

Investor Decision Making in Hong Kong, Taiwan and Singapore: A Survey of Asian Investor Psychology

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1 Introduction

This report describes the results of a telephone survey of how Asian consumers handle risk and uncertainty in the context of hypothetical financial decision making situations as well as other, non-financial contexts. The survey was conducted with 2591 randomly selected consumers in Hong Kong, Singapore, and Taiwan in April and May 2005 on behalf of Citigroup.

The primary purpose of the data reported here was to examine whether and to which extent consumers in the three countries exhibit the same behavioral biases in decision making under uncertainty that have been demonstrated in the literature with Western (i.e., typically U.S.) investors, consumers, and student respondents. The biases we examined were risk seeking for losses (Kahneman and Tversky 1979), overconfidence (Odean 1999), greater commission than omission regret (Spranca, Minsk, and Baron 1991), and faulty portfolio choices (Shefrin 2002). In addition, we looked at respondents' risk attitudes in financial and social risk taking (Weber, Bias, and Betz 2002). The analyses we report all show significant differences in these behavioral biases between the countries.

We recognize that our findings need to be further validated with actual experimental and empirical investigations of actual risk taking and investment behavior; hypothetical responses in telephone surveys are subject to lack of incentive compatibility, noise, and lack of experimental control. Yet, our findings suggest systematic underlying differences in decision making under uncertainty that are likely to have implications for real investment behavior and for how financial services providers approach investors.

Below, we first report means of various demographic and other sample characteristics (Section 2). We then describe our substantive findings on risk preferences for gains and losses (Section 3), risk attitudes (Section 4), regret (Section 5), overconfidence (Section 6), and portfolio decisions (Section 7).

2 Demographic and Sample Descriptors

The survey was administered by phone in three different countries: Hong Kong, Singapore, and Taiwan. Each participant had to answer a series of demographic/descriptor questions. Below is a list of these variables along with summary statistics.

2.1 COUNTRY:

“What is your country of residence?”

Respondents in Total and per Country

Total Persons	2591
HK Total Persons	850
SGP Total Persons	872
TW Total Persons	869

2.2 AGE, GENDER, AND EDUCATION:

“Which of the following age groups do you belong to?”

Category	Age Group (years)
1	Below 18
2	18 – 20
3	21 – 30
4	31 – 40
5	41 – 50
6	51 – 55

Demographic Overview: Means (Standard Deviations) by Country

Variable	Hong Kong	Singapore	Taiwan
Age (based on age categories)	4.252 (0.977)	4.394 (0.935)	4.175 (0.964)
Male ²	0.474 (0.5)	0.532 (0.499)	0.503 (0.5)
Graduate ³	0.283 (0.451)	0.587 (0.493)	0.738 (0.440)

2.3. INVESTMENT EXPERIENCE:

“For how long have you been investing (in years)?”

Investing Experience in Years: Means (Standard Deviations) by Country

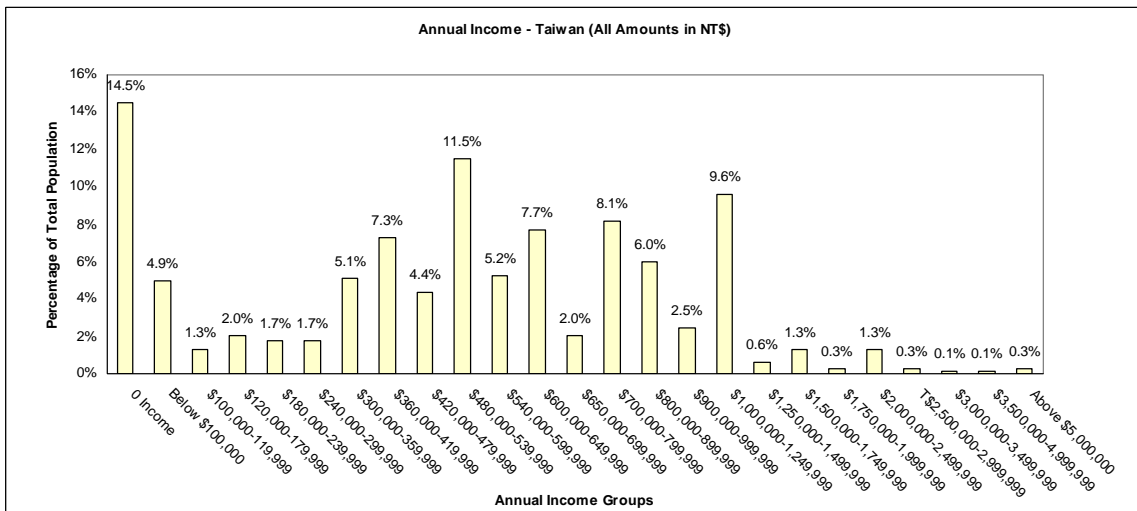
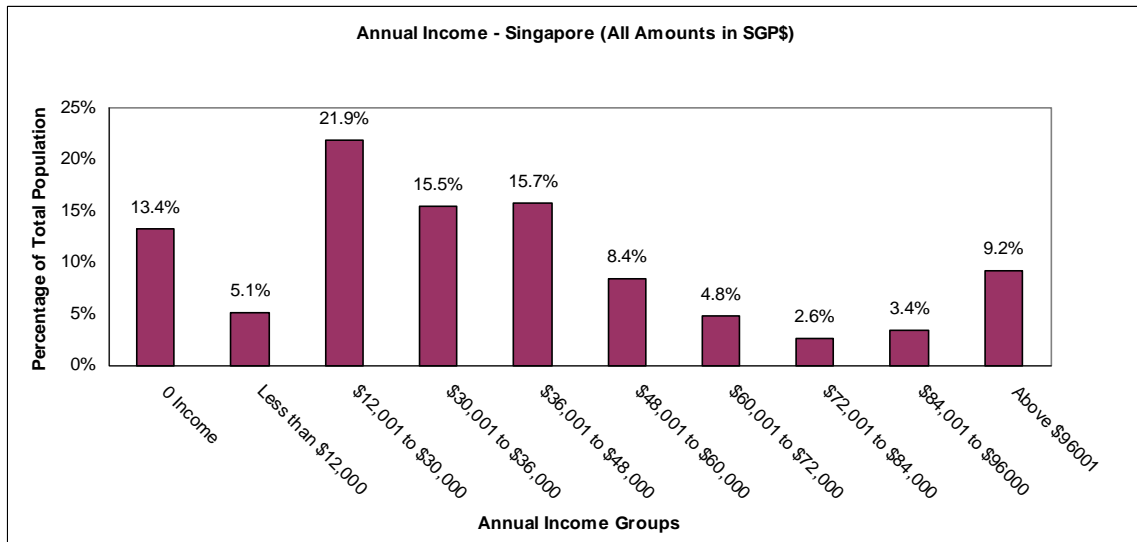
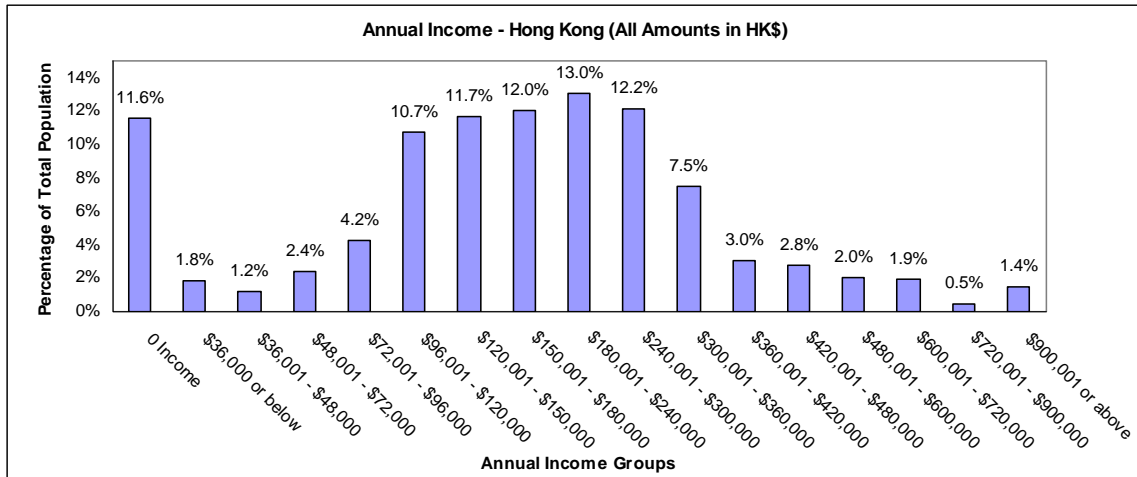
	Hong Kong	Singapore	Taiwan
Experience (years)	6.65 (5.55)	7.46 (5.38)	6.66 (5.17)

