Behavioral Insurance: Essays on the Influence of Ratings and Price Presentation on Consumer Evaluation, Risk Perception, and Financial Decision-Making

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The President:

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St. Gallen, October 2011

Carin Huber

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SUMMARY

This doctoral thesis addresses behavioral aspects in the area of insurance regarding product evaluation, risk perception, and financial decision-making. In addition, we investigate the influence of different framing forms such as price presentation or ratings. The dissertation consists of four individual research papers. In the first research paper entitled "On the Valuation of Investment Guarantees in Unit-Linked Life Insurance: A Customer Perspective", we empirically examine the willingness to pay for an investment guarantee in a unit-linked life insurance and contrast it with the calculated reservation prices using an option pricing approach. Our findings reveal that even knowledgeable individuals show difficulties to determine subjective prices; on average, these estimates are often significantly lower than the technical prices.

With the second research paper "How Do Price Presentation Effects Influence Consumer Choice? The Case of Life Insurance Products" we focus on price communication. We experimentally examine the effects of different forms of price presentation of life insurance contract components and especially of investment guarantees on consumer evaluation. Our findings reveal that contrary with consumer products price bundling and price optic have no significant effect on consumer evaluation and purchase intention for life insurance products. However, consumer experience and price perception emerge as significant predictors.

The third research paper, "The Effects of Ratings on Financial Decision-Making" experimentally examines the influence of third-party opinion in form of ratings or certificates of investment products on product evaluation and risk perception. Results show that participants' product evaluations and risk perceptions differ significantly if the investment product is framed by a positive versus negative versus no rating. Additionally, we find a mediating effect of risk perception and a moderating effect of expertise and susceptibility to informational influence.

Finally, the last research paper, entitled "To Buy or not to Buy Insurance? The Antecedents in the Decision-Making Process and the Influence of Consumer Attitudes and Perceptions" sheds light on customers' financial decision-making and the underlying attitudes and perceptions. Developing a causal model, we identify a pivotal role of risk avoidance and uncertainty avoidance determining product perceptions which themselves have an impact on consumers' purchase behavior. The moderating effects of trust in the industry, product guarantees, and expertise provide empirical evidence for the theoretical framework of *risk as feeling* and *risk as analysis* (Loewenstein et al. 2001; Slovic et al. 2004).

PART I

ON THE VALUATION OF INVESTMENT GUARANTEES IN UNIT-LINKED LIFE INSURANCE: A CUSTOMER PERSPECTIVE

Abstract

Interest rate guarantees in unit-linked life insurance products ensure that at contract maturity, at least a minimum guaranteed amount is paid, even if the mutual fund falls below the guaranteed level. Strongly depending on the riskiness of the underlying mutual fund, these guarantees can be of substantial value. However, while insurer pricing is based on the replication of cash flows, customers are more likely to base their decisions on individual preferences. The aim of this paper is to contrast reservation prices for guarantees in unit-linked life insurance policies based on customers' subjective willingness to pay with a financial pricing approach, an investigation that has not been undertaken to date. To do so, we use an online questionnaire survey, as well as calculate reservation prices using option pricing theory. Our findings reveal that even though the majority of the participants in the online questionnaire are employed in the field of insurance, subjective prices are difficult to derive and are significantly lower on average than the prices obtained using a financial pricing model. However, a considerable portion of participants is still willing to pay a substantially higher price.[1]

1 Introduction

Attractive pension product design is becoming increasingly important, in part due to demographic changes (i.e., the increasing number of elderly people and the aging of the population) in many countries. For this reason, knowing customer perceptions and preferences as to product characteristics is crucial for product development. Unit-linked life insurance policies, in particular, are often offered with different types of investment guarantees, typically ensuring that at least a minimum amount is paid, even if the mutual fund value falls below a specific guaranteed level. These guarantees can be of substantial value since—depending on the riskiness of the underlying fund—costly risk management measures must be undertaken to secure the guarantees promised to the customers. Thus, the question arises as to whether customers' maximum willingness to pay (WTP) actually exceeds the reservation price, which is the minimum amount an insurer needs to charge in order to buy adequate risk management measures to ensure the guarantee. The reservation price is thus the minimum price at which an insurer is willing to sell a guarantee. In the following analysis, the reservation price is based on model assumptions, such as no transaction costs and no jumps, and may thus be higher in practice.

The aim of this paper is to broaden the traditional viewpoint of risk valuation of investment guarantees in unit-linked life insurance products and to investigate the difference between customer WTP for investment guarantees and the insurer's reservation price for a guarantee. This will be done by comparing the results from an empirical survey with those of a financial valuation approach. In general, examining WTP and the process of decision making requires psychological foundations in order to consider possible biases or heuristics. These have been broadly studied in the field of behavioral economics, which has led to the development of new theoretical models, such as prospect theory (Kahneman and Tversky, 1979), cumulative prospect theory (Tversky and Kahneman, 1992), and the model of intertemporal choice (Loewenstein and Prelec, 1992).

Experimental analyses of insurance demand build on central prior studies on behavioral economics. Wakker, Thaler, and Tversky (1997) analyze the demand for probabilistic insurance, building up on prospect theory (Kahneman and Tversky 1979). A probabilistic insurance policy indemnifies the policyholder with a probability of strictly less than 1 to account for insurer default risk (Gatzert, Holzmüller, and Schmeiser, forthcoming). Furthermore, Albrecht and Maurer (2000), Zimmer, Gründl, and Schade (2008), and Zimmer, Schade, and Gründl (2009) provide recent experimental research on demand for insurance under default risk. In general, they demonstrate that awareness of even a very small positive probability of insolvency drastically reduces customer WTP. Gatzert, Holzmüller, and Schmeiser (forthcoming) contrast prices for participating life insurance contracts determined via financial theory with prices determined via expected utility theory, thus combining customer and insurer perspectives based on theoretical valuation models. In particular, contract parameter combinations are identified that— while keeping the contract value fixed and fair from the insurer's viewpoint— maximize customer value. However, in contrast to this paper, Gatzert, Holzmüller, and Schmeiser (forthcoming) do not focus on an empirical analysis in order to analyze how customers evaluate life insurance contracts in general and the value of investment guarantees in particular.

Previous literature on behavioral insurance has focused on the impact of insurance company insolvency risk on customer WTP. We extend this research by investigating customer WTP to prevent their maturity payoff from falling below a fixed guaranteed level. In addition, we contrast these results with the actual reservation price that, from the insurer's perspective, is necessary to acquire risk management measures that will ensure the investment guarantee. To the best of our knowledge, this paper is the first to study the gap between the value of guarantees in unit-linked life insurance based on duplication of cash flow (from the insurer's perspective) and the empirically identified value of guarantees from the customer's perspective. The present analysis is a first step in discovering customer WTP for investment guarantees in unit-linked life insurance contracts. Based on research (e.g., Wakker, Thaler, and Tversky,

1997; Zimmer, Gründl, and Schade, 2008; Zimmer, Schade, and Gründl, 2009) examining WTP for insurance products with default probability, we try to avoid making people sensitive to the problem of default risk, as it can be presumed that many customers may not consider default risk in their insurance purchase decisions at all. We assume that our provided method of asking WTP for an investment guarantee will be more realistic from a practitioner's point of view. Furthermore, participants will have the option to choose or to refuse the guarantee, as insurance products are seen as product bundles, where it is possible to buy an additional guarantee or not.

We provide an empirical framework that combines the insurer's and customer's viewpoints in the context of unit-linked life insurance contracts with an embedded investment guarantee. In a first step, we calculate the fair price of an investment guarantee in a unit-linked insurance contract, which is the reservation price the insurance company needs to charge in order to secure the guarantee with risk management measures. In a second step, we conduct a comprehensive survey to identify customer WTP for investment guarantees. We take into account customers' gender, age, financial background knowledge, and risk behavior. In the empirical design, customer WTP for guarantees might exceed or fall below the insurer's calculated reservation price.

The remainder of the paper is organized as follows. In Section 2, the unit-linked life insurance contract design with minimum interest rate guarantee is introduced and evaluated from the insurer's perspective using risk-neutral valuation. Section 3 presents the customer's perspective, along with survey design and empirical results on WTP for guarantees from the customer's perspective using descriptive statistics and different statistical tests. Section 4 derives policy implications based on the empirical findings, and Section 5 provides a summary and an outlook for future research fields.

2 Risk-neutral valuation of investment guarantees in unit-linked life insurance products

Unit-linked life insurance contracts typically contain a savings policy and a death benefit that is paid out if the policyholder dies during the term of the contract. In respect to the savings part of the contract, one common form of underlying is a mutual fund with an embedded investment guarantee. A single up-front premium paid by the policyholder for a unit-linked life insurance contract can be split into two parts: the premium P^d for the death benefit and P for the savings policy. In the following, we focus on the value of investment guarantees in unit-linked life policies only and study this value from the both the insurer's and the customer's perspectives. Thus death benefits or transaction costs are not included in the model but the focus is solely on the savings part of the product. To simplify our questionnaire (described in detail in Section 3), mortality risk (i.e., the chance that the policyholder will die before the contract matures), the possibility of early option exercise (e.g., surrendering the contract), and the use of a paid-up option are not included in the model framework.

