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The Less You Know, The More You Are Afraid of – A Survey on Risk Perception of Investment Products

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A survey on risk perception of investment products

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Abstract

We conducted a survey on risk perception of investment products in the German-speaking area of Switzerland. Unlike the typical two-factor structure documented in the previous literature, we found that the knowledge-related scales were highly correlated with the risk-related scales, whereas the correlation between perceived risk and historical risk measures was much lower. The respondents perceived those easier-to-understand products to be less risky, which were very likely driven by the familiarity bias. Our results are in line with the affect heuristic and risk-as-feelings hypotheses.

Keywords: financial products, risk perception, familiarity heuristic, home bias

PyscINFO Classification code: 3900, 3040, 2229

JEL Classification code: G11, G32

The degree of one's emotions varies inversely with one's knowledge of the facts, the less you know the hotter you get.

Bertrand Russell

Risk comes from not knowing what you are doing.

Warren Buffet

1. INTRODUCTION

Familiar environment makes us feel safer. When it comes to investment decisions, most people perceive the familiar investment products to be safer. The traditional portfolio theory assumes that individuals maximize their expected utility. As a result, the risk-averse investors should favour diversification. In reality, there are abundant instances that people don't follow this strategy. Instead, investors focus their portfolios on the assets they are familiar or feel comfortable with, e.g., domestic assets, employer's stocks (Huberman, 2001), even though it would increase the overall risk of investment.

One explanation of these phenomena is that investors possess superior information of the assets that they are familiar with, and hence exploit this informational advantage. Little evidence supports this explanation though. Increasing empirical evidence points to another explanation, namely, distorted probability judgment: Investors are overoptimistic and underestimate the risk of the investment instruments that they are familiar with. For example, Kilka and Weber (2000) showed that both American and German students estimated their domestic stocks as more profitable and less risky than foreign stocks. Similarly, respondents to a Gallup survey viewed their own employer's stock as safer than a diversified domestic or international fund (Driscoll et al., 1995).

The above observations are at odds with the traditional asset pricing models, which posit that agents hold correct probability beliefs about future payoffs. It seems that the perceived risk often deviates from the objective risk. The measure of risk is not only limited to the variance of the underlying distribution, as defined in the classical mean-variance and CAPM models (Markowitz, 1952; Sharpe, 1964), but also can be skewness, semi-variance, below-the-target return, expected value of loss, and the probability of loss, which reflect better the subjective perceived risk (e.g., Weber, 1988; Brachinger & Weber, 1997; Veld & Veld-Merkoulova, 2008). Understanding how people perceive the underlying risk of different financial instruments is the first step to understand how investment decisions are made, and to further help investors to avoid biases and make sensible decisions.

Risk and uncertainty are not only mathematical and statistical concepts, but also psychological constructs. MacGregor et al. (1999) found that although for some assets financial advisors and planners defined risk in similar way to the traditional finance theory, they embraced contextual and emotional factors, such as knowledge and worry, into the risk evaluation for specific investments. Olsen (1997) compared professional analysts and nonprofessional wealthy individuals, and found the risk perception by both groups were multidimensional, but the nonprofessionals were more sensitive to potential losses. Diacon & Ennew (2001) reported that the perception on risk of personal financial service can be characterized by five dimensions, namely, distrust, the seriousness of averse consequence, volatility, knowledge/observability, and failure of regulation. All these studies focused on professional groups or at least active investors. To our knowledge, there is no large-scale data collection yet to investigate the lay public's risk perception on various financial products.

The personal emotions and feelings play no role in the standard asset pricing models, which usually assume correct and homogeneous probability beliefs among all investors. However, the burgeoning literature in behavioural finance shows that, instead of being rational Bayesians, people rely on heuristics and are subject to certain biases. Since it is too

complicated to collect and process all relevant information, affect and emotions are often served as cues to judge the risk. Here affect refers to "goodness or badness" that are attached to the objects. One example is that the perceived risk and benefit of activities seem to be negatively correlated in people's mind, although the objective risk and benefit are usually positively correlated in the external environment (Alhakami & Slovic, 1994). The reason is that instead of evaluating the pros and cons analytically, the judgment is mainly driven by how people *feel* about the particular activity or whether they *like* it or not. When they like an activity, then they tend to believe that the risk is low and the benefit is high, and vice versa. Therefore, "Affective and cognitive features of judgment and decision processes are likely to interact with each other." (Finucane, Peters & Slovic, 2003, p. 343) The further study by Finucane *et al.* (2000) supports this hypothesis by showing that the inverse relationship between the perceived risk and benefit increased dramatically when under time pressure, because the analytic deliberation was reduced. Some studies demonstrated that even experts tend to use intuitive affect as judgmental cues (e.g., MacGregor et al., 1999).

Considerable evidence indicates that affect is important in pricing. Hsee (1998) demonstrated that the subjects were willing to pay higher price for an overfilled ice cream serving with 7 oz than an underfilled serving with 8 oz ice cream, because the overfilled one is associated with good feelings and positive affect. Using the rating of Long-Term Investment Value from Fortune Magazine survey as a proxy of affect, Statman, Fisher & Anginer (2008) showed that the respondents perceived those admired stocks as having high expected returns and low risk. They proposed a behavioural asset pricing model which includes a fundamental component that reflects the objective risk and a sentiment component that reflects subjective risk (Statman, Fisher & Anginer, 2008; see also Shefrin, 2005).