² Male = 1 if Male, 0 if Female

³ Graduate = 1 if undergraduate degree or higher, 0 if below undergraduate degree

2.4 ANNUAL INCOME: “Which grouping below best indicates your annual income?”

Annual Income Distribution ⁴

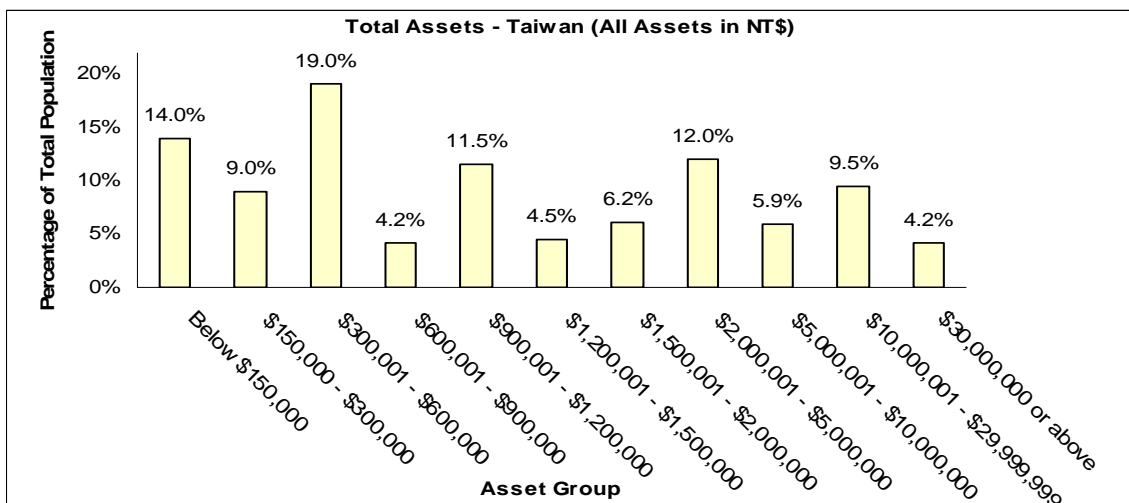
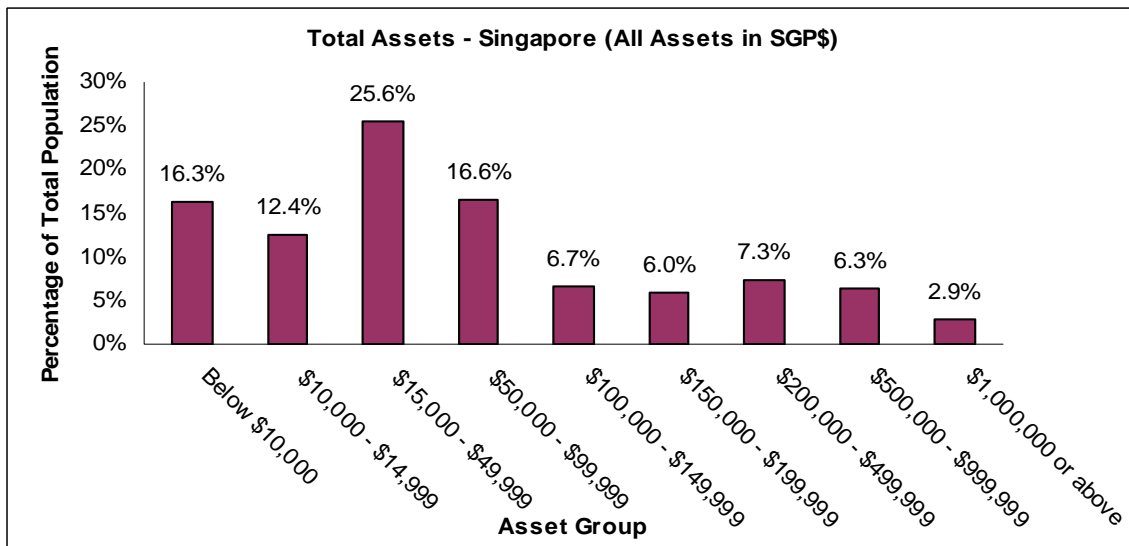
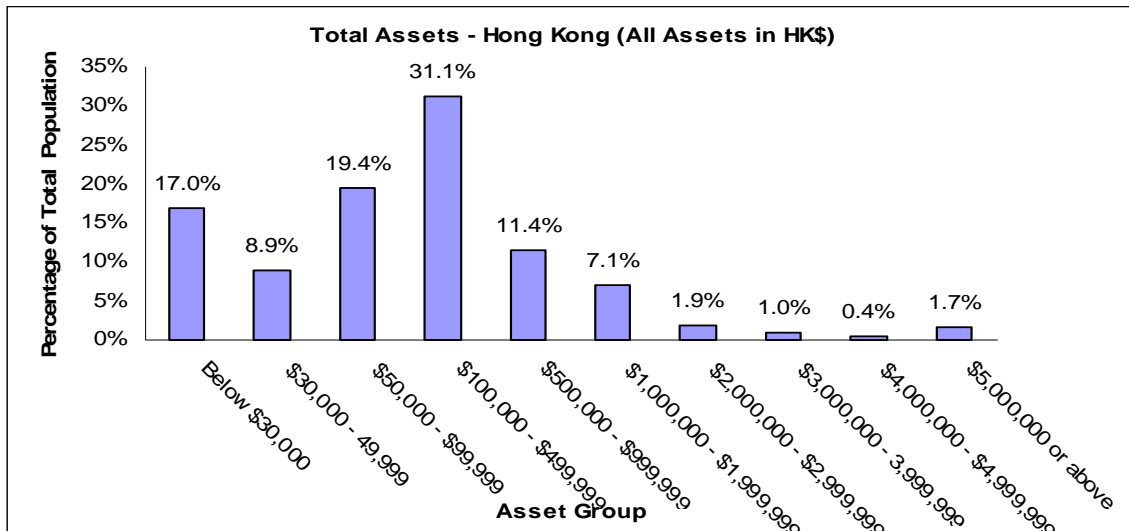


⁴ Annual Income – Part I, Question 11; percentages are with respect to each country individually

2.5 TOTAL ASSETS:

“Which grouping below best indicates your total assets?”

Total Assets Distribution⁵



⁵ Total Assets – Part I, Question 12; does not include primary residence; percentages are with respect to each country individually.

2.6 ASSET PORTFOLIO COMPOSITION:

“Please indicate the composition of your currently invested assets (%).”

- ❖ “Individual Stocks”
- ❖ “Money Market Funds (unit-based funds purchased by cash)”
- ❖ “Structured Notes (e.g. market-linked notes)”
- ❖ “Bonds (e.g. govt, corporate bonds)”
- ❖ “Managed Mutual Funds / Unit Trusts (excluding MPF / CPF)”
- ❖ “Options, Warrants, FX, Commodities Trading”
- ❖ “Real Estate (other than your residence)”
- ❖ “Other”

Asset Distribution - Current Investment Amounts in Percentages for Bonds, Stocks, etc.: Means (Standard Deviations) by Country⁶

% invested in...	Hong Kong	Singapore	Taiwan
Bonds	9.97 (25.19)	5.08 (18.31)	3.98 (13.52)
Money Markets	12.72 (25.69)	3.10 (13.41)	4.50 (15.21)
Structured Notes	1.33 (7.71)	0.84 (7.62)	1.45 (8.67)
Stocks	52.65 (40.96)	35.42 (40.07)	48.98 (40.88)
Mutual Funds	8.59 (23.28)	40.21 (41.67)	20.26 (32.82)
Options	7.02 (19.67)	1.78 (10.77)	2.04 (10.85)
Real Estate	7.65 (22.47)	6.08 (20.12)	9.65 (25.70)
Other	0.11 (0.97)	7.49 (22.92)	9.14 (23.30)

⁶ Asset Distribution – Part I, Question 13

2.7 INVESTMENT ATTITUDE:

“Rate the attractiveness of the following investment types.” The rating was based on a 1 to 5 scale; 1 being the least attractive and 5 being the most attractive.