2.1 Design and modeling of the underlying mutual funds

To determine a risk-adequate price for investment guarantees included in unit-linked life insurance contracts, we use the following model framework (see, e.g., Gatzert and Schmeiser, 2009; Lachance and Mitchell, 2003). At time $t = 0$, the policyholder pays a single up-front premium P that is invested in a traded mutual fund with a contract term of T years. The unit price of the mutual fund at time t is denoted by S_t and its development is described by a geometric Brownian motion with fixed average rate of return and standard deviation during the policy term. Hence, under the objective (or empirical) measure P, it can be characterized by the following stochastic differential equation,

$$dS_t = S_t(\mu dt + \sigma dW_t),$$

with $S_0 = S(0)$, a constant drift μ, a volatility σ, and a standard P -Brownian motion (W_t), $0 \leq t \leq T$, on a probability space (Ω, Φ, P). In addition, (Φ_t), $0 \leq t \leq T$, denotes the filtration generated by the Brownian motion. The solution of the stochastic differential equation is given by (see, e.g., Björk 2004)

$$S_t = S_{t-1} \cdot e^{(\mu-\sigma^2/2)+\sigma(W_t-W_{t-1})}$$
$$= S_{t-1} \cdot e^{(\mu-\sigma^2/2)+\sigma Z_t} = S_{t-1} \cdot R_t,$$

where Z_t are random variables, which adhere to a standard normal distribution. Thus, the continuous one-period return $r_t = \ln(R_t)$ is normally distributed with an expected value of $\mu - \sigma^2/2$ and standard deviation σ.

2.2 Mutual fund payoff with embedded investment guarantee

At maturity, the stochastic value of the investment at maturity T, F_T, is characterized by the number of acquired units (P/S_0) times the value S_T of a unit in T:

$$F_T = \frac{P}{S_0} \cdot S_T.$$

The payoff depends on the fund's development over time and thus on future conditions in the financial market. Therefore, the terminal value of the investment can fall below the initially paid premium P. To prevent such a default situation for the policyholder, unit-linked life insurance contracts are often offered with an interest rate guarantee g on premium P, providing a minimum payoff G_T of the investment at maturity T. In formal terms, G_T is given by:

$$G_T = P \cdot \exp(g \cdot T).$$

In the presence of an investment guarantee, the customer's terminal payoff is the greater of the guaranteed minimum payoff G_T and the value of the investment in the underlying fund, i.e.,

$$L_T = \max(F_T, G_T) = F_T + \max(G_T - F_T, 0).$$ (1)

The right hand side of Equation (1) shows that the payoff to the investor at maturity, L_T, can be described as the value of the underlying assets (F_T) at time T plus a put option on F_T with a strike price G_T (guaranteed minimum payoff).

2.3 Default probabilities for $F_T < G_T$

Under the given assumptions, $\ln(F_T)$ is normally distributed with mean $m = \ln(P) + (\mu - \sigma^2 / 2)T$ and standard deviation $v = \sigma \cdot \sqrt{T}$. Hence, the probability that the value of the mutual fund at maturity, F_T, is below the guaranteed level G_T can be calculated in the following way (cf., e.g., Winkler, Roodman, and Britney 1972, pp. 290-295):

$$\Pr(F_T < G_T) = N\left(\frac{\ln(G_T) - m}{v}\right),$$

where $N(.)$ denotes the cumulative probability distribution function for a standard normal distribution. The probability that $F_T < G_T$ and hence the provider of the investment guarantee has to pay the difference between G_T and F_T to the customer are given in Table 3 for different numerical examples.

2.4 Valuation of investment guarantee from insurer perspective

The value of the investment guarantee from the insurer's perspective is derived by using the concept of risk-neutral valuation. The cost of the guarantee is the reservation (or minimum) price an insurer needs to charge at time $t = 0$, in addition to the premium that is invested in the mutual fund, to be

able to finance adequate risk management measures. Such risk management measures (e.g., hedging strategies, equity capital, or reinsurance) must ensure the guarantee provided to the policyholder.

Under the unique equivalent martingale measure $\mathbb{Q}$ (see Harrison and Kreps 1979), the development of the unit price of the mutual funds at time t, S_t, is given by

$$dS_t = S_t(r dt + \sigma dW_t^{\mathbb{Q}}),$$

where $W^{\mathbb{Q}}$ is a standard $\mathbb{Q}$-Brownian motion. Compared to the description of the mutual fund unit price process under the under the objective measure P, the drift μ changes to the riskless rate of return r. Hence, the difference between the discounted expected value of the contract's payoff under the risk-neutral measure $\mathbb{Q}$ and the present value of the premiums paid, which are discounted with the riskless interest rate r gives the value of the investment guarantee Π_0^G at time $t = 0$. According to Equation (1), this implies that the price of the investment guarantee Π_0^G is the price of a European put option with strike G_T. Using the Black and Scholes option pricing formula, one obtains (see, e.g., Hull 2008, p. 291)

$$
\begin{aligned}
\Pi_0^G &= e^{-rT} \cdot E^{\mathbb{Q}}(\max(G_T - F_T, 0)) \\
&= G_T \cdot e^{-rT} \cdot N(-d_2) - P \cdot N(-d_1)
\end{aligned}
\tag{2}
$$

where $N(..)$ denotes the cumulative probability distribution function for a standard normal distribution and

$$d_1 = \frac{\ln\left(\dfrac{P}{G_T}\right) + \left(r + \dfrac{\sigma^2}{2}\right) \cdot T}{\sigma \cdot \sqrt{T}},$$

$$d_2 = \frac{\ln\left(\dfrac{P}{G_T}\right) + \left(r - \dfrac{\sigma^2}{2}\right) \cdot T}{\sigma \cdot \sqrt{T}} = d_1 - \sigma \cdot \sqrt{T}.$$

The price of the guarantee calculated in Equation (2) rather represents a lower limit to the market price, since no transaction costs are included.

3 The value of investment guarantees from the customer's perspective

The value of guarantees in unit-linked life insurance contracts may differ depending on the perspective from which they are viewed. On the one hand, an insurer is generally able to calculate the appropriate premium for investment guarantees assuming a duplication of the cash flows, such as risk-neutral valuation and other premium principles, all based on the assumption of an efficient capital market. Customers, on the other hand, are not necessarily able to replicate cash flows or claims to the same extent as the insurer and may thus assess the value of investment guarantees based on their own preferences. In addition, it may not be appropriate to assume a *homo oeconomicus* when it comes to subjective WTP. Thus, customer WTP may be quite different from what financial theory suggests. To elicit customer WTP, we conduct a survey, explained below.

3.1 Design of the survey

The aim of the study is to compare objective (model-based) and subjective (assessed by the survey) prices for guarantees that are included in unit-linked life insurance products. To elicit the subjective WTP, we used a computer-based questionnaire comprising direct open-response questions, a section containing choice options, and questions about the respondent's demographic characteristics or knowledge about insurance. An overview of methods for measuring consumer WTP can be found in Miller et al. (2010) or Diller (2000). In this study, we use a direct survey method. Even though measuring WTP directly in general has a lack of validity and reliability (see e.g., Wertenbroch and Skiera 2002; Breidert, Hahsler, and Reutterer 2006; Völckner 2006, 2005) and thus, the results and implications will only be tentative, we assume that it will be a feasible approach, particularly due to the specific sample with finance or insurance background. In addition, besides measuring WTP, a direct approach provides first insights into the understandability of the products and consumer's price knowledge of

investment guarantees in unit-linked life insurance (Vanhuele and Drèze 2002), which should be of particular interest in the context of pension and insurance products.

Furthermore, examining the value of investment guarantees from the customer perspective needs to consider human behaviour, and thus possible irrational phenomena. We draw on the existing literature of probabilistic insurance (e.g., Wakker, Thaler, and Tversky 1997; Albrecht and Maurer 2000; or Zimmer, Gründl, and Schade 2008; and Zimmer, Schade, and Gründl 2009) and take the following phenomena and biases into account in the questionnaire design:

- Framing effects, that is, reliance on how information is presented (Tversky and Kahneman 1981, 1986; Kahneman and Tversky 1984), are dealt with by using graphical, verbal and numerical illustrations of the probabilities (see Figure A.3 in the Appendix);
- Loss aversion, that is, losses loom larger than corresponding gains (Tversky and Kahneman 1991), and overestimation of probabilities (Johnson et al. 1993; Slovic 1972; Slovic et al. 1977) are dealt with by a neutral presentation of possible defaults (see Figure A.3 in the Appendix);
- Anchoring, that is, the adjustment on an initial value (Tversky and Kahneman 1974), is dealt with by the order of the questions (for example, by putting the choice questions with the calculated prices given at the end of the questionnaire) and by not allowing the participants to skip back in the questionnaire.

3.2 Empirical study: Input data

The unit-linked product studied in the survey is based on a mutual fund that invests in bonds and in stocks. The input data for the mutual fund were estimated from the Swiss market indices, with resulting input parameters as shown in Table 1.

Table 1

Expected value ($\mu-0.5\sigma^2$) and standard deviation (σ) of annualized continuous returns for selected indices

Asset class	Index	$\mu-0.5\sigma^2$ (%)	σ (%)
Stocks	Swiss Market Index (Total Return)	5.975	17.220
Bonds	Yield on bonds of the Swiss Confederation (duration of 10 years; period from 1994 - 2008)	2.148	-
Portfolios:			
50% Bonds 50% Stocks	Medium-risk fund	4.061	8.610
100% Stocks	High-risk fund	5.975	17.220

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In the survey, we compare the case of a ―medium-risk‖ mutual fund that invests 50% in bonds and 50% in stocks with a ―high-risk‖ mutual fund that invests 100% in stocks. The medium-risk fund has an expected return of 4.061% and a volatility $\sigma = 8.610\%$; the high-risk fund has an expected return of 5.975% and a volatility of $\sigma = 17.220\%$.