Greater familiarity can reduce the perceived risk (Slovic, Fischhoff, & Lichtenstein, 2000). One potential reason is that familiarity can induce positive feelings or affects. It is well documented by the social psychologists that people express undue preference for some items simply because they are exposed to them more often, the so-called "mere-exposure effect" (Zajonc, 1968) or "Familiarity breeds liking." This positive emotion may lead to underestimation of risk.

Familiarity also creates feelings of greater (sometimes illusive) competence. Heath and Tversky (1991) found in their experiments that participants preferred to "bet in the context where they consider themselves knowledgeable or competent than in a context where they feel ignorant or uninformed" (p.7) even though the judged probabilities were the same. They concluded that this "might help explain why investors are sometimes willing to forego the advantage of diversification and concentrate on a small number of companies (Blume, Crockett, & Friend, 1974) with which they are presumably familiar." (p. 27)

This article presents a survey, in which the respondents were asked to evaluate a variety of investment products (e.g., bonds, stocks, gold). Unlike the two-factor structure (e.g., dread and unknown) that has been frequently reported from psychometric risk perception literature (Fischhoff et al., 1978; Slovic, Fischhoff, & Lichtenstein, 1979; Slovic, 1972), our factor analysis revealed only one component. We found that the degree of self-reported understanding and the perceived prevalence were highly correlated with perceived uncertainty of the financial products, whereas the correlations of perceived risk with the objective risk measures from historical data were much lower, which supported the hypothesis of familiarity heuristic. We also found that respondents were prone to home bias, i.e., they perceived the domestic equities or bonds as easier to understand and less risky than the international ones. In addition, the underestimation of private-house investment risk also

manifests the familiarity bias. We present the methodology in Section 2 and the results in Section 3. The last section concludes.

2. METHODS

2.1. Questionnaire

The design of the survey was based on the psychometric paradigm adopted by Fischhoff et al. (1978). We included 20 investment products in the questionnaire and asked participants to rate them on seven scales. These rating scales, measuring qualitative risk dimensions, were adapted from previous empirical and theoretical work on risk perception (Fischhoff, et al., 1978; Brachinger & Weber, 1997; Diacon & Ennew, 2001).

Table 1 illustrates the names and descriptions of the seven scales, together with the scale end points used in the questionnaire. The first three scales (understanding, expert knowledge, and prevalence) correspond to the familiarity, whereas the last four scales (risk of capital loss, risk of lower-than-expectation, variation and chance of higher-than-inflation) correspond to the different statistical measures of risk.

Each participant also judged the perceived risk of each product by answering the following question: "*How risky do you consider each of the following financial products?* (1=very low; 5=very high) " All 20 investment products were rated on one scale before going to the next scale.

Insert Table 1 here

2.2. Participants

We conducted a mail survey in the German-speaking part of Switzerland during 2006. A questionnaire and an accompanying letter were sent to a random sample of addresses from the telephone book. The questionnaire addressed the person in the household next in line for their birthday and over 18 years of age. A reminder letter was sent out some time later. A second questionnaire was sent to persons who did not respond to the letter or reminder.

A total of 1249 people participated in the study with a response rate of 33%. Forty-five percent (N = 558) reported to have an investment portfolio, whereas 52% of all participants (N= 647) did not have a portfolio. Three percent (N = 44) did not answer this question. Because we focused on persons who are interested in financial topics, only those participants who had an investment portfolio were presented with the questions referring to the psychometric paradigm. Seventy percent of these respondents (N= 388) were men and 30% were women (N=164). Six persons did not report their gender. The mean age was 55.5 (*SD* = 15.2). Five respondents did not provide information about their age. The self-reported education level ranged from primary and lower secondary school (3%; N = 15), upper secondary vocational school or upper secondary university preparation school (46%; N = 256), to college or university (51%; N = 286). One respondent did not indicate his education level.

Among the participants who had an investment portfolio, 64 respondents had more than 11 missing answers to questions referring to the psychometric paradigm. Not answering more than 11 questions points to a lack of information about more than half of a scale of the psychometric paradigm. Therefore, the data of these participants were excluded from the analyses. This resulted in 494 persons to be included in the final data set for analysis.

3. RESULTS

3.1. Perceived overall risk

An Analysis of Variance with repeated measures (MANOVA) revealed significant differences in perceive risk ratings among the twenty investment products, $F(19,665)=8.07$, $p < 0.001$. Table 2 presents the average ratings of the perceived risk scale for all the 20 investment products. The respondents perceived the *bank saving accounts* as the least risky among all products, whereas *commodity funds* as the most risky. We also observed that our respondents perceived the products in Switzerland as less risky than foreign assets. For example, paired samples t-test revealed that the respondents perceived for example *bonds in Switzerland* (M=2.34, SD=0.86) to be safer than *bonds in Europe* (M=2.72, SD=0.83, $t(492)=-13.66$, $p < .001$), and perceived the latter to be safer than *bonds worldwide* (M=2.88, SD=0.86, $t(492)= -16.18$, $p < .001$). The respondents also rated the *blue-chip stocks in Switzerland* (M=3.02, SD=0.88) as less risky than *blue-chip stocks in USA* (M=3.41, SD=0.87, $t(492)= -14.36$, $p < .001$).