- ❖ *“Bonds”*
- ❖ *“Money Market Funds”*
- ❖ *“Structured Notes”*
- ❖ *“Individual Stocks”*
- ❖ *“Managed Mutual Funds / Unit Trusts”*
- ❖ *“Options, Warrants, FX, Commodities Trading”*
- ❖ *“Real Estate”*
- ❖ *“Others”*

Investment Interest: Means (Standard Deviations) by Country⁷

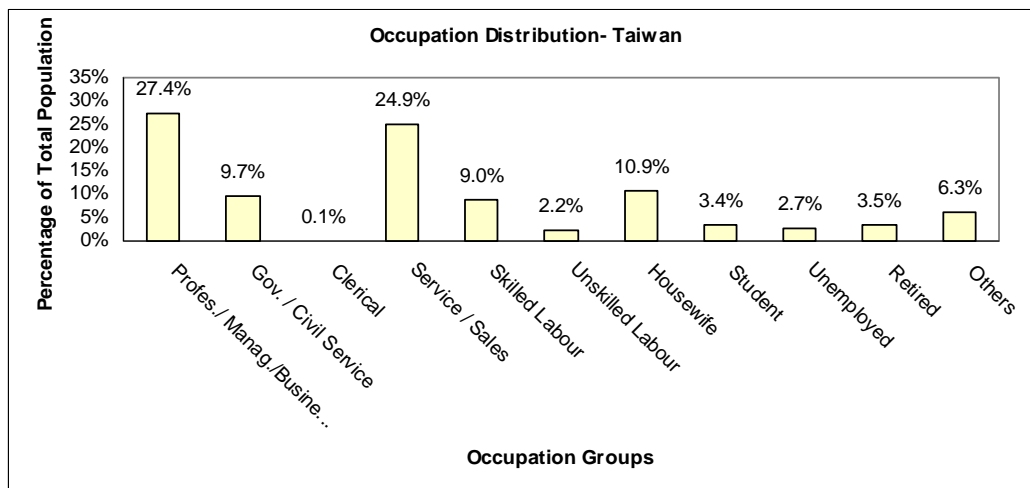
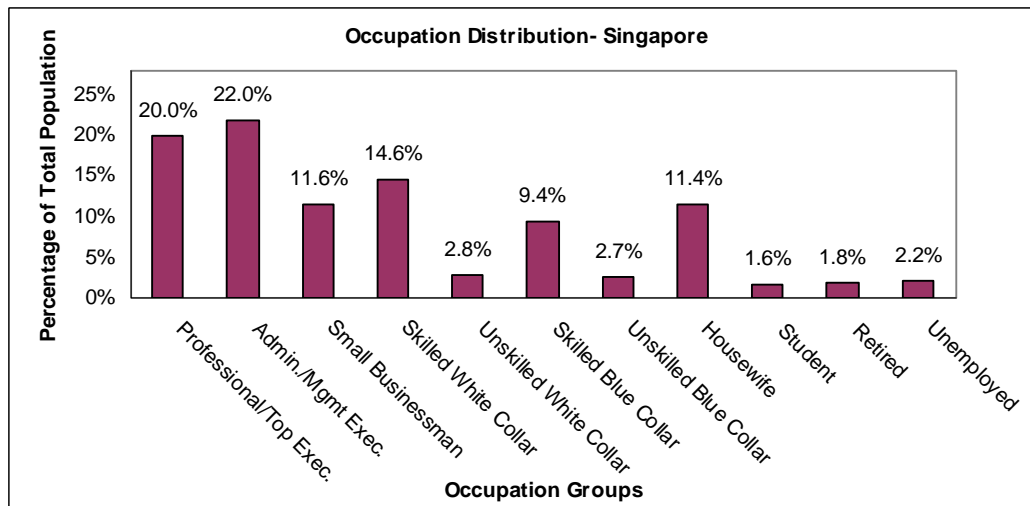
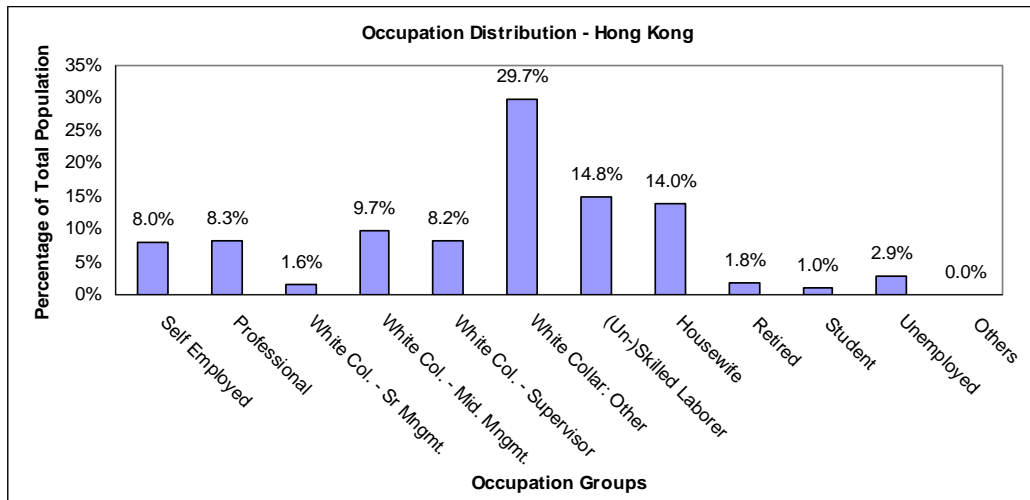
Interest in...	Hong Kong	Singapore	Taiwan
Bonds	2.21 (1.10)	2.12 (1.12)	2.16 (1.13)
Money Markets	2.38 (1.10)	1.93 (1.06)	2.26 (1.16)
Structured Notes	1.84 (0.10)	1.68 (0.95)	1.71 (0.96)
Stocks	3.48 (1.16)	2.80 (1.22)	2.98 (1.24)
Mutual Funds	2.31 (1.15)	2.74 (1.16)	2.68 (1.25)
Options	2.23 (1.17)	1.77 (0.99)	1.94 (1.10)
Real Estate	2.62 (1.24)	2.42 (1.30)	2.45 (1.28)
Other	1.75 (1.05)	2.08 (1.12)	2.06 (1.06)

⁷ Investment Interest – Part I, Question 15

2.8 OCCUPATION:

“What is your current occupation and position?”

Occupation Groups in Percentages⁸



⁸ Occupation – Part IX, Question 17; percentages are with respect to each country individually

3 Risk Preferences for Gains and Losses⁹

In this section, we explore respondents' risk preferences in the three countries for uncertain investment gains and losses. Risk preferences have been shown to differ depending on whether investors face gains or losses relative to their current wealth position. Accordingly, Kahneman and Tversky (1979) proposed prospect theory as a descriptively more valid alternative to von Neumann and Morgenstern's (1944) 'classic' expected utility theory. Prospect theory accounts for certain empirical regularities in investor and consumer choice under uncertainty that expected utility theory does not predict. The key innovation in prospect theory is reference dependence. Investors value investment alternatives relative to a reference point (e.g., their current wealth position).

Figure 3 depicts a typical prospect theory value function. First, risk preferences differ depending on whether investors evaluate gains or losses relative to the reference point. Investors are typically risk averse in the gain domain, implying a concave value function over gains, and risk seeking in the loss domain, implying a convex value function over losses. Second, investors are averse to incurring losses relative to the reference point, implying a steeper slope for losses than for gains. A third feature of prospect theory is the probability weighting function, which specifies a weight, by which investors distort their subjective probability estimates for uncertain outcomes. In our survey, we were interested in exploring differences between Hong Kong, Singapore, and Taiwan in risk preferences for gains and losses. We explored neither loss aversion per se (see, e.g., Novemsky and Kahneman 2005; Ariely, Huber, and Wertenbroch 2005) nor the probability weighting function (see, e.g., Rottenstreich and Hsee 2001).