In addition to distinguishing between a medium- and a high-risk fund, we compare three products in the survey: a unit-linked policy without guarantee and two products with guarantees, including a money-back guarantee and a reservation price interest rate of 2% on the initial nominal premium ($g = 0\%$ and $g = 2\%$). Guarantee costs for all three products are calculated based on the Black and Scholes option pricing formula given in Equation (2).

3.3 Sample and survey procedure

Due to the complexity of investment products and the survey method (directly asking about WTP), we choose a sampling by focusing on participants with some relation to insurance or finance. We assume that insurance and finance professionals are more capable of stating WTP for guarantees directly and are more likely to be familiar with the insurance terminology. The desired sample was achieved by conducting the survey among people in the contact database of the Institute of Insurance Economics at the University of St. Gallen, most of whom work in the financial services industry or in the insurance and finance departments of universities. There are 2,500 people in the contact database. The link to the online questionnaire was sent to each of these individuals via a personal email invitation that contained a unique anonymous login code. Each respondent who chose to participate could complete the questionnaire only once. Once a respondent chose to participate, the goal of the survey was explained and standardized instructions were given without interaction or inducements. Participants filled out the survey individually. Participants could pause the survey, but could not skip

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questions or go back and change answers. No new question was posed until the current one has been answered. Within the two-week period from May 20, 2009 to June, 2, 2009, 375 respondents have completed the survey, a completion rate of 14.5%.

The survey was divided into three parts. In the first part, we surveyed participants' demographic characteristics (gender, age, job, education) and some additional information concerning their risk behavior, stock ownership, knowledge about guarantees in life insurance products, and previous purchase of pension or life insurance products (see Figure A.1 in the Appendix).

To compare theoretical guarantee costs with the price customers are willing to pay, in the second part of the survey, we directly asked the participants their WTP for an additional investment guarantee that would protect them from default at various levels ($g = 0\%, 2\%$), explaining that the cost of the guarantee would have to be paid in addition to the initial up-front premium invested in the mutual fund (the initial premium was given by $P = $ CHF 10,000, contract term = 10 years; see Figures A.2, A.3 and A.4 in the Appendix). The purpose was to investigate the extent to which participants who already have some knowledge about insurance or finance can actually estimate a price they are willing to pay for such a risk management product. To avoid framing effects due to how the payoff was represented (verbally, numerically, graphically, positively, or negatively), we formulated our information about the mutual fund payoff structure as neutral as possible. To this end, participants received a graphical illustration of the terminal payoff and the probabilities accompanied by a written explanation (see Figure A.3 in the Appendix).

Since direct judgments of guarantee costs are difficult to assess and typically display a high degree of volatility (Völckner 2006), in the third part of the survey (see Figure A.5 in the Appendix), we asked the participants to choose among three products (no guarantee, money-back

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guarantee, and 2% reservation price interest rate), giving them the guarantee prices obtained by option pricing theory. The guarantee prices are presented as absolute values payable at contract inception (at time $t = 0$) to simplify the questionnaire as much as possible, and thus, to ensure the participants' understanding of the setting. By positioning the choice question after asking for WTP, possible anchoring effects were avoided— as mentioned, participants could not change their answers to the judgment question after reading the choice questions with the calculated guarantee prices. Thus, this part sheds light on participants' decision behavior, if the calculated guarantee prices, and hence cost transparency are given, since they are illustrated as total costs and not as monthly calculated payments or relative costs. Furthermore, the consistency of the answers of Part 2 can be checked.

3.4 Empirical study: Descriptive statistics

Fifteen outliers had to be removed from the 375 responses, leaving a total sample size of 360.[2] The information collected in Part 1 of the survey (customer characteristics) is presented in Table 2.

Table 2 shows that the majority of the participants are male (91%), work in the field of insurance (84%), have an education that includes knowledge of financial markets (84%), and are aware that life insurance products typically contain investment guarantees (97%). In addition, 84% have stocks in their portfolio and thus have experience with the volatility of financial markets. Most respondents are between 30–45 years old (52%) and 46–65 years old (42%). Interestingly, most respondents consider themselves as risk-neutral (55%), 27% classify themselves as

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[2] The reasons for elimination were: (a) obviously false statements concerning WTP, possibly due to a desire to move on to the next question in the survey (e.g., 123456), (b) disproportionate overestimation of WTP, possibly due to the question being too complex for the participant (e.g., WTP twice as high as the initial premium invested in the fund) and (c) inconsistency in the given answers (e.g., participant with a too small WTP for a given guarantee chooses a higher guarantee-level in the choice-part).

risk-seeking, while only 18% are risk-averse. Even though all survey participants have some connection to insurance and finance, 19% do not own a pension or life insurance product other than obligatory state pension schemes. Of those, 15% do not even plan to buy insurance. However, most participants own at least one contract (81%), of which more than half are unit-linked.

To summarize, while the majority of our respondents have experience with the stock markets, have an educational and job profile related to insurance and finance, and consider themselves as risk-neutral or even as risk-seeking, a substantial number are rather critical about life and pension products.

To analyze customers' WTP for investment guarantees in unit-linked life insurance, we first examine descriptive statistics of WTP for different product designs and contrast them with prices based on option pricing theory (OPT). Results are displayed in Table 3, including mean, median and standard deviation of results of Part 2 of the survey for unit-linked life policies with the two underlying funds and two levels of guarantee. In addition, we varied the amount of the initial premium to CHF 50,000 (instead of CHF 10,000) and the contract term to 20 years (instead of 10 years). The theoretical reservation price guarantee costs obtained using the Black-Scholes formula in Equation (2) are given in the first column of Table 3 ("OPT model"). The column "p-value" contains the results for the two-sided t-test on whether the average WTP ("mean") significantly differs from the insurer's reservation price calculated via option pricing.

Table 2

Survey part 1—Description of the sample (absolute frequency, percentage in parentheses)

	n (%)
Gender	
Male	326 (91%)
Female	34 (9%)
Total	360 (100%)
Age (years)	
18-29	19 (5%)
30-45	186 (52%)
46-65	152 (42%)
over 65	3 (1%)
Total	360 (100%)
Job	
I work in the area of insurance	301 (84%)
I work in the area of financial services, but not in insurance	27 (7%)
I work in a different area	32 (9%)
Total	360 (100%)
Education involves knowledge about financial markets	
Yes	302 (84%)
No	58 (16%)
Total	360 (100%)
Attitude towards risk	
Risk averse	65 (18%)
Risk neutral	198 (55%)
Risk seeking	97 (27%)
Total	360 (100%)

Table 2 (continued)

Survey part 1—Description of the sample (absolute frequency, percentage in parentheses)

	n (%)
Owning stocks?	
Yes	302 (84%)
No	58 (16%)
Total	360 (100%)
Know about investment guarantees in life insurance?	
Yes	348 (97%)
No	12 (3%)
Total	360 (100%)
Own a pension or life insurance product?	
No, and signing a contract is not planned	56 (15%)
No, but signing a contract is planned	13 (4%)
Yes, I own one contract	96 (27%)
Yes, I own multiple contracts	195 (54%)
Total	360 (100%)
If yes, is there a unit-linked product among them?	
Yes, one	99 (28%)
Yes, multiple	48 (13%)
No	143 (40%)
I don't know	1 (0%)
Total	291 (81%)

Table 3

Survey part 2—Subjective WTP versus guarantee costs Π_0^G according to option pricing model OPT (in CHF)

	OPT model	All participants (n=360)				Participants with WTP > 0			Participants with WTP ≥ OPT model		
		Mean	p-value	Median	Std	N (out of 360)	Mean	Std	N (out of 360)	Mean	Std
Medium-risk fund											
Default probability	7%	20%	0.00%	11%	20%						
G I	298	219	0.00%	100	314	268	294	332	99	600	378
G II	1,003	516	0.00%	400	552	319	582	553	33	1,851	578
High-risk fund											
Default probability	14%	36%	0.00%	30%	23%						
G I	1,117	401	0.00%	250	485	295	489	494	22	1,750	706
G II	2,057	788	0.00%	500	858	324	876	861	21	3,179	1,363
Medium-risk fund; Premium 50,000											
G I	1,491	1,045	0.00%	500	1,37	283	1,330	1423	96	2,828	1,531
G II	5,015	2,344	0.00%	1,500	2,63	323	2,613	2652	32	8,950	2,674
Medium-risk fund; Contract term 20 years											
G I	204	206	93.80%	50	384	227	326	442	91	671	533
G II	1,363	603	0.00%	250	958	300	724	1007	41	2,763	1,391

Notes: G I = money-back guarantee; G II = 2% guaranteed interest rate on premium; default probability = probability that the maturity fund value falls below the single up-front premium; medium-risk fund = 50% bonds and 50% stocks; high-risk fund = 100% stocks; p-value for two-sided t-test (with respect to the guarantee costs according to option pricing theory (OPT) model with data from Table 1); N = number of respondents with WTP > 0 respectively with WTP ≥ OPT.

The results in column 2 demonstrate that, on average, default probabilities were significantly overestimated. In the case of a medium-risk fund, for instance, the actual default probability given the input parameters of Table 1 is 7%, while the subjective default probability estimated by the respondents is around 20%. Despite this judgment, the respondents' WTP to prevent this default by purchasing an additional guarantee is significantly lower than the reservation price the insurer would be expected to charge given the input parameters. Taking Guarantee I and the underlying high-risk fund as an example, we find that the subjective WTP of CHF 401 is almost 65% lower than the theoretically calculated guarantee cost of CHF 1,117. Similar results are observed for all product designs in Table 3 (second column), with the exception of Guarantee I for the longer contract term of 20 years, in which case the subjective price is almost equal to the OPT reservation price.