Insert Table 2 here

3.2. Intercorrelations among the rating scales and perceived risk

Table 3 shows a high degree of intercorrelations among the seven judgment scales and the overall perceived risk aggregated across individuals. In the first column, the perceived risk was almost perfectly correlated with the scale “risk of capital loss”, “risk of lower-than-expectation return”, and “variation of gains and losses”. The last scale, “chance of higher-than-inflation return” had the lowest correlations with all other scales, implying that the gain potential was less prominent than the loss potential and volatility for the risk judgment. The

knowledge-related scales were also highly correlated with the overall perceived risk. For an illustration, we plot for all investment products the average scores of the judgment scale "understanding (*Do you have the feeling, that the investment product is easy or difficult?*)" vs. the overall perceived risk in Figure 1. From the graph, we see that the *banking accounts* were considered to be the easiest to understand and the least risky investment, whereas *antique/art* and *commodity funds* were among the most difficult to understand as well as the most risky assets. The *private house* investment was rated as relatively easy to understand and not very risky, whereas *real estate funds* were rated as difficult to understand and medium risky, reflecting underestimation of private house investment caused by the familiarity bias. The respondents viewed *equity funds in Switzerland* as easier to understand and less risky than the *equity funds in Europe*. The latter were in turn rated as easier to understand and less risky than *equity funds worldwide*. Similar pattern can be observed for bonds and blue chip stocks as well. These correlations were based on the aggregated data. Figure 2 shows the individual correlations between risk and understanding across the 20 investment products. Seventy percent of the participants have a higher correlation than r=0.48 and 50% a higher correlation than r=0.62. This implies that in most cases, people who viewed the investment products as easy to understand, also viewed such products as less risky, and vice versa.

Insert Table 3 here

Insert Figure 1 here

Insert Figure 2 here

3.3. Factor analysis on risk dimensions

We conducted factor analysis on the seven rating scales to further examine the underlying structure of risk-related dimensions. A principal components factor analysis using an orthogonal (Varimax) rotation revealed, as we expected, only one factor, which accounts for 91% of the total variance in the items. This result confirms the high correlation between the knowledge-related and uncertainty-related dimensions. In other words, people perceived the easy-to-understand, well-known and prevalent investment instruments as less likely to cause capital loss, less volatile, and more likely to gain high returns.

3.4. Categorization of investment products

In order to understand how the different investment products were implicitly categorized by our respondents, we implemented a principal component analysis across the 20 products. The Eigen-value criteria indicated that five components were necessary to explain the correlations among the investment products, which explained 70% of the total variance. Factor loadings are presented in Table 4. The internal consistencies of these scales were very good (Bonds α = .91, Equity α = .86, Insurance α = .74, Blue-chip α = .87; Alternative investment α = .70). It implies that the respondents considered the investment products within each category as similar to each other regarding the degree of perceived risk. For example, *art and antique*, *gold*, and *commodity funds* were perceived as similar to each other, whereas the *third pillar pension funds,* the *life insurance,* the *private real estates,* and *saving accounts* were considered to be similar.

Insert Table 4 here

3.5. Gender difference on perceived risk

An Analysis of Variance (ANOVA) indicated significant differences in risk perception among the perceived risks of the five categories of the products ($F(4,1968)=611.05$, $p < 0.001$). On average, the investment instruments that belong to the *insurance* category (e.g., *third pillar pension funds*, *saving accounts*) were rated as the least risky ($M=1.58$, $SD=0.54$), whereas the *alternative investment* category (e.g., *gold, art and antique)* was rated as the most risky ($M=3.54$, $SD=0.77$), followed by *blue-chip stocks* ($M=3.42$, $SD=0.97$). Table 5 reports the mean values of the overall perceived risk for the five categories of investment products by men and women respectively. It is interesting to see that the directions of gender differences of the perceived risk were opposite between the *equity* category and the *alternative investments* category — when compared to men, women perceived significantly higher risk associated with the *equity* category (t (487) = –2.34, p = .02) whereas they perceived lower risk associated with *alternative investments* such *art and antique*, *gold*, and *commodity funds* (t (486) =–2.56, p = .01). No gender differences were found on the perceived risk of the categories of *bonds*, *insurance* and *blue-chip stocks*.

We also calculated the average score of *understanding* for each of the five investment categories for men and women (Table 5). Again, in general both genders seemed to use the familiarity heuristics for their risk judgments. The asset categories that were considered to be easier to understand (e.g., *insurance*), were also rated as less risky, and vice versa (e.g., alternative investments). Women rated *equity* as more difficult to understand than men did ($t(487)=-2.62$, $p = 0.01$), and as we reported above, they also perceived the *equity* category as riskier than men did. However, it seemed that men did not show the familiarity bias for the *blue-chip* category: Although men considered the *blue-chip* category as much easier to understand than women did, they still perceived this category as high-risk investment, which

suggests that the male respondents were *not* biased by their self-perceived knowledge regarding the *blue-chip stocks*.

Insert Table 5 here

3.6. Comparing perceived risk with historical data

To evaluate whether the subjective risk perception was consistent with the objective risk, we calculated a variety of risk measures from the historical data of the 19 asset classes[1] over the last 10 years (1997~2006) and 20 years (1987 ~ 2006). The data we have used were from THOMSON Datastream. The correlation pattern were very similar between the past 10 years and 20 years. Therefore we only report the results about the objective risk in the past 10 years. Table 6 shows the overall perceived risk and the historical risk measured by standard deviation of the annual returns from 1997 to 2007. In general, it seems that the participants have a fairly good sense of the asset risk, except for a few asset classes. For example, the risk of third pillar pension funds, life insurance, equity fund in Switzerland, and bonds worldwide appear to be underestimated, whereas participants tend to overestimate the risk of commodity fund, real estate fund and blue chip stocks in the US.

