the 10% or better level for the American model, but only 6 are significant at the 10% or better level for the Chinese model. Chi-square tests indicate that the impacts of education, relative income, occupation, and homeownership on risk-taking attitudes are statistically different between the Chinese and Americans (test statistics not shown but available from the authors upon request).

Stock Ownership

Results support Hypothesis 2 as the Chinese are more likely than Americans to own stocks. Approximately 24.5% of Chinese in the sample reported as owning stocks. The simulation results show that if these Chinese were Americans, a smaller percentage, 21.6% would own stocks (Table 4). The log likelihood test shows that this difference is statistically significant at the 99% confidence level.

Rejecting Hypothesis 4, the results in Table 3 show that more demographic variables are significant in explaining the differences in stock ownership among Americans than among Chinese. Out of 17 independent variables, 10 are significant at the 10% or better level for the American model, but only 3 are significant at the 10% or better level for the Chinese model. The effects of risk-taking attitude, family type, age, education, income, and homeownership on stock ownership are statistically different between the Chinese and Americans (test statistics not shown but available from the authors upon request).

Discussion

The discussion of these results must be prefaced with one important caveat. Readers are reminded that the Guangzhou sample is not representative of the Chinese population, because Guangdong province, of which Guangzhou is the capital city, is the first Special Economic Development Area in China. As such, the economic system is more westernized and the standard of living of households is higher than most other areas of China (Chinese Statistical Information Network, 2001, Table 10-11). In addition, the Guangzhou sample over-sampled workers from foreign-, jointly-, and privately-owned enterprises and under-sampled workers from state-owned enterprises. This sample also has higher educational levels, and relatively more young people (age 0-14) live in Guangdong compared to the national average. In 1998, the children dependence ratio (number of people aged 0-14 to number of people aged 15-64) in Guangdong was 45, compared to the national average of 35 (Chinese Statistical Information Network, 2001, Table 4-7).

Keeping this sampling limitation in mind, on average, Chinese in this sample were more risk tolerant than Americans, both in their risk-taking attitude and behavior, holding demographics and relative income constant. Especially interesting is that the percentage of people who were willing to take substantial risk expecting substantial return is higher among the Chinese than among Americans. This result holds in spite of the fact that Americans have more economic resources than Chinese. This result is contradictory to predictions from Douglas and Wildavsky (1982) that Chinese may be more cautious and risk averse than Americans because hierarchical and bureau-

cratic societies lead people to make decisions by standard operating procedures. This result is also contradictory to predictions from Doyle's theory that most Asians are analytics who emphasize security, which leads to caution, restraint, and risk-avoidance in their financial behavior (Doyle, 1999). This implies that the application of the concept "temperaments" may be overly simplified in Doyle's division of culture. The concept in this context needs to be studied further.

The findings, however, are consistent with the empirical evidence presented by Weber and his colleagues (Hsee & Weber, 1999; Weber & Hsee, 1998; Weber, Hsee, & Sokolowska, 1998). The fact that more demographic variables are significant predictors of risk taking in the American sample than in the Chinese sample offers further evidence for the cushion hypothesis. For Chinese investors, perhaps it is the size of their social network that predicts risk taking and individual characteristics, such as income, are less important, because the risk is not carried entirely by the individual but partly by the network. This suggests including other group level or network level "demographics" in future analyses.

Because this study used a non-student sample, a different measure of risk-taking attitude, and a measure of risk behavior, it adds validity and generalizability to the findings by Weber and her colleagues. Although this study is not a direct test of Weber and Hsee's (1998) cushion hypothesis, these results certainly are consistent with predictions generated from the cushion hypothesis.

The finding that Chinese are more risk tolerant than Americans in financial decisions has some anecdotal support from the gambling literature. Gambling, a behavior exhibiting high risk tolerance, is quite popular in China, even though the government is very much anti-gambling (Nepstad, 2000). In the U.S., casinos in Las Vegas advertise heavily in the largest U.S.-based Chinese language newspaper "World Journal" to lure Asian American customers. A number of Internet sites related to gambling addictions have Asian and/or Chinese specific information, with titles such as "Problem Gambling and the Asian Canadian Communities" (Addictions Foundation of Manitoba, 2001), "Prevalence of Gambling in Toronto's Chinese Community" (The Wager, 1998), and "Chinese Community Problem Gambling Project" (NICOS, 2001). It is well documented that the first generation of Chinese immigrants to the U.S. often started their own small businesses such as restaurants and laundromats (Barringer, Gardner, & Levin, 1993). While one reason for such a choice could be limited opportunities and limited human capital, it is also possible that these Chinese immigrants were quite financially risk tolerant and thus were willing to be self-employed.