Table 3 also provides information on the WTP of the subsample which is willing to pay at least a positive amount (third column). The results show that between 10% and 37% of the participants (depending on the product design) are not willing to pay a positive amount for an additional guarantee. Furthermore, in this subsample, WTP is no longer clear-cut. For instance, in the case of a medium-risk fund with Guarantee I, subjective WTP is almost the same as the theoretical price, but in the case of a contract term of 20 years, the WTP of CHF 326 on average significantly *exceeds* the price calculated using the OPT model (CHF 204). All other product designs, however, show a subjective WTP that is significantly less than the OPT model price.

Further analysis shows that WTP is significantly higher when the guarantee level is increased from I to II and when there is a switch from a medium- to a high-risk fund (using a one-sample t-test). Furthermore, we observe that in every case there are more people with a positive WTP for Guarantee II than there are for Guarantee I (i.e., fewer people are willing to pay anything for Guarantee I). Nevertheless, the WTP of those who are

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willing to pay for Guarantee I (except in the case of the high-risk fund) is always closer to the OPT model price than the WTP of those willing to pay for Guarantee II. The nature of the product also seems to have an impact on WTP. Most people with a positive WTP are found for the product investing in a high-risk fund and for the product with the medium-risk fund with an initial premium of CHF 50,000.

However, additional analysis reveals some people who are willing to pay more than the calculated reservation price as illustrated in Table 3, right column. In the subsample with a positive WTP (Table 3, third column), more participants are willing to pay a positive price for Guarantee II than for Guarantee I. However, when looking at the subsample with a WTP exceeding the OPT price (Table 3, right column), we observe that for every product design, there are always more participants with a WTP that exceeds the insurer's OPT price for Guarantee I compared to Guarantee II. Thus, the price plays an important role in the decision making process of buying (or not buying) additional guarantees, a finding that we will see again in Part 3 of the survey; where the participants have to choose among the different products for given OPT prices. Looking at the high standard deviations, we further find that for the subsample with a WTP higher than the OPT prices, stating the WTP will be difficult, too. Furthermore, one has to question whether they are indeed willing to pay these prices in reality, especially those with an extraordinary high WTP.

In order to analyze our findings, Table 4 provides the customer characteristics of the subsample with a WTP that exceeds the OPT price. The subsamples for every type of product design are similar to the main sample, but we can still observe certain shifts. In addition, comparing Table 4 with Table 2 shows that the number of risk- averse people willing to pay more than the OPT price increased (e.g., for products with a higher initial premium). Whereas most participants of the main sample own at

least one unit-linked product, the majority of all subsamples possesses no unit-linked life insurance product.

To obtain a more comprehensive picture of customer preferences, Part 3 of the survey asked participants to choose among three unit-linked products, given OPT guarantee prices (see also the first column, ―OPT model,‖ of Table 3). Results are displayed in Table 5. Consistent with the results from Table 3, we find that a majority of the participants chose Product A without any additional guarantee (44% medium-risk fund/44% high-risk fund). However, a substantial proportion—more than half—remains willing to purchase an additional guarantee. Overall, more participants prefer the money-back guarantee to the 2% interest rate guarantee. The results are similar when comparing the results for the underlying medium- and the high-risk fund. However, while Table 3 shows that demand is, generally speaking, higher for Guarantee II than for Guarantee I, we see from Table 5 that many respondents prefer a product without any additional guarantees when they are confronted with the OPT model-based prices.

As all participants were consistent with their previous statements concerning WTP (no one chose a product in Part 3 that exceeded his or her WTP), we may assume that it is not the idea of a guarantee per se that discourages customers from buying one, but the price—even though the OPT price for the guarantee in our model is generally lower than it would be in reality.

Table 4

Description of the subsamples with WTP $\geq$ OPT price Π_0^G (absolute frequency, percentage in parentheses)

n (%)	All participants (N=360) Total	Medium-risk fund G I	Medium-risk fund G II	High-risk fund G I	High-risk fund G II	Medium-risk fund; Premium: 50'000 G I	Medium-risk fund; Premium: 50'000 G II	Medium-risk fund; Contract term: 20 ys G I	Medium-risk fund; Contract term: 20 ys G II
Total	360 (100)	99 (100)	33 (100)	22 (100)	21 (100)	96 (100)	32 (100)	91 (100)	41 (100)
Gender									
Male	326 (90.6)	93 (94)	32 (97)	22 (100)	21 (100)	92 (96)	32 (100)	87 (96)	38 (93)
Female	34 (9.4)	6 (6)	1 (3)	0 (0)	0 (0)	4 (4)	0 (0)	4 (4)	3 (7)
Age									
18-29 years	19 (5.3)	2 (2)	1 (3)	1 (5)	1 (5)	2 (2)	1 (3)	3 (3)	4 (10)
30-45 years	186 (51.7)	56 (57)	19 (58)	15 (68)	14 (67)	54 (56)	19 (59)	48 (53)	24 (59)
46-65 years	152 (42.2)	40 (40)	13 (39)	6 (27)	6 (29)	39 (41)	12 (38)	39 (43)	13 (32)
over 65 years	3 (0.8)	1 (1)	0 (0)	0 (0)	0 (0)	1 (1)	0 (0)	1 (1)	0 (0)
Job									
Area of insurance	301 (83.6)	81 (82)	24 (73)	18 (82)	17 (81)	79 (82)	26 (81)	74 (81)	34 (83)
Area of fin. services	27 (7.5)	7 (7)	3 (9)	0 (0)	0 (0)	8 (8)	0 (0)	8 (9)	2 (5)
Different area	32 (8.9)	11 (11)	3 (9)	4 (18)	4 (19)	9 (9)	6 (19)	9 (10)	5 (12)
Education incl. knowledge about financial markets									
Yes	302 (83.9)	83 (84)	28 (85)	20 (91)	18 (86)	82 (85)	27 (84)	73 (80)	35 (85)
No	58 (16.1)	16 (16)	5 (15)	2 (9)	3 (14)	14 (15)	5 (16)	18 (20)	6 (15)
Attitude toward risk									
Risk averse	65 (18.1)	26 (26)	6 (18)	6 (27)	4 (19)	24 (25)	7 (22)	22 (24)	8 (20)
Risk neutral	198 (55.0)	48 (49)	13 (39)	6 (27)	9 (43)	44 (46)	13 (41)	47 (52)	16 (39)
Risk loving	97 (26.9)	25 (25)	14 (42)	10 (45)	8 (38)	28 (29)	12 (38)	22 (24)	17 (41)

The header group *Participants with WTP $\geq$ OPT (subsamples)* spans the Medium-risk fund, High-risk fund, Medium-risk fund; Premium: 50'000 and Medium-risk fund; Contract term: 20 ys columns.

Table 4 (continued)

Description of the subsamples with WTP $\geq$ OPT price Π_0^G (absolute frequency, percentage in parentheses

n (%)	All participants (N=360) Total	Participants with WTP $\geq$ OPT (subsamples)							
		Medium-risk fund		High-risk fund		Medium-risk fund; premium: 50,000		Medium-risk fund; contract term: 20 ys	
		G I	G II	G I	G II	G I	G II	G I	G II
Total	360 (100)	99 (100)	33 (100)	22 (100)	21 (100)	96 (100)	32 (100)	91 (100)	41 (100)
Own stocks?									
Yes	302 (83.9)	85 (86)	27 (82)	19 (86)	17 (81)	83 (86)	28 (88)	77 (85)	34 (83)
No	58 (16.1)	14 (14)	6 (18)	3 (14)	4 (19)	13 (14)	4 (13)	14 (15)	7 (17)
Know about guarantees in life ins.?									
Yes	348 (96.7)	97 (98)	31 (94)	21 (95)	20 (95)	95 (99)	30 (94)	87 (96)	40 (98)
No	12 (3.3)	2 (2)	2 (6)	1 (5)	1 (5)	1 (1)	2 (6)	4 (4)	1 (2)
Own a pension or life insurance product?									
No, no signing planned	56 (15.6)	19 (19)	7 (21)	4 (18)	4 (19)	20 (21)	6 (19)	14 (15)	7 (17)
No, signing planned	13 (3.6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1)	1 (2)
Yes, one contract	96 (26.7)	28 (28)	9 (27)	7 (32)	7 (33)	30 (31)	9 (28)	28 (31)	14 (34)
Yes, multiple contracts	195 (54.2)	52 (53)	17 (52)	11 (59)	10 (48)	46 (48)	17 (53)	48 (53)	19 (46)
If yes, is there a unit-linked product among them?									
Yes, one	99 (27.5)	23 (23)	9 (27)	5 (28)	6 (35)	21 (28)	9 (35)	26 (34)	13 (39)
Yes, multiple	48 (13.3)	11 (11)	3 (9)	3 (17)	1 (6)	11 (14)	3 (12)	11 (14)	5 (15)
No	143 (39.7)	46 (46)	12 (42)	10 (56)	10 (59)	44 (58)	14 (54)	39 (51)	15 (45)
I don't know	1 (0.3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Notes: G I = money-back guarantee; G II = 2% guaranteed interest rate on premium; medium-risk fund = 50% bonds and 50% stocks; high-risk fund = 100% stocks.