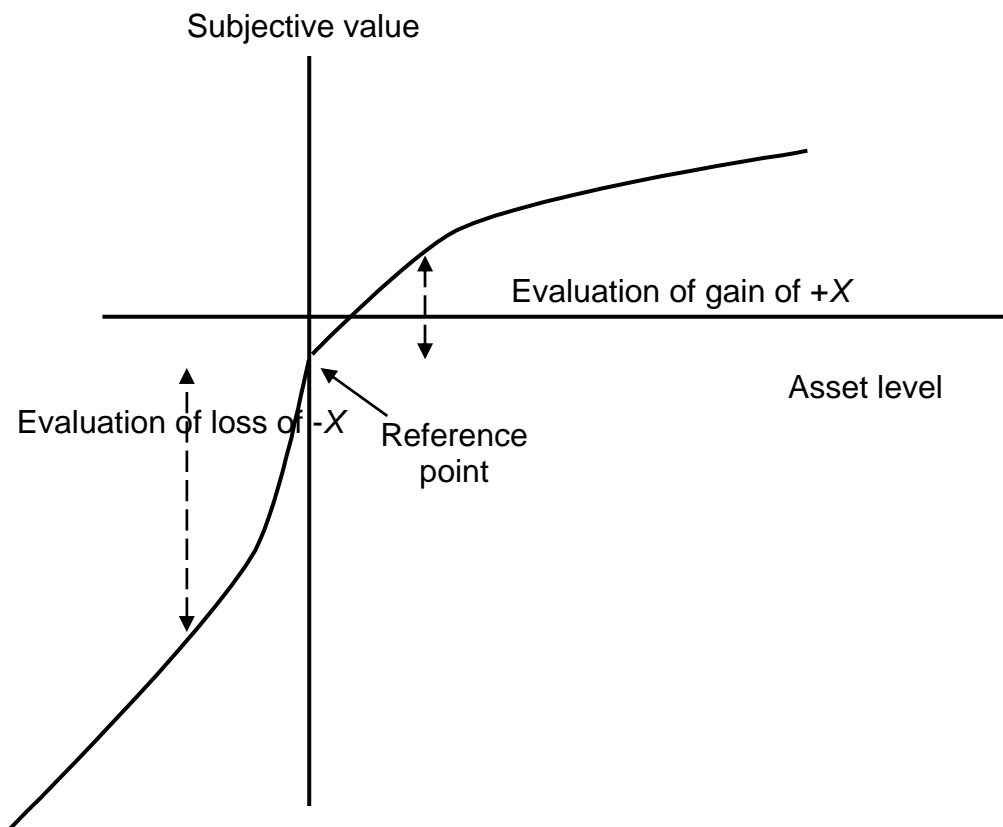
A standard approach to measuring risk preferences is to provide respondents with a gamble and ask them for a certainty equivalent (CE, or 'sure thing') so that they would be indifferent between taking the gamble or receiving the CE (see, e.g., Weber and Hsee 1998;

⁹ Risk Preferences for Gains and Losses – Part II, Questions 1 & 2

von Winterfeldt and Edwards 1986). A respondent's risk preference for uncertain gains is inferred from whether his or her CE equals the expected value of the gamble (i.e., risk neutrality), is less than the expected value (i.e., risk aversion), or is greater than the expected value (i.e., risk seeking). For example, a respondent who is indifferent between a gamble with even chances of winning \$100 or winning nothing and a CE of less than the gamble's expected value of \$50 is risk averse—he or she would rather gain a smaller amount than \$50 for sure than play the gamble and risk not winning anything. A $CE > \$50$ would indicate risk seeking for gains—he or she would have to be compensated with more than \$50 for sure not to play the gamble for a chance to win \$100.

Figure 3.

PROSPECT THEORY VALUE FUNCTION



For uncertain losses, CEs with an absolute value of less than the absolute expected value of the gamble indicate risk seeking. For example, a respondent who is indifferent between a gamble with even chances of losing \$100 or losing nothing and a CE less than the

gamble's expected value of -\$50 (for example, a CE = -\$80) is risk averse—he or she would rather lose a larger amount than \$50 for sure than play the gamble and risk losing \$100. A CE > -\$50 would indicate risk seeking for losses—he or she would rather play the gamble and risk losing \$100 than lose \$50 for sure.

3.1 Method

We implemented the CE procedure as follows. The experimental design was a mixed 2×3 full factorial with the within-subjects factor risk domain (gains, losses) and the between-subjects factor country (Hong Kong, Singapore, Taiwan). We asked respondents to imagine that they had the equivalent of \$10,000 USD in their local currency available to invest and that they faced two options for investing that money. We then asked them to provide their CEs for two gambles, one in the gain domain, the other in the loss domain. For gains, we described the following two investment options that would yield:

- A. “a return of plus 20% or a return of 0%, each with an equal chance,” or
- B. “a return of plus X% for sure.”

For losses, we described the following two investment options that would yield:

- A. “a return of minus 20% or a return of 0%, each with an equal chance,” or
- B. “a return of minus X% for sure.”

After each question, the participant was asked: “What value of X will make you indifferent between alternatives A and B?”

3.2 Results

In analyzing the data, we discovered that 870 respondents (in roughly equal proportions across all three countries) had provided CEs of 20%. For gains, that meant that they claimed to be indifferent between playing the gamble and receiving the maximum payoff for sure, indicating an implausible degree of risk seeking. For losses, it meant that

they claimed to be indifferent between playing the gamble and losing the maximum payoff for sure, again indicating an implausible degree of risk seeking. Quite obviously, these respondents had not understood the question they were being asked, and hence we eliminated their responses from further analysis. This is not entirely unexpected, because naïve respondents find CE questions notoriously difficult to answer in survey settings, where interviewers are not equipped to explain the reasoning behind the question in detail, as in the present telephone survey. We excluded these 870 respondents from our analysis of risk preferences, but not from the other analyses in this report. For the remaining 1696 respondents, the resulting mean CEs for gains and losses, are shown in Table 3A.

Table 3A: Mean Certainty Equivalents for Gains and Losses, by Country

	Hong Kong	Singapore	Taiwan
Gains	9.93	9.38	10.08
Losses	7.25	4.86	7.14

A repeated-measures ANOVA showed main effects of country ($F(2,1693)=41.77$, $p<.0001$), of gains versus losses ($F(1,1693)=890.55$, $p<.0001$), and of the interaction of country and gains versus losses ($F(2,1693)=24.98$, $p<.0001$). The two main effects are not interesting per se—CEs for gains and losses differed because they were positive for gains and negative for losses, and the average of gain and loss CEs differed across the three countries. What is interesting is the interaction.

For gains, planned contrasts showed that Singapore ($M=9.38\%$) had a lower CE than Hong Kong ($M=9.93\%$, $t=-2.52$, $p<.02$) and Taiwan ($M=10.08\%$, $t=-3.31$, $p<.001$). Singapore was also the only country that showed risk aversion for gains as predicted by both prospect theory and standard expected utility theory, that is, a CE of less than 10%, the expected value of the gamble ($t=-3.56$, $p<.001$). For losses, respondents in all three countries were risk seeking as predicted by prospect theory. Specifically, planned contrasts showed that Singapore had a less negative CE ($M=-4.86\%$) than Hong Kong ($M=-7.25\%$, $t=9.58$, $p<.0001$) and Taiwan ($M=-7.14\%$, $t=9.38$, $p<.0001$).

3.3 Discussion

In the gain domain, our findings of only a small degree of risk aversion for Singapore and of risk neutrality for Hong Kong and Taiwan are surprising in light of both standard expected utility theory and prospect theory, which both predict risk aversion (i.e., a concave value, or utility, function for money). However, in recent research on risk preferences across different cultures, Weber and Hsee (1998) found that Chinese respondents were significantly less risk averse than Western (i.e., U.S. and German) respondents. Hence, our findings are perhaps less surprising than they may seem in light of extant theories. Our respondents were predominantly Chinese in culture (we were not able to collect demographic data on ethnic origin), so that our results echo those obtained by Weber and Hsee (1998) on Chinese respondents. In the loss domain, our findings are consistent with prospect theory's risk seeking for losses, although the degree of risk seeking is stronger in Singapore than in the other two countries.

In sum, three issues are noteworthy about our results on risk preferences. First, Singaporean responses corresponded most closely to a prospect theory-type value function in both gains and losses, although even Singaporeans' risk aversion was weak. Second, respondents in Hong Kong and Taiwan do not exhibit the risk aversion for gains that standard theory predicts. Third, there is a notable difference in risk seeking for losses between Singaporeans on the one hand and Hong Kong and Taiwanese respondents on the other. This would predict, for example, that Singaporeans are more likely to show the disposition effect in investments (i.e., selling winners too soon and holding on to losses for too long) compared to investors in Hong Kong and Taiwan.

4 Risk Attitudes, Risk Preferences, Expected Benefits¹⁰

In this section, we explore whether respondents' attitudes towards taking financial and social risks differ across the three countries. Weber, Blais, and Betz (2002) constructed a domain-specific risk-attitude scale to measure to what extent attitudes towards engaging in risky behaviors in a number of domains are a function of respondents' perceptions of how risky a particular activity is and of how great the expected benefits of the activity are. Weber et al. (2002) found that, across five risk domains (financial, health and safety, recreational, ethical, and social risks), risk attitudes are negatively correlated with perceived risk and positively correlated with perceived benefits. That is, the greater the perceived risk from engaging in an activity, the less likely respondents were to want to engage in it, suggesting a general level of risk aversion. The greater the perceived benefits of an activity, the more likely respondents were to want to engage in it. These results could be interpreted as consistent with the standard risk-return framework in financial theory.