Insert Table 6 here

Figure 3 demonstrates the relationship between the perceived risk and objective risk in a two-dimensional graph. The nonlinear regression model with logarithm link function fitted better than the linear regression model, implying that respondents were relatively insensitive to the objective risk. Consistent with what we discussed before, the risks of commodity funds,

[1] We omit the asset class art/antique because of the difficulties of obtaining meaningful historical data.

real estate funds, and bluechips USA seemed to be overestimated, whereas the risks of third pillar pension funds and private house seemed to be underestimated. Especially, respondents exhibited certain degree of home bias regarding bonds and bluechips – they thought the bonds in Europe were riskier than bonds in Switzerland, and bluechips in USA were riskier than bluechips in Switzerland, whereas the historical data show the opposite.

Insert Figure 3 here

Table 7 demonstrates the correlation between various risk measures with three mean responses from the survey (overall perceived risk, understanding, and chance of higher inflation). The perceived risk was moderately correlated with four objective risk measures (Standard Deviation, Probability of Loss, Expect Value of Loss, Value at Risk), with the correlations between 0.53 to 0.64. However, as we've seen in Table 3, the correlations of overall perceived risk with the judgment of understanding, prevalence and expert knowledge were much higher (around 0.92). Another observation is that the perceived chance of higher-than-inflation return (the third column in Table 7) was *not* correlated with the corresponding objective measure (the fifth column in Table 7), but again was highly correlated with self-reported understanding (Table 3). This shows that although understanding should be conceptually separate from the underlying risk and return, people seemed to rely substantially on the feelings of familiarity for their risk judgment, leading to some specific biases.

Insert Table 7 here

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4. DISCUSSION AND CONCLUSION

Previous research shows that the lay public's perception of risk can be captured by two orthogonal factors, "dread" and "unknown." Those research, however, mostly focus on the perception of environmental, health and safety risks. We adopted the methodology by Slovic, Fischoff, & Lichtenstein (1979) to investigate the underlying factor structure in the domain of financial investment products. Our main result shows that the so-called "dread" and "unknown" factors were highly correlated in our sample, which implies that in the context of financial investments, people might reply even more on their feelings and simple heuristics to judge the risk. In particular, using the historical risk as a benchmark, we find that the perceived risk was only moderately correlated with the objective risk measures, but nearly perfectly correlated with the self-reported degrees of difficulties to understand those asset classes. This is consistent with previous literature, which documented that, for more complex tasks, individuals rely more on simple heuristics, such as the affect heuristics (Finucane, Peters, & Slovic, 2003).

Warren Buffet stated that "Wide diversification is only required when investors do not understand what they are doing." Unfortunately, investors often overestimate what they understand. The self-perceived knowledge can be incorrect and deceiving, which may lead to biased risk judgment, insufficient diversifications, and less optimal portfolios. Despite the importance of diversification that is emphasized by many financial experts, people prefer to invest in the familiar assets. Even with the reduced barriers of international investment, many investors still put proportionally too high wealth into their domestic stocks (i.e., home bias), instead of benefiting from the international diversification as prescribed by the traditional finance wisdom (Huberman, 2001). Similarly, many people consider investing into a single private house as less risky than the real estate funds, again, ignoring the fact that the latter can actually reduce the idiosyncratic risks borne by a single house.

Our survey sheds some light on the above phenomena by demonstrating that when people *think* certain investment product as easier to understand and more prevalent, they also perceive it as less risky. Consistent with previous studies (e.g., Weber, Siebenmorgen, & Weber, 2005), our respondents exhibited home bias to some extent. Moreover, they considered private house investment as easier to understand and safer than the real estate fund. These patterns support the "affect heuristics" and "risk-as-feelings" hypotheses, which suggest that the risk perception is mediated by emotional reactions or feelings that often diverge from cognitive evaluations (Finucane, Peters & Slovic, 2003; Loewenstein et al., 2001).

We also observed some gender differences. In a study on risk perception by professional men and women investors, it was found that women tend to perceive higher risk for saving accounts, long-term bonds and IPOs than their male counterparts (Olsen & Cox, 2001). In our study, we confirmed that women rated the *equity* category as riskier than men did. However, women rated the *alternative investment* (e.g., art, antique, and gold) as *less* risky than men did. This may be caused by the affect heuristic in that men are more fond of the stocks, whereas women are more in favour of the art, antique and gold. This hypothesis needs to be further tested. Although both genders were influenced by the familiarity heuristics, we observed an exception in that men were not biased by the familiarity heuristic for the *blue-chip* stocks — men rated them as very risky assets, even though they considered this category as much easier to understand than how women thought about it.

It has been frequently reported that men engage more risk-taking activities than women, but the risk-taking behaviour is also somehow context-specific (Byrnes, Miller & Schafer, 1999; Harris, Jenkins, & Glaser, 2006). Different risk attitudes can be driven by social-cultural, as well as biological and evolutionary factors. Our survey did not study the risk-

taking behaviour directly. Instead we focused on the perceived risk, because risk-taking behaviour does not only reflect the true risk-tolerance level, but also is determined by the perceived risk. The men may be more risk-loving because they are more familiar with the associated tasks and perceive less risks. A deeper look at the impacts of emotion and affect on risk perception can help explain the underlying mechanism of gender differences in risk-taking behaviour.