Table 5

Survey part 3—Choice among three unit-linked life insurance products given option pricing model OPT prices Π_0^G; absolute frequency, percentage in parentheses

n (%)	Product A: no guarantee, no additional costs	Product B: money-back guarantee, CHF 300 (for medium risk), CHF 1'000 (for high risk)	Product C: 2% reservation price interest rate guarantee, CHF 1'120 (for medium risk), CHF 2'060 (for high risk)
Medium-risk fund	157 (44)	124 (34)	79 (22)
High-risk fund	160 (44)	117 (33)	83 (23)

In summary, this descriptive analysis demonstrates the difficulty in assessing the value of an investment guarantee in a unit-linked life insurance policy. By comparing subjective guarantee values with reservation prices obtained using a theoretical option pricing model, we show that respondents, even though they all had a background in financial services with experience in financial markets, valued guarantees significantly lower than the theoretical price. Thus, even though a direct judgment of the value of a guarantee is highly complex and difficult for the participants—even in this fairly knowledgeable sample—the empirical findings still allow the tentative conclusion that the true value of investment guarantees may not be fully acknowledged by customers. However, when providing the theoretical prices and then asking participants to choose among unit-linked products with different guarantee levels for the given price, a large number of them would still select a guarantee, even though more than 40% consistently chose the product without an additional guarantee. The results of the choice option are certainly influenced by the presentation of the OPT prices (see Figure A.5 in the Appendix). Giving the participants' absolute values of the costs and the premium, and thus the demanded transparency and cost overview, probably leads to a different WTP than giving, e.g., monthly calculated payments (small vs. big numbers) or relative costs (under-/ overestimation of probabilities).

3.5 Empirical study: Further analysis of relationships

To provide further insight into the relationship between customer characteristics and WTP, Table 6 display the respective correlations (see Figure A.1 in the Appendix for coding). Aside from some insight into the estimation, customer characteristics appear to play only a minor role in assessing subjective WTP and estimating default probabilities. However, we do find that females have a lower WTP for guarantees, which is found to be significant for Guarantee I of the medium-risk fund and Guarantee II of the high-risk fund.

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Older people are willing to pay more (except for Guarantee II medium risk) and have a higher subjective estimate of default probabilities. A significant relation of this is found for the default probability of the high-risk fund. Other characteristics with significant relation were persons having a job in an area other than insurance or finance, who tend to more greatly underestimate the default probability for the high-risk fund compared to persons working in insurance or financial services. At the same time, these people have a higher WTP for investment guarantees (except for Guarantee I high-risk fund).

Persons without an education in financial markets estimate the default probability as significantly higher than do persons who do have such an education. Participants owning one or more life or pension products are willing to pay less than those without life insurance products, even though their subjective default probability for the high-risk fund is slightly higher. Persons with more than one life or pension product have a lower WTP for both types of guarantees and both fund types. Similar results are observed for the fund with an initial premium of CHF 50,000, for the fund with a contract term of 20 years, and for the choice-options.

Table 6
Correlations between customer characteristics and WTP

	Medium-risk fund			High-risk fund		
	Default probability	G I	G II	Default probability	G I	G II
Gender						
Pearson Correlation	-.038	-.093	-.058	.044	-.063	-.088
Sig. (2-tailed)	.471	.079	.274	.405	.231	.097
Age						
Pearson Correlation	.079	.048	-.030	.136**	.049	.021
Sig. (2-tailed)	.132	.360	.568	.010	.354	.687
Job						
Pearson Correlation	-.067	.058	.066	-.105*	-.005	.005
Sig. (2-tailed)	.207	.270	.213	.047	.919	0.93
Education						
Pearson Correlation	.101	-.005	-.004	.112*	.018	.023
Sig. (2-tailed)	.055	.928	.943	.034	.728	.665
Attitude toward risk						
Pearson Correlation	.035	-.050	-.001	.008	-.081	-.021
Sig. (2-tailed)	.503	.340	.850	.875	.126	.692
Owning stocks						
Pearson Correlation	-.095	-.013	.048	-.049	.025	.031
Sig. (2-tailed)	.072	.812	.364	.358	.630	.560
Knowledge about guarantees						
Pearson Correlation	.031	-.043	-.008	-.013	-.056	-.033
Sig. (2-tailed)	.562	.413	.880	.810	.287	.536
Owning a life insurance product						
Pearson Correlation	.053	-.017	-.030	.122*	-.013	-.052
Sig. (2-tailed)	.311	.754	.569	.021	.813	.324

Notes: * Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed); G I = money-back guarantee; G II = 2% guaranteed interest rate on premium; default probability = probability that the maturity fund value falls below the single up-front premium; medium-risk fund = 50% bonds and 50% stocks; high-risk fund = 100% stocks.

Table 6 (continued)
Correlations between customer characteristics and WTP

	Medium-risk fund; premium: 50,000		Medium-risk fund; contract term: 20 ys		Product choice (product A–C)	
	G I	G II	G I	G II	MRF	HRF
Gender						
Pearson Correlation	-.107*	-.117*	-.020	-.005	-.056	.015
Sig. (2-tailed)	.042	.027	.705	.916	.286	.773
Age						
Pearson Correlation	.031	-.034	.005	-.054	.066	.051
Sig. (2-tailed)	.561	.520	.921	.306	.211	.335
Job						
Pearson Correlation	.033	.051	.018	.023	.069	.008
Sig. (2-tailed)	.528	.331	.727	.665	.192	.873
Education						
Pearson Correlation	-.021	-.015	-.015	.005	.093	.051
Sig. (2-tailed)	.688	.780	.778	.919	.079	.330
Attitude to-ward risk						
Pearson Correlation	-.049	-.024	-.079	.018	-.011	-.053
Sig. (2-tailed)	.355	.648	.136	.731	.834	.312
Owning stocks						
Pearson Correlation	-.025	-.002	-.055	.059	.064	.032
Sig. (2-tailed)	.638	.975	.298	.263	.229	.540
Knowledge about guarantees						
Pearson Correlation	-.039	-.001	-.037	.010	-.067	-.067
Sig. (2-tailed)	.456	.982	.487	.845	.202	.205
Owning a life insurance product						
Pearson Correlation	-.027	-.035	.015	-.017	-.069	-.072
Sig. (2-tailed)	.607	.505	.771	.741	.193	.176

Notes: * Correlation is significant at the 0.05 level (2-tailed); G I = money-back guarantee; G II = 2% guaranteed interest rate on premium; default probability = probability that the maturity fund value falls below the single up-front premium; medium-risk fund = 50% bonds and 50% stocks; high-risk fund = 100% stocks.

Table 7

ANOVA between customer characteristics and WTP

	Medium-risk fund		High-risk fund		Medium-risk fund; premium: 50,000		Medium-risk fund; contract term: 20 ys	
	G I	G II	G I	G II	G I	G II	G I	G II
OPT model (in CHF)	298	1003	1116	2057	1491	5015	204	1363
Gender								
Mean total (in CHF)	219	516	401	788	1,045	2,344	206	603
Male	228	526	411	813	1,093	2,444	208	605
Female	129	417	306	556	590	1,393	182	588
F	3.100	1.200	1.438	2.774	4.148	4.951	0.143	0.010
Sig	.079*	.274	.231	.097	.042**	.027**	.705	.919
Age								
Mean total (in CHF)	219	516	401	788	1,045	2,344	206	603
18-29 years	106	480	225	663	530	1,924	87	775
30-45 years	223	539	405	786	1094	2,516	227	624
46-65 years	230	498	422	817	1058	2,210	195	562
over 65 years	133	267	167	333	600	1,200	167	333
F	0.963	0.389	1.170	0.471	1.079	0.742	0.844	0.404
Sig.	.410	.761	.321	.703	.358	.527	.471	.750
Job								
Mean total (in CHF)	219	516	401	788	1,045	2,344	206	603
insurance area	213	508	408	800	1,033	2,325	199	598
financial area	206	387	263	507	956	1,674	305	549
different area	286	694	450	921	1,239	3,088	188	701
F	0.814	2.438	1.285	1.866	0.386	2.169	0.995	0.213
Sig.	.444	.089*	.278	.156	.680	.116	.371	.809
Education involving knowledge about financial markets								
Mean total (in CHF)	219	516	401	788	1,045	2,344	206	603
yes	220	517	397	780	1,058	2,361	208	601
no	215	511	421	833	979	2,256	193	615
F	0.008	0.005	0.121	0.187	0.161	0.078	0.080	0.010
Sig.	.928	.943	.728	.665	.688	.780	.778	.919

Notes: * F is significant at the 0.10 level; ** F is significant at the 0.05 level; G I = money-back guarantee; G II = 2% guaranteed interest rate on premium; medium-risk fund = 50% bonds and 50% stocks; high-risk fund = 100% stocks.

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Table 7 (continued)

ANOVA between customer characteristics and WTP

	Medium-risk fund		High-risk fund		Medium-risk fund; premium: 50,000		Medium-risk fund; contract term: 20 ys	
	G I	G II	G I	G II	G I	G II	G I	G II
OPT model (in CHF)	298	1003	1116	2057	1491	5015	204	1363
Attitude toward risk								
Mean total (in CHF)	219	516	401	788	1,045	2,344	206	603
risk averse	266	559	505	890	1,280	2,726	278	617
risk neutral	207	494	380	743	972	2,171	194	573
risk loving	211	531	374	813	1,037	2,443	180	655
F	0.895	0.395	1.836	0.773	1.231	1.179	1.471	0.245
Sig.	.410	.674	.161	.463	.293	.309	.231	.782
Owning stocks?								
Mean total (in CHF)	219	516	401	788	1,045	2,344	206	603
yes	221	504	395	777	1,060	2,346	215	579
no	210	576	429	849	967	2,334	157	733
F	0.057	0.826	0.233	0.340	0.222	0.001	1.087	1.258
Sig.	.812	.364	.630	.560	.638	.975	.298	.263
Knowledge about guarantees								
Mean total (in CHF)	219	516	401	788	1,045	2,344	206	603
yes	221	517	406	794	1,055	2,345	208	602
no	146	492	254	638	754	2,328	130	657
F	0.671	0.023	1.139	0.383	0.556	0.001	0.483	0.038
Sig.	.413	.880	.287	.536	.456	.982	.487	.845
Owning a life insurance product								
Mean total (in CHF)	219	516	401	788	1,045	2,344	206	603
no (no signing planned)	246	552	427	904	1,204	2,607	218	618
no (signing planned)	54	396	232	607	367	1,616	29	662
yes (one contract)	238	551	425	816	1,103	2,457	209	630
yes (multiple contracts)	213	496	393	754	1,017	2,262	212	582
F	1.478	0.501	0.675	0.669	1.391	0.637	0.956	0.076
Sig.	.220	.682	.568	.572	.245	.592	.414	.973

Notes: G I = money-back guarantee; G II = 2% guaranteed interest rate on premium; medium-risk fund = 50% bonds and 50% stocks; high-risk fund = 100% stocks.