The present survey selected two of the five domains from Weber et al.'s (2002) study, financial and social risks, along with questions about four (out of ten) activities from each subscale (to minimize interviewer and respondent effort). Financial risk taking is of focal interest here, but we also included social risk taking to determine if attitudes toward financial risks were diagnostic of more general, underlying risk attitudes that would also be reflected in social risk taking, or whether financial risk attitudes have a somewhat different psychological structure than social risk attitudes, which may be more embedded in local culture.

¹⁰ Risk Attitudes, Risk Perceptions, and Expected Benefits – Part III, Questions 3, 4, & 5.

4.1 Method

We employed a between-subjects design with country as the only factor (Hong Kong, Singapore, and Taiwan). We asked respondents in all three countries to comment on how they viewed the four social (S) and the four investment (I) activities. The questions were divided into 3 sections: risk attitudes (Section 1), risk perceptions (Section 2), and expected benefits (Section 3). Each section referred to the same eight activities; however, the order of the questions in each section varied. Respondents had to rate each activity on a scale of 1 to 5.

- ❖ Section 1: Risk Attitudes asked the participant to indicate how likely they would be to engage in each activity or behavior.
- ❖ Section 2: Risk Perceptions asked the participant to provide their “gut level assessment” of how risky each situation is.
- ❖ Section 3: Expected Benefits asked the participants to indicate the benefits that they would obtain from engaging in each situation.

The questions used in each section were the following:

1. “Admitting that your tastes are different from those of your friends. (S)”
2. “Investing 10% of your annual income in a moderate growth mutual fund. (I)”
3. “Disagreeing with your father on a major issue. (S)”
4. “Investing 5% of your annual income in a very speculative stock. (I)”
5. “Approaching your boss to ask for a raise. (S)”
6. “Investing 5% of your annual income in a conservative stock. (I)”
7. “Wearing provocative or unconventional clothes on occasion. (S)”
8. “Investing 10% of your annual income in government bonds (treasury bills). (I)”

4.2 Results

We only report summary analyses of average ratings across the four activities in each domain (results on the individual items are available as well). That is, we averaged risk attitude, risk perception, and perceived benefit ratings across the four activities in each domain for each respondent. We then regressed each respondent's average risk attitude (RA) toward social risks on his or her average social risk perception (RP) and his or her average perceived benefit (PB) from social risk taking, plus dummy variables for the Hong Kong (HK) and Singapore (SG; i.e., the regression model intercept characterizes the average attitude toward social risks in Taiwan, controlling for risk and benefit perceptions). We ran a similar model for investment risks. The model we estimated was

$$RA = \beta_0 + \beta_1 RP + \beta_2 PB + \beta_3 HK + \beta_4 SG +$$

where ϵ denotes the estimation error.

The regression parameter estimates are shown in Table 4A. As expected, perceived benefits have a statistically significant positive effect on attitudes towards both social and investment risks, while risk perceptions have a negative effect for investment risks. For social risks, there was no effect of risk perceptions (although the sign was negative).

Table 4A: Attitude toward Social Risk and Investment Risk – Estimates of Regression Parameters (Standard Errors of Estimates)

	Social Risk Attitude	Investment Risk Attitude
Intercept (Taiwan)	1.38* (0.05)	1.68* (0.07)
Risk Perceptions	-0.01 (0.02)	-0.13* (0.02)
Expected Benefits	0.47* (0.02)	0.56* (0.02)

Hong Kong	0.24* (0.03)	0.06 (0.04)
Singapore	0.20* (0.03)	-0.13** (0.04)

NOTE: The table is with respect to Taiwan (intercept = Taiwan)

p = p -value for H_0 : Regression parameter = 0

* = $p < 0.0001$

** = $p < 0.0002$

Table 4B looks at the differences in risk attitudes between the three countries, controlling for risk perceptions and perceived benefits. For social risks, there was no difference in risk attitude between Hong Kong and Singapore, yet participants in both countries had more positive attitudes toward social risks than the Taiwanese. In contrast, attitudes toward investment risks did not differ between Hong Kong and Taiwan, both of which had more positive attitudes than the Singaporeans.

Table 4B: Statistically Significant Comparisons of Risk Attitudes (t=t-statistic and p-value for H_0 : No Difference between Countries) by Pairs of Countries

	Social Risk Attitude	Investment Risk Attitude
Hong Kong vs. Taiwan	HK > TW $t = 7.62^*$	HK = TW $t = 1.78$
Hong Kong vs. Singapore	HK = SG $t = 1.13$	HK > SG $t = 5.52^*$
Singapore vs. Taiwan	SGP > TW $t = 6.57^*$	SGP < TW $t = -3.74^{**}$

* = $p < 0.0001$

** = $p < 0.0002$

4.3 Discussion

Two key findings emerge from our data. First, as expected under standard theory, in all three countries, risk perceptions have a negative effect and expected benefits have a positive effect on risk attitudes, although the effect of risk perceptions is not statistically significant toward social risk taking. We believe the lack of significance of risk perceptions for social risk taking merits further investigation because it suggests that risk taking behavior in different domains among Asians may have different underlying psychological structures, the reasons for which will be interesting to explore.

Second, after controlling for risk perceptions and expected benefits, respondents in Hong Kong and Singapore appear more likely to take social risk than our Taiwanese respondents, whereas Singaporeans appear less likely to take investment risk than respondents in Hong Kong and Taiwan. The latter finding is yet another difference between Singaporeans and respondents in the other countries in terms of investment behavior and coping with uncertainty. In line with many of our other findings, it appears that Singaporeans are less comfortable in dealing with risks that involve a salient component of randomness.

5 Regret¹¹

In this section, we examine the notion of regret and how it might differ across the countries. It has been shown that decisions with identical outcomes are judged worse when they result from acts of commission than acts of omission (e.g., Spranca, Minsk, and Baron 1991; Ritov and Baron, 1992). This is consistent with the findings of Kahneman and Tversky (1982) who showed that people feel a more poignant emotional reaction to events that involve actions relative to events that have identical outcomes but which do

¹¹ Regret - Part IV, Question 6

not involve actions. They used as an example the following scenario:

Paul owns shares in Company A. During the past year he considered switching to stock in Company B, but he decided against it. He now finds that he would have been better off by \$1,200 if he had switched to the stock of Company B.

George owned shares in Company B. During the past year he switched to stock in Company A. He now finds that he would have been better off by \$1,200 if he had kept his stock in Company B.

Note that Paul and George experience the same outcome. However, in George's case the outcome resulted from action, whereas in Paul's case it resulted from inaction. Respondents in the Kahneman and Tversky study predicted that George will feel worse than Paul. Shefrin (2002) used a similar example in his study, but also introduced an additional case. He considered a scenario where for a given period in a stock market

Paul renews his certificates of deposit (CDs) after considering switching to the stock market;

George trades out of the stock market and into CDs based on his own analysis;

John also trades out of the stock market and into CDs, but based on his financial advisor's recommendation.

The respondents were then asked, assuming that stock market is up by 15% during the period and hence all three investors are worse off by having their investments in CDs who would suffer the most regret. About 70% chose George, 12% chose John, virtually no one chose Paul, and 18% chose nobody. As expected, respondents showed commission regret (regret for George) as being higher than omission regret (regret for Paul). Also, respondents showed that advisor-based commission regret (regret for John) as being less than (self-inflicted) commission regret in the case of George. Shefrin argues that "having a financial advisor enables the investor to carry a psychological option. If an investment decision turns out well, the investor can take the credit, attributing the favorable outcome to his or her own skill. If the decision turns out badly, the investor can protect his or her ego and lower the regret by blaming the advisor."

5.1 Method

To examine regret, we used a scenario similar to the example in Shefrin (2002). The respondents were presented with a scenario that involved three investors, each with an investment equivalent to \$10,000 USD in the local currency. The three investors were described as follows:

- ❖ *A*'s investment was in stocks. Based on his/her own judgment, *A* sold all the stocks and put the money into a Fixed Deposit instead.
- ❖ *B*'s investment was also in stocks. *B* also sold all the stocks and put the money into a Fixed Deposit instead. However, unlike *A*, *B* based his/her decision on a financial advisor's recommendation rather than his/her own judgment.
- ❖ *C*'s money, on the other hand, was in a Fixed Deposit. *C* thought about switching from his Fixed Deposit into stocks, but in the end decided to keep the money in the Fixed Deposit, based on his/her own judgment.

The respondents were then told "Subsequently, the stock market went up by 15%. All three people (*A*, *B*, and *C*) held Fixed Deposits during this period. All three would have been better off holding stocks instead of keeping their money in a Fixed Deposit. To what extent will each of these three people regret their choice of keeping their money in a Fixed Deposit over the period?"