Eliciting risk tolerance level of the clients has already been put into practice during the financial advisory process. It is often overlooked, however, that the perceived risks of the same investment product can be distinctly different among investors. Thus, in addition to the risk tolerance level, it is also crucial to understand how much risk the clients actually perceive. We found that the perceived knowledge was an important predictor of the perceived risk. The clients might overestimate the risk of certain investment due to their lack of knowledge, or underestimate the risk due to their overconfidence of the self-perceived knowledge. To fill the knowledge gap is important for effective risk communication.

The traditional finance assumes no perception biases, which contradicts numerous empirical evidences, including the results in our study. Some leading researchers have already been engaged in adapting the traditional normative asset pricing theory to the more descriptive models. For example, Merton (1987) offered a model that assumes investors focus on the familiar. Shefrin (2005) studied systematically how heterogeneous preferences and beliefs among investors can shape the asset price. Statman, Fisher, & Anginer (2008) suggested to include affect into the asset pricing model. Based on the above studies, we believe that incorporating heterogeneity and cognitive biases of risk perception is a promising and fruitful approach to improve asset-pricing models. Such models could accommodate the behavioural patterns in the real world that do not fit into classical theories.

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Table 1. Description of rating scales

Scale name	Description	Endpoints	
Understanding	Q1. *Do you have the feeling, that investment product is easy or difficult?*	1= easy	5= difficult
Expert knowledge	Q2. *Are the risks of this investment product familiar to experts?*	1= not at all	5= very familiar
Prevalence	Q3. *How prevalent are these products among private investors in Switzerland?*	1= not at all prevalent	5= very prevalent
Risk of capital loss	Q4. *How high is the risk of this investment product that all the invested money will be lost?*	1= very low	5= very high
Risk of lower-than-expectation	Q5. *How high is the risk that the return of this investment product will be lower than expected?*	1 = very low	5= very high
Variation	Q6. *How volatile are the gains and losses of this investment product?*	1 = very high	5 = very low
Chance of higher-than-inflation	Q7. *How much is the chance by this investment product to gain higher than inflation rate?*	1 = very low	5= very high

Table 2. Mean rating of perceived risk

Investment products	Mean (1=very low; 5=very high)	S.D.
Bank saving accounts	1.21	0.53
Third pillar (individual voluntary pension provision)	1.56	0.75
Private real estate property	1.75	0.76
Life insurance	1.78	0.79
First-class bonds in Swiss Francs	2.31	0.93
Bonds in Switzerland	2.34	0.86
First-class bonds in Euro	2.60	0.88
Bonds in Europe (Germany, Great Britain, France)	2.72	0.83
Bonds worldwide	2.88	0.86
Equity funds in Switzerland	2.91	0.86
First-class bonds in Dollar	2.92	0.93
Blue chips (single stock of famous and distinguished firms) in Switzerland	3.02	0.88
Precious metal (Gold)	3.04	0.99
Real estate funds	3.05	0.84
Equity funds in Europe (Germany, Great Britain, France)	3.22	0.82
Sustainable equity funds (social-/□nvironmental-concerned firms)	3.22	0.81
Equity funds worldwide	3.38	0.85
Blue chips (single stock of famous and distinguished firms) in USA	3.41	0.87
Art or antique	3.77	1.04
Commodity funds	3.82	0.88

Note. The sample size varies between 492 and 494.

Table 3. Intercorrelations among the rating scales and the perceived risk

	Perceived risk (1=very low; 5=very high)	Understanding (1=easy; 5=difficult)	Expert knowledge (1=not at all; 5=very familiar)	Prevalence (1=not at all; 5=very prevalent)	Risk of capital loss (1=very low; 5=very high)	Risk of lower-than-expectation (1=very low; 5=very high)	Variation (1=very high; 5=very low)
Understanding	0.94						
Expert knowledge	-0.96	-0.98					
Prevalence	-0.90	-0.91	0.94				
Risk of capital loss	0.99	0.95	- 0.97	-0.90			
Risk of lower-than-expectation	0.99	0.92	-0.95	-0.89	0.98		
Variation	-0.99	-0.91	0.94	0.89	-0.98	-0.99	
Chance of higher-than-inflation	0.79	0.67	-0.65	-0.57	0.77	0.73	-0.79

Note. The correlations are based on 20 investment products. Means are aggregated across N=491 to 494 individuals.

Table 4. Loadings from a Principal Component Analysis over 20 investment products (N=494)

Investment products	*Bonds*	*Equity*	*Personal insurance*	*Blue-chips*	*Alternative investment*
First-class bonds in Euro	**.85**	.10	.08	.31	.05
Bonds in Europe	**.81**	.38	.08	-.07	-.01
First-class bonds in Dollar	**.80**	.07	-.01	.33	.18
Bonds worldwide	**.78**	.33	.03	-.03	.11
First-class bonds in Swiss Francs	**.74**	.11	.23	.32	-.01
Bonds in Switzerland	**.70**	.40	.21	-.01	-.12
Equity fund in Europe	.26	**.78**	.03	.38	.02
Equity funds in Switzerland	.13	**.77**	.15	.42	-.07
Equity funds worldwide	.22	**.74**	-.01	.37	.08
Real estate funds	.29	**.63**	.16	.01	.15
Sustainable funds	.26	**.62**	-.01	.01	.29
Third pillar or individual voluntary pension provision	.15	.01	**.81**	.03	.04
Life insurance	.11	.09	**.74**	-.04	.14
Private real estate property	-.08	.13	**.71**	.08	.12
Equity funds in Switzerland Bank saving account	.15	-.04	**.70**	.02	-.11
Blue-chip in USA	.23	.26	-.06	**.81**	.18
Blue-chip in Switzerland	.20	.30	.11	**.81**	.067
Art or antique	-.02	.05	.05	.07	**.82**
Precious metal (Gold)	.08	.03	.21	.15	**.79**
Commodity funds	.09	.48	-.10	-.02	**.63**
Explained variance	21%	17%	12%	11%	10%