These findings are confirmed by an ANOVA analysis between customer characteristics and WTP, as shown in Table 7. The table reveals that customer characteristics have no significant effect on levels of WTP, except of the characteristic —gender", neither do they reveal a significant trend. Only —gender" shows significant differences in respect to the WTP of men and women. For all types of guarantees, we observe that males are willing to pay considerably more than females. This proves significant for Guarantee I and II for the medium risk fund with an initial up-front premium of CHF 50,000, both on a 0.05 level. In these two cases, women are on average willing to pay more than 50% less than men. However, the average WTP of men is still too small to cover the reservation price calculated using option pricing theory. Except for the customer characteristic —gender", customer characteristics do not show any significant differences between groups and thus, do not represent good predictors of WTP by group. These results indicate that even within different groups, it is difficult to state WTP.

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4 Discussion and policy implications

The results of our empirical study show that participants are on average not willing to pay the reservation price necessary to secure the guarantees in insurance products. This is true, even though the cost of the guarantee in our model can in general be considered to represent a lower bound to the ―true costs" due to the underlying assumptions (no inclusion of, for example, jumps in the underlying asset process, stochastic volatility, transaction costs). Thus, the market price might even be higher. Nevertheless, we found that people are generally positively disposed towards guarantees, especially in the case of high-risk products or products with a higher premium volume. Moreover, for every type of guarantee, we still find a substantial portion of up to one-third of the participants, who are willing to pay a price that substantially exceeds the reservation price. Further research could thus focus on the characteristics of this group in more detail and analyze biases as to what extent the hypothetical WTP may or may not be overestimated. In addition, it would be worthwhile to compare the results for WTP in a different time period when historical volatility and, thus, guarantee costs are lower. However, at the moment, customers' average maximum WTP in our sample does not cover the reservation price derived by option pricing theory.

Furthermore, people find it difficult to directly assess ―true" subjective WTP for insurance-related guarantees, even though the sample is specialized in finance or insurance. This finding was confirmed when considering the substantial deviations of the stated WTP and the high number of outliers, which makes a direct assessment of ―true" subjective prices for guarantees very difficult. There are several explanations for this finding. First, perhaps the most obvious reason is the complexity of the product. Specifically, even for our fairly knowledgeable sample, the products are complicated for consumers to evaluate in anything close to an objective manner. Second, most consumers have only a very low involvement with insurance products and very rarely engage in making

insurance purchase decisions. Third, we conducted a survey that included direct open-response questions eliciting subjective WTP, a cognitively very demanding task. The high deviations of stated WTP may indicate an absence of a reference price. A reference price is an anchor or benchmark against which the product price is judged (Kahneman and Tversky 1979; Mazumdar, Raj and Sinha 2005; Monroe 1973). Interestingly, even the sample with insurance or finance background seems to be unable to rely on such a standard. Thus, it might be even more difficult for typical customers to assess their WTP for investment guarantees. However, in this analysis the discussion of the existence of a reference price can only be a tentative derivation, and has to be confirmed in further research (see e.g., Lowe and Alpert 2007). Even so, by directly asking if and how much people are willing to pay for guarantees, the survey should be a first step in how well these products are understood, and to what extent subjective WTP differs from insurers' OPT prices.

Interestingly, customer characteristics, such as age, gender, or risk attitude, had no influence on these findings, as reflected in the lack of statistical significance. It thus appears that even for our sample, more than 90% of whom work in insurance or finance, customer characteristics have only very low power in explaining WTP, customer estimates of default probabilities, and the general lack of understanding the products. This is true even for our sample, where more than 90% of participants work in the fields of insurance or finance.

Due to the non-representative selection of the sample and the not entirely given validity and reliability in the direct approach, our findings and their implications cannot be generalized. However, even though interpretations and policy implications are tentative, the present research still allows deducing some practical implications for insurers.

First, and as pointed out earlier, insurance products are very complex, and people may not be able to fully understand these products or

single elements of them, much less evaluate or compare them entirely. Consequently, the question arises, if it is advisable and justifiable to offer rather complex products instead of a transparent product design that may increase customer value. Second on average, the WTP for investment guarantees does not cover the reservation price. Thus, the question arises to what extent the product design considers customer preferences and, more specifically, the trade-off between the wish for high guarantees (and thus a secure payoff at maturity) and the associated costs. Certainly, life insurance products with different types of embedded guarantees may imply a unique selling proposition for insurance companies. However, the results of the study challenge the reasonability of investment guarantees in this context, especially in regard to the insufficient average WTP, if costs are communicated in a transparent way. This is important in the context of the current demand for more transparency, since our empirical study suggests that customers may often not choose the products or pay the required price when they are fully informed about absolute costs and pay-off structure. However, these results may change when altering, for example, the presentation of the premium payment method (e.g., monthly instead of up-front; percentage of fund value instead of absolute). Third, regulatory authorities and tax subsidies generally obligate people to buy guarantees, even if customers may not be willing to voluntarily buy and pay for these guarantees. Thus, regulatory authorities should reflect requirements in regard to guarantees against the background of customers' interests. Doubtless, it is important to protect customers, and in particular to prevent poverty among the elderly, but at the same time, massive regulatory frameworks may constrict market mechanisms and thus conceal cost transparency.

Hence, to summarize these tentative implications, it is worthwhile to consider whether insurance companies should reassess their product designs and to conduct an in-depth analysis of customer needs in order to ensure a sufficient WTP that exceeds the reservation price. Further, regulatory authorities should readjust their frameworks. Both, regulatory

authorities and insurance companies, should focus on a reduction of complexity, an increase of (cost) transparency, and a more comprehensive consideration of customer preferences, e.g., by integration of customer surveys. However, due to the specific choice of the sample and the method, these implications can only be considered as a first indication, and have to be confirmed in further research.

5 Summary and outlook

In this paper, prices for investment guarantees for unit-linked life or pension products based on options pricing theory were compared to subjective WTP. To elicit the subjective WTP, we administered an online questionnaire comprising direct open-response questions and choice options. The results were compared to the actual reservation price calculated with the Black and Scholes option pricing formula. The majority of the participants had some connection to either insurance or finance, an aspect of survey design necessitated by the complexity of the products they were asked to evaluate and choose from, and the subject matter of the direct open-response questions.

The results of this study show that the average WTP of customers for investment guarantees in unit-linked life insurance products is significantly lower than the reservation price the insurer would be expected to charge. However, there was still a substantial portion of participants whose WTP considerably exceeded the insurer's reservation price. Customer characteristics had almost no influence on the WTP, and differences between groups could hardly be observed. Our results indicate first implications, such as the reassessing of product designs by insurers, and of the regulatory framework by regulatory authorities, which have to be analyzed in detail in further analyses.

We have shown that on average, there is too little WTP for guarantees in unit-linked life insurance, and not much of a link, if any, between customer characteristics and WTP. Thus, the way is now cleared for work on determining indirect WTP and why subjective prices are so low on average and still high for a considerable portion of the sample. Thus, the data from this study constitute a first step in examining the contrast between reservation prices for guarantees in unit-linked life insurance policies based on a financial pricing approach and the subjective WTP of customers. However, it is difficult to examine the ―real‖ WTP of

consumers, especially since insurance products are perceived as product bundles, comprised of several items, including price, service, and image. Thus, there is a discrepancy between real and hypothetical WTP. The next step is to replicate and extend this study by investigating these dimensions for buying insurance, measuring their extent, and analyzing indirect WTP for guarantees by conducting a conjoint analysis on a panel representing, for example, the Swiss population.

Appendix

Figure A.1
Design of the survey—Part 1: Customer characteristics

1. Gender
☐ Male *(1)*
☐ Female *(2)*

2. Age
☐ 18–29 years *(1)*
☐ 30–45 years *(2)*
☐ 46–65 years *(3)*
☐ Over 65 years *(4)*

3. Job
☐ I work in the area of insurance *(1)*
☐ I work in the area of financial services, but not in insurance *(2)*
☐ I work in a different area *(3)*

4. Did you complete or are you completing an education, which involves knowledge about financial markets?
☐ Yes *(1)*
☐ No *(2)*

5. How would you describe your risk behaviour?
☐ Risk averse *(1)*
☐ Risk neutral *(2)*
☐ Risk seeking *(3)*

6. Do you own stocks?
☐ Yes *(1)*
☐ No *(2)*

7. Do you know that life insurances generally contain investment guaranties (particularly in the form of reservation price interest rate promises)?
☐ Yes *(1)*
☐ No *(2)*

8a. Do you own a pension or life insurance product (e.g. pension fund or life insurance)?
☐ No, and signing a contract is not planned either *(1)*
☐ No, but signing a contract is planned *(2)*
☐ Yes, I own one contract *(3)*
☐ Yes, I own multiple contracts *(4)*

8b. *(Only if you answered Question 8a with "Yes")*: Is there a unit-linked life insurance product amongst them?
☐ Yes, one *(1)*
☐ Yes, multiple *(2)*
☐ No *(3)*
☐ I don't know *(4)*

Note: Italic numbers in parentheses display coding scheme; the survey was originally in German.