Each respondent was asked to rate the level of regret for each of the three investors on a 1 to 5 scale, where 1 meant "No regret at all" and 5 meant "Regret very much".

Investor *A*'s regret here is commission regret, since it is based on an action that he/she took. Investor *B*'s regret is also a form of commission regret, but one which results from an action based on a financial advisor's recommendation rather than his/her own judgment. Investor *C*'s regret is the case of omission regret, since it results from inaction rather than an act of commission¹².

¹² The experimental design was a mixed 3x3 full factorial with the within-subjects factor regret type (commission, advisor-based commission, omission) and the between-subjects factor country (Hong Kong, Singapore, Taiwan).

5.2 Results

Table 5.A below shows the mean regret levels by country, and Table 5.B shows the statistically significant comparisons of mean regret levels by pairs of countries.

Table 5.A: Mean Regret Levels by Country

	Hong Kong	Singapore	Taiwan
Commission Regret (Investor A)	2.76	2.70	2.95
Advisor-Based Commission Regret (Investor B)	3.22	2.95	3.08
Omission Regret (Investor C)	2.70	2.49	2.63

Table 5.B: Statistically Significant Comparisons of Mean Regret Levels ($t=t$ -statistic and $p=p$ -value for H_0 : No Difference between the Countries) by Pairs of Countries¹³

	Hong Kong Vs. Singapore	Hong Kong Vs. Taiwan	Singapore Vs. Taiwan
Commission Regret (Investor A)	HK = SG $t = 0.80$	HK < TW $t = -2.98^{**}$	SG < TW $t = -3.81^{****}$
Advisor-Based Commission Regret (Investor B)	HK > SG $t = 4.14^{****}$	HK > TW $t = 2.23^*$	SG = TW $t = -1.91$
Omission Regret (Investor C)	HK > SG $t = 3.12^{**}$	HK = TW $t = 1.12$	SG < TW $t = -2.00^*$

* = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$, **** = $p < 0.0001$

The average commission regret is highest for Taiwan, with no statistically significant difference between Hong Kong and Singapore. The average advisor-based commission regret is highest for Hong Kong, with no statistically significant difference between Singapore and Taiwan. And, the average omission regret is lowest for Singapore,

¹³ A repeated-measures ANOVA showed main effects of country ($F(2,2563)=8.97, p<0.0001$), of regret type ($F(2,5126)=105.77, p<0.0001$), and of the interaction of country and regret type ($F(4,5126)=5.15, p<0.001$)

with no statistically significant difference between Hong Kong and Taiwan. In general, regret levels are the lowest in Singapore.

Overall, across the three countries, the surprising result is that the differences between commission and omission regret are small and that both of these regret types are lower than the advisor-based commission regret. This is not what we expected a priori given the existing studies on regret where the usually observed order is commission regret > advisor-based commission regret > omission regret. We explore this further below. Table 5.C below shows the mean differences between commission and omission regret and between commission and advisor-based commission regret by country.

Table 5.C: Mean Differences in Types of Regret ($t=t$ -statistic and $p=p$ -value for H_0 : Mean Difference = 0) by Country

	Hong Kong	Singapore	Taiwan
Commission Regret – Omission Regret	0.05 $t=0.91$	0.21 $t=3.77***$	0.32 $t=5.69*****$
Commission Regret – Advisor-Based Commission Regret	-0.47 $t=-9.00*****$	-0.25 $t=-4.8*****$	-0.12 $t=-2.42*$

* = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$, ***** = $p < 0.0001$

As expected, the mean differences between commission and omission regret are positive for all countries, although the difference for Hong Kong is not statistically significant. In other words, respondents in Hong Kong rated commission and omission regret similarly. The same difference is statistically significant for Singapore and for Taiwan, where respondents on average rate commission regret as being higher than omission regret, which is consistent with existing studies in the Western countries. The mean differences between commission and advisor-based commission regret are all

statistically significant and negative, which is an unexpected result. Table 5.D below compares these results by pairs of countries.

Table 5.D: Statistically Significant Comparisons of Means of Commission Regret – Omission Regret, and of Commission Regret – Advisor-based Commission Regret, (t=t-statistic and p=p-value for H₀: No Difference between the Countries) by Pairs of Countries

	Hong Kong Vs. Singapore	Hong Kong Vs. Taiwan	Singapore Vs. Taiwan
Commission Regret – Omission Regret	HK < SG <i>t</i> =-2.00*	HK < TW <i>t</i> =-3.35***	SG = TW <i>t</i> =-1.37
Commission Regret – Advisor-Based Commission Regret	HK < SG <i>t</i> =-3.05**	HK < TW <i>t</i> =-4.70****	SG = TW <i>t</i> =-1.67

* = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$, **** = $p < 0.0001$

The average difference between commission and omission regret is similar in Singapore and Taiwan, and in both these countries it is higher than in Hong Kong where the commission and omission regret appear to be the same. As mentioned earlier, the advisor-based commission regret is greater than commission regret in all three countries. However, that differential is much greater in Hong Kong than in Singapore and Taiwan, the latter two countries showing no statistically significant difference in this respect.

To make a direct comparison with the results of the existing studies, we also created a rank order of the regret types for each subject. Table 5.E shows a comparison of commission regret and omission regret within respondents, by country.

Table 5.E: Commission Vs. Omission Regret: Percentage of Respondents by Country

	Hong Kong	Singapore	Taiwan
Commission Regret > Omission Regret	33.45%	27.91%	41.56%
Omission Regret > Commission Regret	29.29%	20.65%	28.75%
Commission Regret = Omission Regret	37.26%	51.44%	29.69%

For all three countries, as expected, a higher percentage of respondents rate commission regret as being greater than omission regret, although these percentages are much lower than we expected. In the existing studies, conducted primarily in the U.S., almost all respondents rate commission regret as being higher than omission regret, with almost no one choosing omission regret as being higher than commission regret. Table 5.F shows the percentage of respondents who clearly showed a dominant regret type, by country.

Table 5.F: Percentage of Respondents by Clearly Dominant Regret Type, by Country

	Hong Kong	Singapore	Taiwan
Commission Regret	13.81%	11.65%	19.32%
Advisor-Based Commission Regret	32.74%	22.95%	27.94%
Omission Regret	18.33%	11.65%	20.49%
None	18.21%	33.79%	12.11%

As mentioned before, Shefrin (2002) in his study found that in terms of the strongest regret type about 70% of the respondents choose commission regret, 12% choose advisor-based commission regret, almost no one chooses omission regret, and 18% choose none. Our results are very different. The strongest regret type appears to be advisor-based commission regret, and omission regret also shows up as being clearly dominant for a significant proportion of the respondents.

5.3 Discussion

In summary, our results are surprising on two fronts. First, the difference between commission and omission regret is not as strong as one would have expected. In other words, it appears that while people in the three Asian countries do regret unfavorable outcomes from acts of investment more than missed opportunities of favorable investments, the difference in the two regret types is much less than expected. In fact, in Hong Kong, there appears to be no difference between commission and omission regret, whereas in Singapore and Taiwan commission regret is higher than omission regret but not to the scale observed in the U.S.

Second, the highest regret type is associated with unfavorable outcomes from following the recommendation of a financial advisor. This is again in sharp contrast to the existing studies in the U.S., where (self-inflicted) commission regret is much higher than advisor-based commission regret. It appears that people in the three Asian countries have a different view of financial advisors compared to in the U.S. This could be due to the fact that the financial advisors play a different role in the three Asian countries (for example, hot stock picking rather than financial planning) compared to in the U.S. Or, it could simply be due to the fact that the financial advisors are less trusted or not well embedded in the investment culture in the three Asian countries when compared to the U.S. The advisor-based commission regret is the strongest in Hong Kong, with no significant difference between Taiwan and Singapore.