Table 5. Perceived risks on the five investment categories

Categories	Perceived risk (1=very low; 5=very high) (SD)		Understanding (1=very easy; 5=very difficult) (SD)	
	Male (N=345)	Female (N=144)	Male (N=345)	Female (N=144)
1. *Bond*				
First-class bonds in Swiss Francs First-class bonds in Euro First-class bonds in Dollar Bonds in Switzerland Bonds in Europe Bonds worldwide	2.59 (.73)	2.72 (.70)	2.67 (1.00)	2.86 (1.08)
2. *Equity*				
Equity funds in Switzerland Equity funds in Europe Equity funds worldwide Real estate funds Sustainable funds	3.11* (.68)	3.26* (.59)	3.05** (1.02)	3.31** (1.04)
3. *Insurance*				
Third pillar Life insurance Private real estate property Saving accounts	1.58 (.56)	1.58 (.48)	1.72* (.68)	1.86* (.73)
4. *Blue-chip*				
Blue-chip stocks in USA Blue-chip stocks in Switzerland	3.48 (.97)	3.32 (.96)	2.88** (1.17)	3.40** (1.21)
5. *Alternative investment*				
Art or antique Precious metal (Gold) Commodity funds	3.60** (.75)	3.41** (.76)	3.40 (.88)	3.52 (.84)

Note. *Males and females are different at the significance level $p<.05$; **Males and females are different at the significance level $p<.01$.

Table 6. Perceived risk vs. historical risk of 19 asset classes

Investment products	Perceived risk [Rank from low to high]	Historical risk [Rank from low to high]	Rank(perceived risk) – Rank(historical risk)
Bank saving accounts	1.21 [1]	0.4% [1]	0
Third pillar (individual voluntary pension provision)	1.56 [2]	6.2% [6]	–4
Private real estate property	1.75 [3]	2.9% [2]	1
Life insurance	1.78 [4]	20.0% [14]	–10
First-class bonds in Swiss Francs	2.31 [5]	4.2% [3]	2
Bonds in Switzerland	2.34 [6]	6.3% [7]	–1
First-class bonds in Euro	2.60 [7]	4.6% [4]	3
Bonds in Europe (Germany, Great Britain, France)	2.72 [8]	4.8% [5]	3
Bonds worldwide	2.88 [9]	29.5% [18]	–9
Equity funds in Switzerland	2.91 [10]	19.6% [13]	–3
First-class bonds in Dollar	2.92 [11]	8.4% [9]	2
Blue chips in Switzerland	3.02 [12]	19.0% [12]	0
Precious metal (Gold)	3.04 [13]	13.8% [10]	3
Real estate funds	3.05 [14]	6.8% [8]	6
Equity funds in Europe (Germany, Great Britain, France)	3.22 [15]	22.3% [16]	–1
Sustainable equity funds (social-/environmental-concerned firms)	3.22 [16]	23.4% [17]	–2
Equity funds worldwide	3.38 [17]	29.5% [18]	–1
Blue chips in USA	3.41 [18]	16.6% [11]	7
Commodity funds	3.82 [19]	20.0% [15]	4

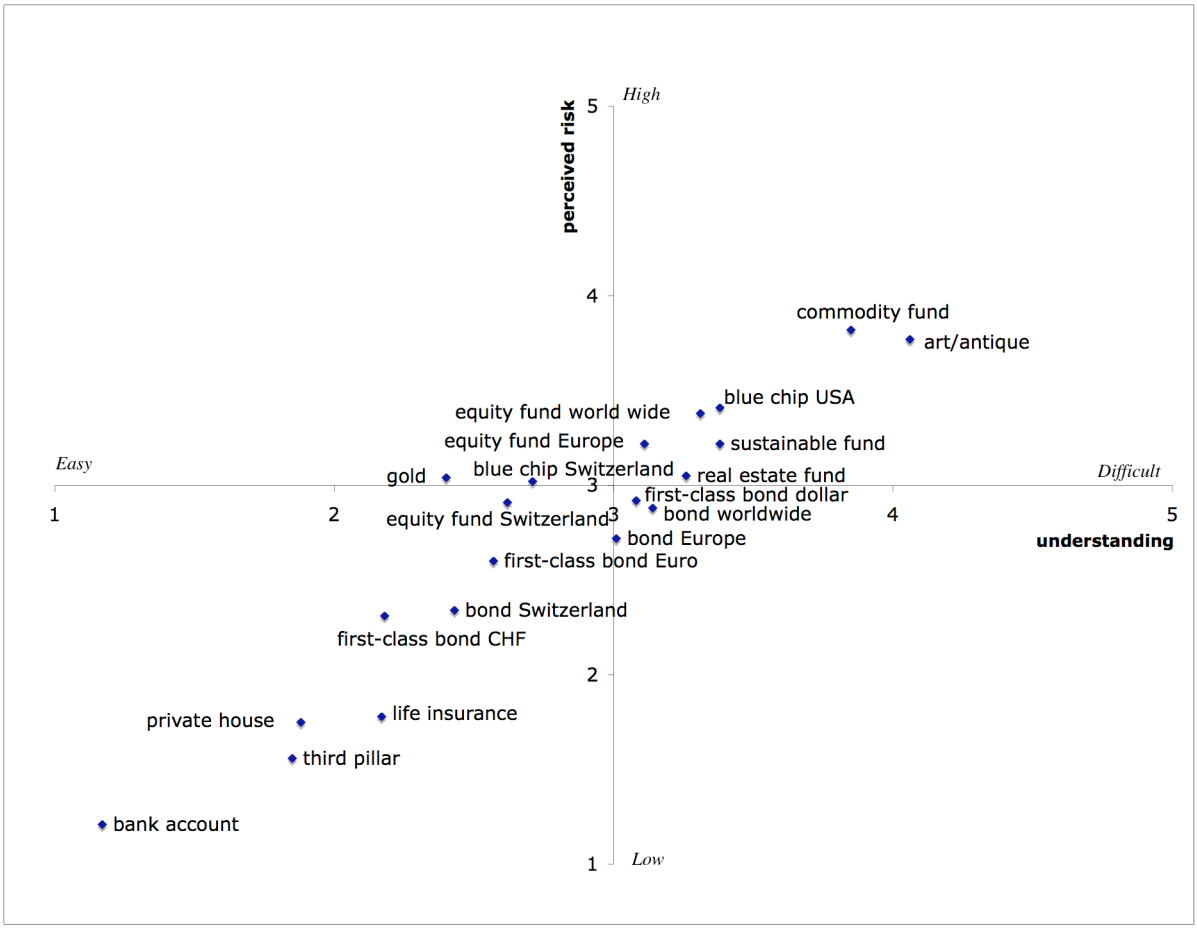
Notes. The asset class art/antique was omitted because of difficulties to evaluate the historical risk.