Although the findings that Chinese in this sample are more risk tolerant than Americans are consistent with previous empirical studies and the cushion hypothesis, alternative explanations cannot be ruled out given

the limitations of this and previous studies on this topic. First, as Weber and Hsee (1998) found, Chinese students in their sample perceived lower financial risk compared to American students. The cushion hypothesis leads to the argument that such perception of lower financial risk is justified because of the family financial support network. An alternative explanation is limited knowledge about the relationship between risk and financial returns among the current generation of Chinese due to a lack of financial education and limited exposure to financial markets. Compared to the U.S. stock market, the Chinese stock market is relatively new. When a market is not mature, potential large stock market returns are possible due to insider trading or government policy changes. For example, stock purchases and trading were first available only in a limited number of Chinese cities so that the demand was initially suppressed. Buyers in these markets may expect stock prices to increase once the rationing period is over. Also, because the history of the stock market is relatively short, people may not have enough historical performance information to get a whole picture of the relationship between risk and return. In addition, limited choices in other investment opportunities may be another reason why Chinese are more likely to own stocks because although government bonds have been issued since the early 1980s, corporate bonds are still not common.

Additionally, it should be noted that the samples used in the studies by Weber and Hsee (from Shanghai, which is the largest city in China) and in this study are not representative of the Chinese general population. As noted earlier, Guangzhou is not a representative city of China, and this sample was not a representative sample of Guangzhou. The self selection of living in Guangzhou (migration was possible even in the earlier years of the Chinese economic reform because of Guangzhou's Special Economic Development Zone status) and the self selection of working in non-state-owned enterprises, which was over-sampled, may contribute to the differences between Chinese and Americans in this study. To further investigate this issue, weights were created for the Chinese sample so that the sample distribution of education levels mirrored that of the population of Chinese workers. While the descriptive numbers changed, in that the overall risk tolerance level decreased and the percentage of stock holders decreased, the multivariate results and the simulation results still showed that the Chinese are more risk tolerant and more likely to hold stocks than Americans, holding demographics and relative income constant (results not shown but available from the authors upon request). While this additional analysis does not eliminate biases caused by self-selection in migration, it makes the sample somewhat more representative. Yet, in order for the findings to be conclusive, research based on representative samples is needed.

Finally, it is important to note the country differences in the relationship between income and risk tolerance. For the American sample, risk

tolerance level rises with income, and stock ownership rises with both income and risk tolerance level. However, for the Chinese sample, excluding people in the bottom 30% of the income distribution, income does not seem to be associated with risk tolerance, both in attitude and behavior. This might be further evidence of the lack of knowledge about stock market performance and the relationship between risk and return due to the novelty of the stock market in China.

Conclusion and Implications

This research used a sample of Chinese workers from the city of Guangzhou to compare their risk-taking attitude and behavior with a sample of American respondents from the Survey of Consumer Finances. Findings revealed that the Chinese in this sample were more risk tolerant than Americans in their financial decisions, both in attitude and behavior, a result consistent with Weber and Hsee's (1998) cushion theory and their empirical findings. A lack of knowledge about the relationship between financial risk and return among the current generation of Chinese due to limited exposure to financial markets may also be an alternative explanation.

Findings have both theoretical and empirical implications. Theoretically, the results show that while the concept of risk tolerance and its determinants are broadly applicable to the Chinese sample, the relationships between socio-economic characteristics and risk tolerance are different for the Chinese sample and the American sample. This finding suggests that the understanding of risk tolerance needs to be expanded if the concept is to have universal validity. Specifically, the concept of "cultural temperaments" needs to be studied in more detail. Because these results are consistent with Weber and Hsee's cushion hypothesis suggests that there may be multiple dimensions of risk tolerance, such as social, financial, political, and physical. As a result, the study of cultural temperaments may need to incorporate these dimensions at the theoretical level. Empirically, data on different types of risk tolerances needs to be collected to test hypotheses generated from this more comprehensive approach.

In addition, it should be noted that the purpose of Doyle's model is to explain the social meaning of money in general. Thus the model is rather broad. A more specific theory explaining the formation of risk tolerance utilizing recent advanced knowledge in psychology and other relevant disciplines needs to be developed in future research. For example, prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992) may be used for theory building. According to this theory, people use perceived decision weights to evaluate risky situations. They are more likely to make mistakes when the probability of the event is extremely high or low. This theory and other theories in economics, psychology, sociology, anthropology, and other

relevant fields may be used to develop a more specific theory on the formation and cultural differences of risk tolerance.

Practically, these findings are useful for American entrepreneurs (including financial management businesses) conducting business in China, as well as for U.S. financial planners and counselors to understand the cultural differences when helping their clients with a Chinese cultural background. Compared to Americans, the relationship between risk taking attitude and behavior among the Chinese is less linear. This implies that financial planners need to exert more cautions when risky products are recommended even when their Chinese clients' attitudes seem to accept high risks.

The findings can also be useful to social workers who help addicted gamblers of Chinese background to understand the cultural context of their behavior and to develop special programs that take this cultural context into consideration. According to these findings, fewer variables are identified that affect risk taking attitude and behavior in the Chinese sample as compared to the American sample. That implies that when educational programs are developed for Chinese clients, less differentiated treatments are needed.

Finally, the findings have implications for future empirical research. For these findings or findings from previous studies on this topic to be generalized to the Chinese population, it is very important that future studies use more representative Chinese samples, especially samples that include Chinese living in smaller urban areas and rural areas.

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Endnotes

1. The estimates from the full model and the restricted model are not reported in tables in this paper because these two models were estimated for the sole purpose of conducting the log-likelihood tests. The test results are reported in this paper.

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