Figure A.2

Design of the survey—Part 2: Description of unit-linked product (I) and estimation of default probability

For your retirement provision, you have the possibility to sign a unit-linked life insurance with the following contract characteristics:

- Single premium at the signing of the contract: CHF 10,000
- Contract duration: 10 years
- Investment: the premiums will be invested in the financial markets either in a medium-risk fund (50% stocks and 50% bonds) or in a high-risk fund (100% stocks)
- Payout at maturity: worth of the fund's assets. Due to the uncertain development of the financial markets, the value of the fund and thus the payout are uncertain.

How high do you estimate the probability that the value of the fund's assets falls under CHF 10,000 at maturity, i.e. you become less than your deposited single premium? Please estimate a number between 0 percent (loss does not occur) and 100 percent (loss occurs in any case) by investment of the premium in a medium risk fund/high risk fund?

Figure A.3

Design of the survey—Part 2: Description of unit-linked product (II)

At maturity of the contract, the payout profile of the fund's assets looks as follows. As you can infer from the graphs below, due to uncertain developments in the financial markets, profits but also losses are possible. In order to protect yourself against possible losses, on the next page you have the choice between two guarantees, which you can buy in addition.

a) medium-risk fund

With a probabilty of **2 %** you'll receive more than CHF 25,000,

With a probabilty of **12 %** you'll receive CHF 20,000 to CHF 25,000,

With a probabilty of **36 %** you'll receive CHF 15,000 to CHF 20,000,

With a probabilty of **43 %** you'll receive CHF 10,000 to CHF 15,000,

With a probabilty of **7 %** you'll receive CHF 7,000 und CHF 10,000.

b) high-risk fund

With a probabilty of **18 %** you'll receive more than CHF 30,000,

With a probabilty of **10 %** you'll receive CHF 25,000 to CHF 30,000,

With a probabilty of **15 %** you'll receive CHF 20,000 to CHF 25,000.

With a probabilty of **21 %** you'll receive CHF 15,000 to CHF 20,000,

With a probabilty of **22 %** you'll receive CHF 10,000 to CHF 15,000,

With a probabilty of **10%** you'll receive CHF 7,000 to CHF 10,000.

With a probabilty of **4 %** you'll receive CHF 4,000 to CHF 7,000.

Guarantee I: You receive back at least your deposited premium, i.e., a guaranteed payout of CHF 10,000 or more.

Guarantee II: You receive back at least your deposited premium with an additional interest payment of 2%, i.e., a guaranteed payout of CHF 12,214 or more.

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Figure A.4

Design of the survey—Part 2: Willingness to pay

How much is your maximal willingness to pay for a given guarantee, which you have to pay in addition to the single premium of CHF 10,000
(in CHF)
- with a medium-risk fund for Guarantee I (i.e., guaranteed payout of CHF 10,000 or more)?
- with a medium-risk fund for Guarantee II (i.e., guaranteed payout of CHF 12,214 or more)?
- with a high-risk fund for Guarantee I (i.e., guaranteed payout of CHF 10,000 or more)?
- with a high-risk fund for Guarantee II (i.e., guaranteed payout of CHF 12,214 or more)?

How much is your maximal willingness to pay for the given guarantee, when you now have to pay a single premium of CHF 50,000 (instead of CHF 10,000) and it is invested in a medium-risk fund
(in CHF)
- for Guarantee I (i.e., guaranteed payout of CHF 50,000 or more)?
- for Guarantee II (i.e., guaranteed payout of CHF 61,070 or more)?

How much is your maximal willingness to pay for the given guarantee, when your contract has a duration of 20 years (instead of 10 years) (single premium = CHF 10,000; medium-risk fund)
- for Guarantee I (i.e., guaranteed payout of CHF 10,000 or more)?
- for Guarantee II (i.e., guaranteed payout of CHF 14,918 or more)?

Figure A.5
Design of the survey—Part 3: Choice of product

Here you have the choice among three products, which either do not contain a guarantee (Product A) or contain guarantees to different extents (Product B and Product C). Which of the three products would you choose in each case? Mark with a cross, please.

a) Your single premium is invested in the financial markets in a medium-risk fund (50% stocks and 50% bonds).
   ☐ Product A: *(1)*
      – No guarantee
      – Payout of more or less than CHF 10,000 (depending on the evolution of financial markets)
      – No additional costs

   ☐ Product B: *(2)*
      – Guaranteed payout of the deposited single premium (i.e., CHF 10,000 or more, 0% yield)
      – Additional costs for the guarantee: CHF 300

   ☐ Product C: *(3)*
      – Premium returns a reservation price of 2% (guaranteed payout: CHF 12,214 or more)
      – Additional costs for the guarantee: CHF 1,000

b) Your single premium is invested in the financial markets in a high-risk fund (100% stocks).
   ☐ Product A: *(1)*
      – No guarantee
      – Payout of more or less than CHF 10,000 (depending on the evolution of financial markets)
      – No additional costs

   ☐ Product B: *(2)*
      – Guaranteed payout of the deposited single premium (i.e., CHF 10,000 or more, 0% yield)
      – Additional costs for the guarantee: CHF 1,120

   ☐ Product C: *(3)*
      – Premium returns a reservation price of 2% (guaranteed payout: CHF 12,214 or more)
      – Additional costs for the guarantee: CHF 2,060

Note: Italic numbers in parentheses display coding scheme

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PART II

HOW DO PRICE PRESENTATION EFFECTS INFLUENCE CONSUMER CHOICE? THE CASE OF LIFE INSURANCE PRODUCTS

Abstract

Attractive life insurance product design becomes increasingly important due to demographic changes and a declining confidence in state-run pension schemes. Most life insurance contracts are often offered with investment guarantees embedded in the savings part of the product. In addition, regulatory authorities and consumers currently ask for more cost transparency with respect to product components (e.g., risk premium for death benefits, savings premium, and cost of investment guarantee) including administration costs. In this regard, it is important for insurance companies and regulators to know to what extent the way of presenting the prices of a product offer affects consumer choice. The aim of this paper is to measure the effects of different forms of price presentation of life insurance contract components and especially of investment guarantees on consumer evaluation. This is done by means of an experimental study and by focusing on unit-linked life insurance products. Our findings reveal that contrary to, consumer products for example, there are no effect of price bundling and price optic on consumer evaluation and purchase intention for life insurance products. However, consumer experience and price perception emerge as significant predictors.[3]

1 Introduction

Due to declining confidence in state-run pension schemes, as well as considerable demographic changes in most western countries, life insurance products offered by private insurance companies become increasingly important for old-age provisions. Besides a term life insurance component paying a death benefit, most life insurance contracts contain investment guarantees in the savings part of the product. In particular, investment guarantees in unit-linked life insurance policies typically assure that a minimum amount is remunerated to the consumer, even if the value of the mutual fund falls below a predefined guarantee level. Such investment guarantees can be of substantial value, especially regarding the riskiness of the underlying fund and the duration of the contract. Hence, risk adequate pricing and risk management of this kind of options are crucial from the viewpoint of an insurance company. Furthermore, current regulatory efforts in most countries of the European Union expect insurance companies to provide a more detailed price presentation, including administration costs, to their consumers. Hence, the aim of this paper is to derive information about possible changes in the consumers' willingness to purchase insurance whenever a detailed price presentation of life insurance contracts is provided by the insurer.

In this paper, we examine whether different forms of price presentation – i.e. a single up-front payment for the guarantee, monthly payments, or the guarantee price defined as an annual percentage of the value of the mutual fund – will influence consumers' choice to purchase an investment guarantee. Furthermore, we allow for different levels of product bundling. In this context, identical products are offered to the participants of our experimental study, showing the total price of the product versus viewing the prices of all individual product components (i.e., term life insurance costs, investment guarantee costs, and administration costs). This way, we are able to investigate to what extent the different price presentations, namely price bundling and price optic, exert an influence on consumers' decisions and on their evaluation of the product.

The experimental analysis has been conducted using an online survey for a Swiss panel, in the German and French speaking part of Switzerland that is representative with regard to region and gender. The survey was divided into three parts. In the first part, a product card has been shown to the participants for evaluation. Using a 3x4 factorial between-subject design, every participant received only one (of the twelve) product offers for evaluation, such that each card was answered by around 55 respondents. Based on this representative sample, we tested four hypotheses. First, we examine whether positive consumer evaluations of an investment product augment in relation to the price information being bundled or abstract. Second, we study the moderating effect of consumers' experience with insurance or investment products on the relationship between price presentation and consumer evaluation. The third hypothesis tests whether the purchase intention of the consumers increases in relation to the price information being abstract or bundled. The fourth hypothesis investigates the predictive power of consumer experience and price perception on their purchase intention.