Table 7. Correlations between perceive risk and various historical risk measures for the last 10 years (1997-2007)

	Perceived risk (1=very low; 5=very high)	Understanding (1=easy; 5=difficult)	Chance of higher-than-inflation (1=very low; 5=very high)
Standard Deviation	0.61**	0.58**	0.50*
Probability of loss	0.58**	0.57*	0.59**
Expected value of loss	0.54*	0.54*	0.51*
Value at risk	0.63**	0.56**	0.54*
Probability of higher than inflation return	0.22	0.22	0.25
Risk-adjusted return	-0.38	-0.38	-0.44

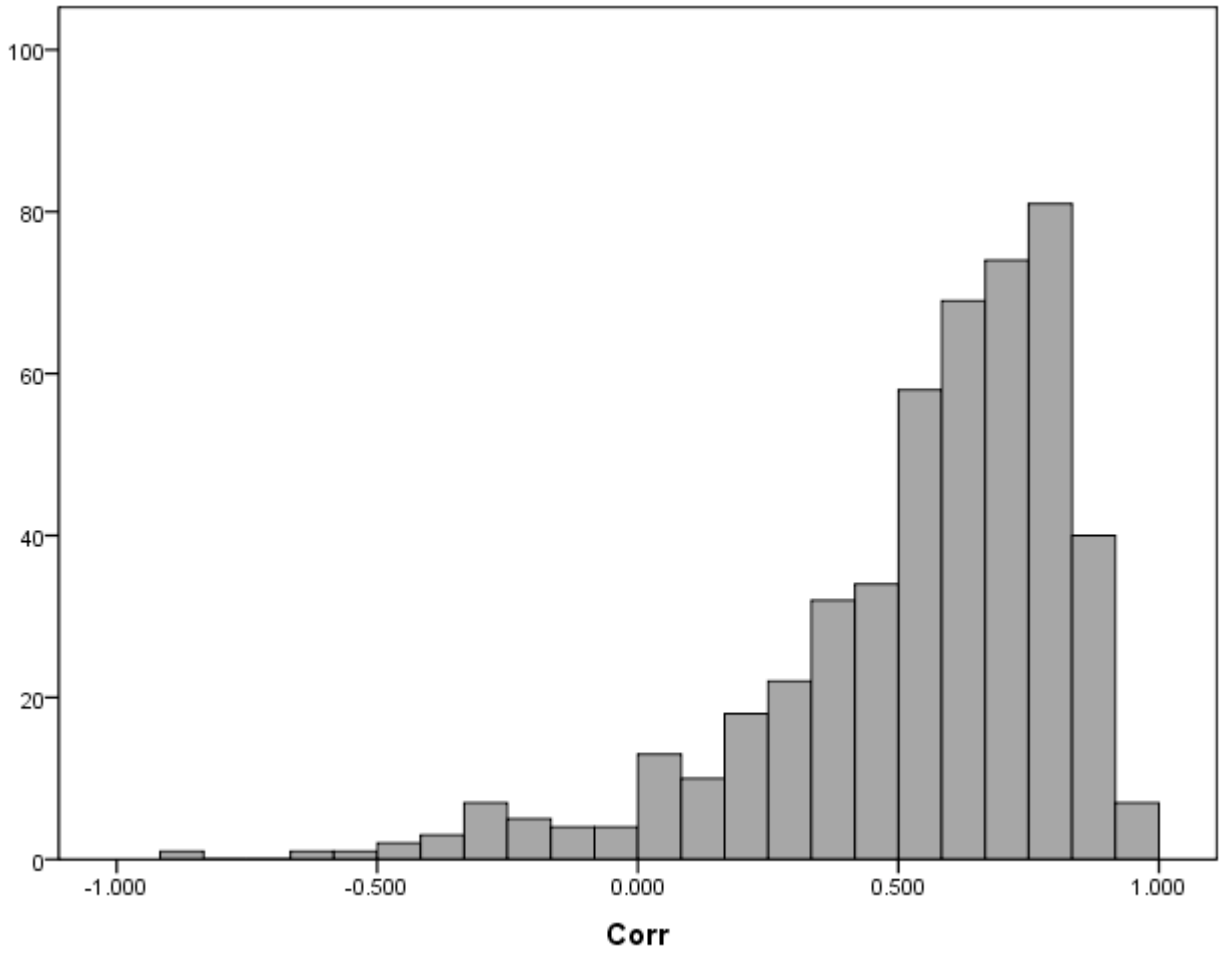
Note. *Significance level p<.05; **Significance level p<.01.