6 Overconfidence¹⁴

In this section, we explore to what extent respondents exhibited overconfidence in general knowledge questions, and whether such overconfidence differed across countries. Overconfidence refers to people's tendency to believe that they can predict uncertain

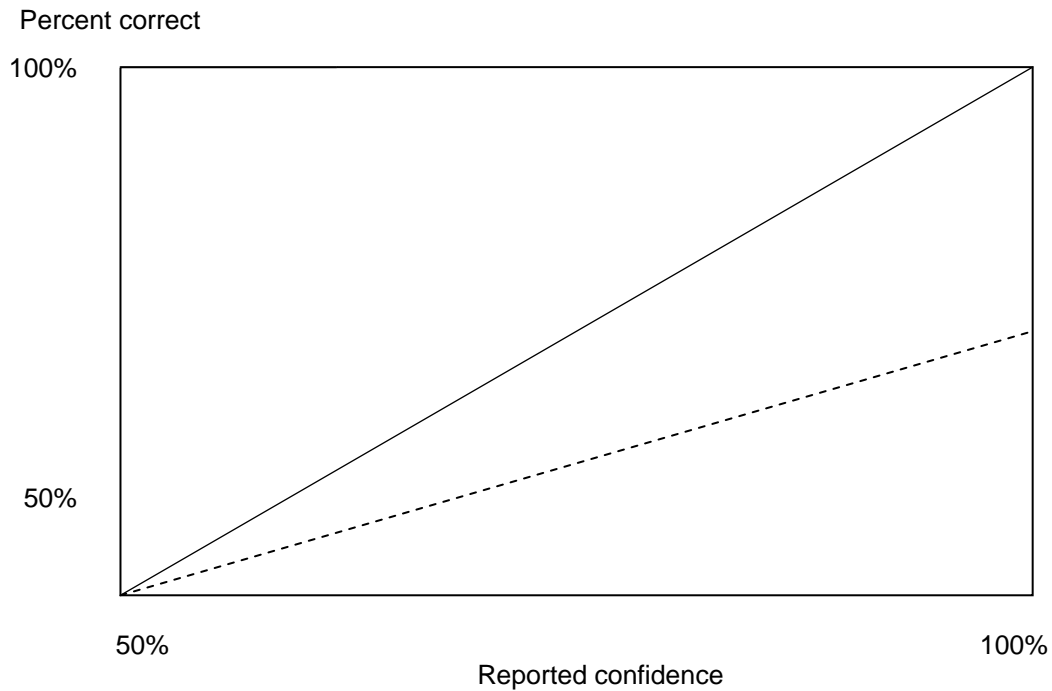
¹⁴ Test of Overconfidence - Part IV, Question 8

outcomes more accurately than they actually can. That is, people are not well calibrated in that they insufficiently incorporate uncertainty into their judgments. These exaggerated beliefs have been demonstrated in many domains, including weather forecasting (e.g., Lichtenstein, Fischhoff, and Phillips 1982) and general knowledge questions (e.g., Soll 1996; Soll and Klayman 2004). Overconfidence in investment decisions has important behavioral consequences—overconfident investors trade too much (Barber and Odean 2001; Odean 1999).

Typical laboratory demonstrations of overconfidence ask respondents to provide a subjective confidence interval such that the true value respondents are trying to predict is incorporated in the interval with a certain probability. For example, a respondent may be asked to provide a 90% confidence interval such that tomorrow's value of the S&P 500 index is included in the interval with a subjective probability of 90%. Suppose, for instance, a respondent's 90% confidence interval is bounded by 1190 at the low end and 1230 at the high end. In other words, that person would be 90% certain that tomorrow's S&P 500 value will lie between these two bounds. Now suppose further that the respondent provides 90% confidence intervals for a number of similar questions. A well-calibrated, non-overconfident investor would be right 90% of the time on average, that is, for 90% of the questions his or her confidence intervals would include the true values. A less well-calibrated, overconfident investor would be right less than 90% of the time on average. Figure 6A shows a typical calibration curve, illustrating the relationship between respondents' reported confidence and the percentage of correctly inclusive confidence intervals. The broken line shows that the percentage of correct predictions decreases as confidence intervals get wider, instead of tracking the solid identity line. That is, the greater the reported confidence that the true value falls into the corresponding interval, the less is the calibration. Overconfidence implies that people provide confidence intervals that are too narrow.

Figure 6A.

TYPICAL CALIBRATION CURVE DESCRIBING OVERCONFIDENCE.



6.1 Method

We employed a between-subjects design with country as the only factor (Hong Kong, Singapore, and Taiwan). We asked respondents in all three countries to respond to 10 general knowledge questions. Each respondent was asked to “provide a low and high guess such that you are 90 percent sure the correct answer falls between the two.” The questions given in the survey were (the correct answer is given in brackets at the end of each question):

- (1) “How many countries are there on the African continent?” – [53]
- (2) “How many women have won a Nobel Prize?” – [31]
- (3) “What is the distance (in kilometers) from the Earth to the Moon?” – [384,4000 km]
- (4) “What percentage of the total wine production is produced by France?” – [20.3%]
- (5) “What is the population of Switzerland?” – [7.45 million]
- (6) “How many steps are there to the top of the Eiffel Tower?” – [1792]
- (7) “What is the air distance between London and New York? (in kilometers)” – [~5562 km]

- (8) “How many gold medals were won by Russia in the 2004 Olympics in Athens?” – [27]
- (9) “When was Mohandas K Gandhi (Mahatma Gandhi) born?” – [1869]
- (10) “What is the gestation period (pregnancy period) of the great blue whale (in days)?” – [335 days]

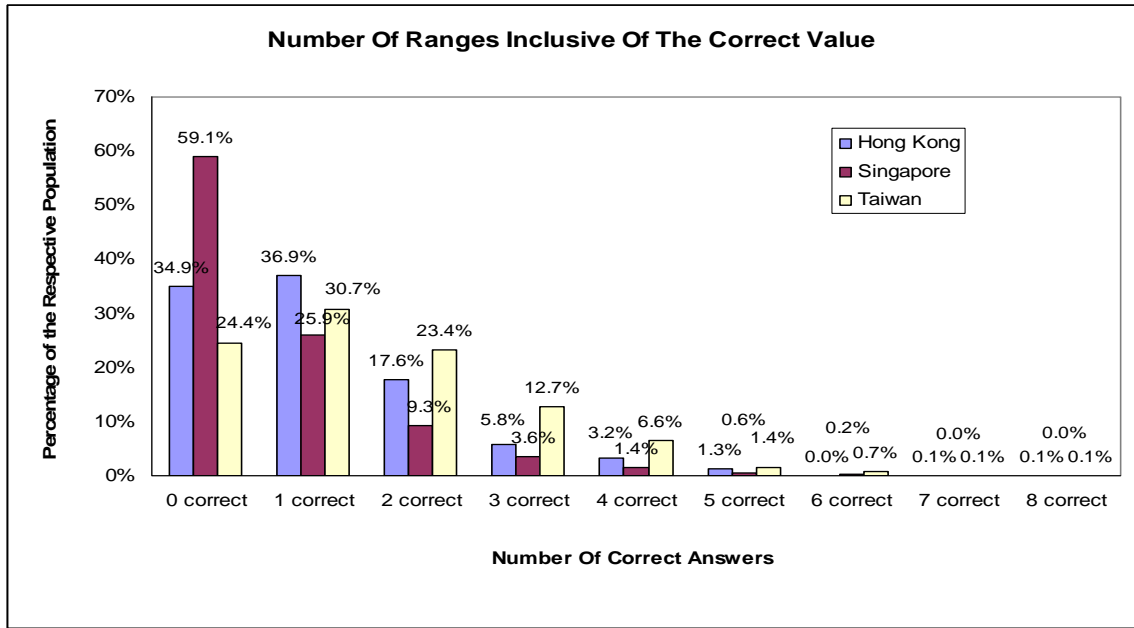
A well-calibrated respondent would miss only one question (i.e., 90 percent certainty is represented by answering 9 questions correctly out of a total of 10 questions).

6.2 Results

To analyze whether respondents exhibited overconfidence, we first calculated for each person the number of questions, for which the respondent’s confidence interval included the correct value. For example, if a respondent’s confidence interval for question (2) about the number of female Nobel Prize winners included 35, we coded the response a hit (=1), if it didn’t we coded it as a miss (=0). The maximum number of hits a person could achieve was ten. Respondents with less than nine hits, that is, with a hit rate of less than 90%, would be classified as overconfident. Figure 6B and Table 6A show the distribution of hits by country.

Figure 6B.

DISTRIBUTION OF HITS BY COUNTRY.



Respondents in each country were highly overconfident. Singaporeans were the most overconfident (i.e., they exhibit the smallest number of hits, *Mean Correct* = 0.65), followed by respondents in Hong Kong (*Mean Correct* = 1.10, $t=-8.01$, $p<.0001$), who, in turn, were more overconfident than respondents in Taiwan (*Mean Correct* = 1.54, $t=-7.80$, $p<.0001$).

Table 5A. Percentage and Frequency Distribution: Number of Correct Answers per Country

	Hong Kong	Singapore	Taiwan
0 correct	34.9%	59.1%	24.4%
1 correct	36.9%	25.9%	30.7%
2 correct	17.6%	9.3%	23.4%
3 correct	5.8%	3.6%	12.7%
4 correct	3.2%	1.4%	6.6%
5 correct	1.3%	0.6%	1.4%
6 correct	0.0%	0.2%	0.7%
7 correct	0.1%	0.0%	0.1%
8 correct	0.1%	0.0%	0.1%
9 correct	0.0%	0.0%	0.0%
10 correct	0.0%	0.0%	0.0%

0 correct	297	515	212
1 correct	314	226	267
2 correct	150	81	203
3 correct	49	31	110
4 correct	27	12	57
5 correct	11	5	12
6 correct	0	2	6
7 correct	1	0	1
8 correct	1	0	1
9 correct	0	0	0
10 correct	0	0	0

6.3 Discussion

Two observations are striking. First, respondents in all three countries displayed an extreme degree of overconfidence, consistent with well-established findings in the psychological literature that Asians are more overconfident than Western respondents (e.g., Wright, Phillips, Whalley, Choo, Ng, Tan, and Wisudha 1978). A caveat here is that overconfidence tends to increase with item difficulty; it is possible that our questions were harder to answer for our Asian respondents than for Western respondents. However, research has shown that Asian (i.e., predominantly Chinese) respondents exhibit more overconfidence even when item difficulty and cultural relevance are controlled for (Yates, Lee, Shinotsuka, Patalano, and Sieck 1998). Coupled with Odean's (1999; Barber and Odean 2001) and others' work on the effect of overconfidence on excessive trading, our findings suggest significant scope for biases in Asian investor behavior, especially in terms of trading too much and too frequently.

Second, Singaporeans again exhibited the highest degree of bias in this study. At this point, it is only possible to speculate about the causes of the excessiveness of overconfidence in Singapore. For instance, Singaporeans are perhaps less exposed to uncertainty in day-to-day affairs and in society, preventing them from becoming better calibrated. Or perhaps they receive less formal and/or informal training on the concept of

probability. It would be highly interesting to examine some possible causes in future research.

7 Portfolio Decisions¹⁵

In Section 3, we explored risk preferences in the domain of gains and losses. In general people tend to be risk averse when facing gains and risk seeking when facing losses. In this section, we explore this phenomenon further but in the context of concurrent decisions. This has implications, for example, in portfolio decisions. Here is a problem considered by Shefrin (2002) who attributes it to Kahneman and Tversky:

Imagine that you face the following pair of concurrent decisions. First examine both sets of choices, then indicate the option you prefer for each.

First Decision: Choose

- A. a sure gain of \$2,400, or
- B. a 25 percent chance to gain \$10,000 and a 75 percent chance to gain nothing.

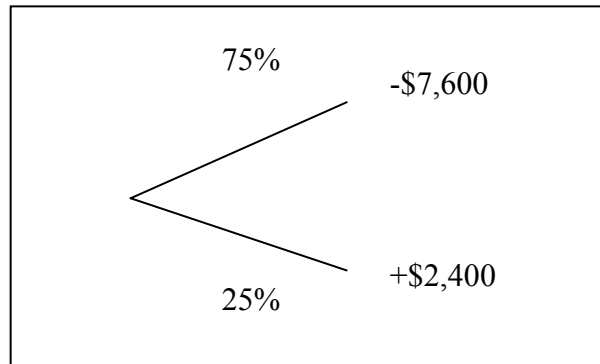
Second Decision: Choose

- C. a sure loss of \$7,500, or
- D. a 75 percent chance to lose \$10,000 and a 25 percent chance to lose nothing.

Note that in the first decision, the choice is between a sure gain of \$2,400 and a gamble with an expected value of \$2,500. In the second decision, the choice is between a sure loss of \$7,500 and a gamble with an expected loss of \$7,500. Typically, in the first decision, people choose A over B (showing risk aversion) and in the second decision people choose D over C (showing risk seeking). Combining A and D across the two decisions creates the following gamble:

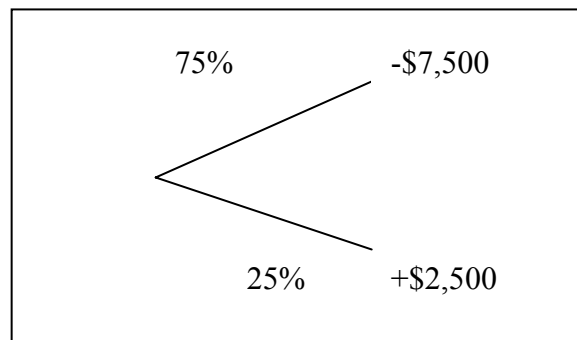
¹⁵ Portfolio Decisions – Part VII, Question 9

A&D:



Now imagine a choice between A&D and A&D plus \$100. It seems hard to imagine why anyone would turn down A&D plus \$100 over A&D. But, this is precisely what people are doing by choosing A&D over B&C. Note that combining B and C across the two decisions leads to the following gamble:

B&C:



Note that B&C is nothing but A&D plus \$100. However, this frame is opaque and people don't see it easily and as a result end up choosing a combination across the two decisions which they clearly would not prefer. The point is that even if the decisions are concurrent (such as portfolio decisions), people deal with the decisions separately and create mental accounts. The frame dependence (gains versus losses) then leads to an option that might be clearly dominated by another option. In the example above, the choice between combinations of A&C, C&D, and B&C is matter of personal risk preferences. However, as

long as an individual prefers more money to less money, he/she should always choose B&C over A&D. This is what we explore across the three countries.

7.1 Method

We asked the participants to respond to two simultaneous decisions regarding an investment. In each of the three countries, the amount in USD was converted into an equivalent amount in the local currency.

First Decision:

- A) a sure gain of \$2,400 USD, or
- B) a 25% chance to gain \$10,000 USD and a 75% chance to gain nothing.

Second Decision:

- C) a sure loss of \$7,500 USD, or
- D) a 75% chance to lose \$10,000 USD and a 25% chance to lose nothing.

For each decision, the respondent was asked to choose one option. The interviewer recorded the answers as combinations of A&C, A&D, B&C, or B&D.

7.2 Results

Tables 7.1 to 7.3 show the decision combinations given by respondents, by country.

Table 7.1: Combination of the two Decisions: Percentage of Respondents in Hong Kong

	A	B
C	22.9%	12.0%
D	42.8%	22.2%

Table 7.2: Combination of the two Decisions: Percentage of Respondents in Singapore

	A	B
C	20.6%	5.5%
D	49.7%	24.2%

Table 7.3: Combination of the two Decisions: Percentage of Respondents in Taiwan

	A	B
C	21.4%	10.2%
D	46.8%	21.5%

The interesting part of the result is to compare the decision combination of A&D with B&C. Assuming that respondents prefer more money to less money, no one must choose A&D over B&C. Hereafter, we only consider respondents who chose the combinations of A&D or B&C. Table 7.4 below shows the distribution of respondents for A&D and B&C, conditional on having chosen one of the two, by country.

Table 7.4: Percentages of Respondents for Decision Combinations of A&D and B&C (conditional on having chosen one of the two combinations) by Country

Hong Kong	A&D	77.97%	<i>n</i> = 463, <i>Chi-Square</i> =144.88 <i>p-value</i> < 0.0001
	B&C	22.03%	
Singapore	A&D	89.96%	<i>n</i> = 478, <i>Chi-Square</i> =305.28 <i>p-value</i> < 0.0001
	B&C	10.04%	
Taiwan	A&D	82.24%	<i>n</i> = 490, <i>Chi-Square</i> =203.79 <i>p-value</i> < 0.0001
	B&C	17.76%	

It is easy to see that in each of the three countries, the proportion who chose A&D instead of the superior option of B&C is very high. Also, the same proportion is highest for Singapore (almost 90%), and about the same for Hong Kong (almost 78%) and Taiwan (82%). A test of significance, using logistic regression, shows that the proportion choosing A&D over B&C is higher for Singapore compared to Hong Kong (*Wald Chi-Square* = 24.14, *p-value*<0.0001) and compared to Taiwan (*Wald Chi-Square*= 11.71, *p-value*<0.001), whereas Hong Kong and Taiwan do not show statistically significant difference (*Wald Chi-Square* = 2.73, *p-value*=0.0986).

7.3 Discussion

It is well established that frame dependence (gains versus losses) can lead to concurrent decisions which are suboptimal. For example, while making concurrent decisions on different assets in a portfolio, people focus on individual decisions separately and hence end up choosing an option which is clearly dominated by another option. As a result, people are not very good at portfolio management. Our survey shows this result across the three countries. Also, the results show that people in Singapore fall into this trap much more than in Hong Kong and Taiwan. The difference between Hong Kong and Taiwan is not statistically significant. This would predict, for example, that investors in Singapore would be less sophisticated in the management of their investment portfolios than in Hong Kong or Taiwan.

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