Figure 1. Understanding vs. perceived risk



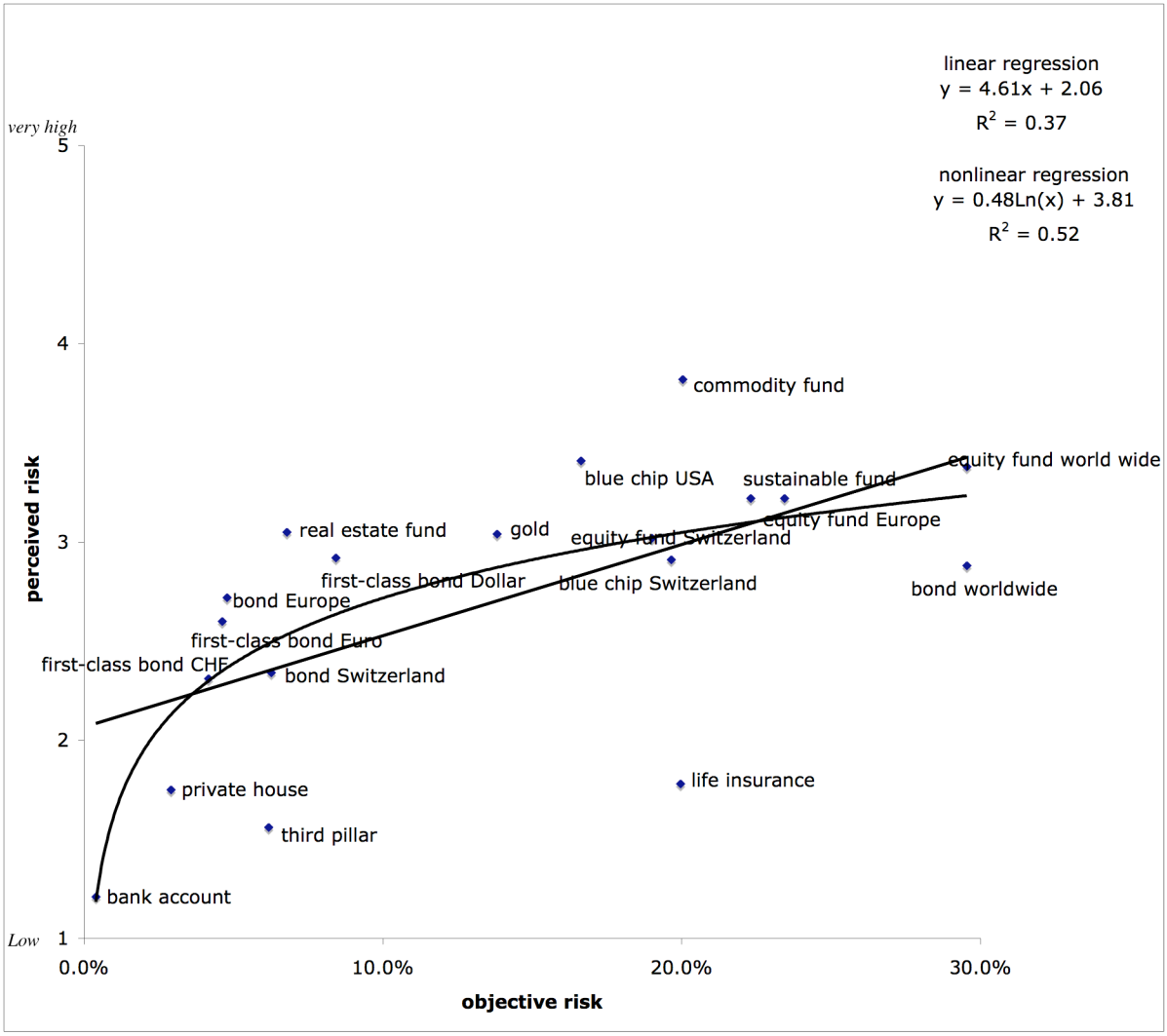
Note. "Understanding" refers to the question "Do you have the feeling, that investment product is easy or difficult?" (1=easy, 5=difficult). "Perceived risk" refers to the question "How risky do you consider each of the following financial products? (1=very low; 5=very high).

Figure 2. Individual correlations between risk and understanding



Note. *N*=486, *M*=0.54, *SD*=0.29

Figure 3. Objective risk (1997~2006) vs. perceived risk



Note. The objective risk were calculated from the historical data of each asset classes from 1997-2006)

"Perceived risk" refers to the question "How risky do you consider each of the following financial products? (1=very low; 5=very high).