To test these hypotheses regarding consumer evaluation, we apply multivariate analyses of variance (MANOVA) models, based on consumer satisfaction and likelihood of recommendation in a first study. In the second study, we enhance this relationship by a moderated model and use OLS regression analyses to test the moderating effect of consumer experience with insurance or investment products on this relationship. In the third analysis, we use logistic regressions in order to assess the impact of several factors on consumers' purchase intention. In addition, principal component analyses are conducted with respect to the "Consumer Experience" moderating variable and the "Price Perception" factor. The paper is structured as follows. Section 2 provides a survey of the relevant literature and theoretical background, based on which we derive four hypotheses as laid out in Section 3. The pricing framework of the unit-linked life insurance contract is presented in Section 4, using actuarial and financial concepts for pricing the different contract component and including mortality risk. Section 5 presents the framework of the experimental study and details regarding the representative sample for

Switzerland. The results and hypothesis tests are presented in Section 6, and the conclusions are presented in Section 7.

2 Literature overview

2.1 Behavioral insurance

The focus of the previous literature stream on behavioral insurance is mainly on the effects of insurance company insolvency risk on consumers' willingness to pay (WTP). We extend this research by investigating consumer choice of a unit-linked life insurance product and a minimum interest rate guarantee, under different price presentation effects. Based on research examining WTP for insurance products with default probability (e.g., Wakker, Thaler, and Tversky 1997; Zimmer, Gründl, and Schade 2008; Zimmer, Schade, and Gründl 2009) and on the WTP for guarantees in unit-linked life insurance contracts in general (Gatzert, Huber, and Schmeiser 2011), we assume that price presentation has a substantial impact on consumer evaluation of unit-linked life insurance products.

2.2 Prospect theory, framing, and mental accounting

Depending on the perspective, the value of guarantees in unit-linked life insurance contracts may differ: While an insurer calculates the price for an investment guarantee assuming a duplication of future cash flows (e.g., using risk-neutral valuation techniques), consumers may not be able to replicate future cash flows (here: individual claims) to the same extent as the insurer and may thus assess the value of investment guarantees based on individual time and state preferences. Thus, when it comes to evaluating different insurance product offers, consumer evaluation may be quite different from financial theory. To elicit consumer evaluation and purchase intention, we conduct an experimental study, explained below.

When making decisions, particularly regarding risky or probabilistic choices, individuals use different mental models, which often contradict the basic principles of expected utility theory. The literature stream based on the theoretical breakthrough of Kahneman and Tversky's prospect theory

(Kahneman and Tversky 1979) examined this phenomenon in detail and detected many biases and heuristics (for an overview, see, for instance Camerer and Loewenstein 2003). Especially the purchase of insurance products leads to a substantial amount of irrational behavior, evoked by several mental models, inter alia: loss aversion, i.e., losses loom larger than corresponding gains (Tversky and Kahneman 1991), overconfidence, for example by overestimating own knowledge and ability to control events while underestimating risks (Barberis and Thaler 2005), risk perception (Slovic 1972; Slovic et al. 1977), or an overestimation of probabilities (Johnson et al. 1993).

In the case of presenting price information, especially framing, i.e., the reliance on how information is presented (Tversky and Kahneman 1981, 1986; Kahneman and Tversky 1984), and mental accounting, i.e., the dividing of current and future assets into separate, non-transferable portions (Thaler 1999), play an important role in the evaluation of product offers. Framing the same problem differently leads to different perceptions of the decision problem and evaluation of probabilities and outcomes (Tversky and Kahneman 1981). This irrational behavior also proves true in the financial decision making process with risky or probabilistic choices (Johnson et al. 1993, Wakker, Thaler, and Tversky 1997). Thus, presenting price information of the components of an insurance contract differently may lead to a different evaluation of the product, even though all products have identical present values.

Furthermore, mental accounting plays an important role in consumer evaluation of price information. Mental accounting builds up on the properties of prospect theory and its value function, introduced by Kahneman and Tversky's prospect theory (Kahneman and Tversky 1979; Tversky and Kahneman 1991, 1992). According to its value function v, which is concave for $x > 0$ ($v''(x) < 0$), convex for $x < 0$ ($v''(x) > 0$), steeper for losses than for gains, and steepest at the reference point (hence, $v'(x) < v'(-x)$ for $x \geq 0$), it predicts that gains (losses) have a higher (lower) value if separately presented, instead of in a combination (Thaler 1985, 1999). Thus, the following two

inequalities specify how consumers mentally account for multiple gains (1) and multiple losses (2)

$$v(x) + v(y) \; > \; v(x+y) \qquad\qquad \text{for all } x, y > 0, \qquad\qquad (1)$$

$$v(-x) + v(-y) \; < \; v(-(x+y)) \qquad \text{for all } x, y > 0, \qquad\qquad (2)$$

where x and y are gains (respectively losses), and $v(x)$ and $v(y)$ are the value of the gains (respectively losses) (Thaler 1985). The two arguments show that in the case of gains (Equation (1)), where the value function is concave and more flat, consumers prefer to separate two positive events, thus obtaining several small gains rather than the whole sum at once. In the case of losses (Equation (2)), where the value function is convex and steeper, consumers prefer one single loss rather than several small losses of the same amount. Particularly, Equation (2) has to be considered in our model framework, since we assume that premiums paid for insurance contracts (and especially for investment guarantees) are perceived more as losses than as gains or savings. This implies that consumers' evaluation of the product offers should be more positive for products with a bundled price presentation than for products with an unbundled price information, i.e., one showing the prices of the several contract components.

2.3 Price presentation and price bundling

Consumers are generally sensitive to price presentation effects and the framing of price information (partitioned vs. consolidated prices), see, for example, Chakravarti et al. 2002; Drumwright 1992; Johnson, Herrmann and Bauer 1999; Puto 1987; Yadav and Monroe 1993. Thus, price presentation plays an important role in pricing policies regarding the subjective perception of consumers (Diller 2000; Diller and Herrmann 2003).

Bundling, i.e., packaging two or more services or products, often for a special price (Guiltinan 1987), is employed in many branches and industries as

a successful marketing strategy. Academic literature investigated mainly how products and services can be optimally combined (Hanson and Martin 1990; Bell 1986; Guiltinan 1987). Furthermore, psychological aspects have been examined, particularly regarding the evaluation process of bundled products, such as, for example, anchoring and adjusting models (see for example, Gaeth et al. 1991; Yadav 1994). The theoretical basis for the psychological research stream builds up on the above explained prospect theory and mental accounting and uses reference price concepts. Additionally, academic literature emphasizes the consumer's evaluation of bundled offers and the importance of price presentation and framing effects (Johnson, Herrmann and Bauer 1999; Mazumdar and Jun 1993; Yadav and Monroe 1993; Yadav 1994).

However, the research stream on price bundling often focuses on the effect of embedded price discounts and the perceived savings (for an overview, see, for example, Krishna et al. 2002). Chakravarti et al. (2002) and Morwitz, Greenleaf and Johnson (1998) investigate the effects on consumers' evaluation of partitioned prices, i.e., of separate prices for each component (vs. consolidated prices, i.e., a single, equivalent price) and show that there is a lower price perception and a higher repurchase intention if price information is partitioned. Contradictory to these studies are the results of Beshears et al. (2010). Investigating retirement saving products, they find that an increase of cost transparency, which corresponds to partitioned price information, does not affect portfolio choice. Thus, the above findings may differ in the case of long-term saving products, such as, for example, life insurance products.

Aside from this study, little research has been conducted to investigate the role of price presentation and price bundling in long-term saving products, and particularly in unit-linked life insurance products and their effect on consumer evaluation. An overview of heuristics and biases for these products is presented by Benartzi and Thaler (2007). Thus, in our study, we aim to investigate whether or not consumers' evaluations vary if the price information of life insurance contracts is differently presented and the sum of the bundled components and the total price are exactly equivalent. Hence, we analyze

whether there is a price presentation format (regarding price framing, price bundling) that consumers prefer in the case of long-term saving products.

3 Model and hypotheses

Based on the previously presented literature and theoretical background, we derive the following model framework (see Figure 1) and deduce several hypotheses. Our experimental framework aims to measure whether the presentation of the price information (bundle vs. optic) has an influence on consumer evaluation and purchase intention. In doing so, we provide three studies: The model setup for Study 1 consists of two independent variables and one dependent variable. The independent variables are bundling of price information (bundled; partially bundled; unbundled price) and price optic. The price optic factor ranges from a "no-additional-costs version" (since the product offer contains no guarantee for comparative reasons) to a single up-front guarantee payment, monthly guarantee payments, and guarantee costs as a percentage of the annual fund value. Thus, the price optic variable becomes increasingly more abstract. These two independent variables constitute the product offers that the participants of the survey received for evaluation. Thus, the basis for the model framework is a 3x4 factorial design. The dependent variable is the consumer evaluation of the offer, which is measured with two different items (see, e.g., Johnson, Herrmann, and Bauer 1999), both on a five point scale, namely:

a) The perceived satisfaction with a product
b) The perceived likelihood of recommending the product to others

In the second study, we enhance the examination of this relationship with a moderated model, using consumers' experience with insurance or investment products as a moderator. To gain a deeper understanding of the basic relationship, we thereby only focus on the two extreme categories, namely bundled vs. unbundled price presentation and without guarantee vs. with guarantee. The model set-up for Study 3 consists of four predictors, including the above described price bundling and price optic factors of Study 1, as well as two additional predictors, namely the consumers' experience with insurance or investment products and the consumers' price perception of the offer. The

dependent variable is the consumers' purchase intention of the product, measured on a binary scale. Thus, we use logistic regressions to assess the impact of the predictors on consumers' purchase intention. In this context, the following hypotheses are assumed and the model is illustrated in Figure 1:

> H1a: Positive consumer evaluations of an investment product augment as prices are bundled presented. This comprises i) the perceived satisfaction with the product and ii) the perceived likelihood of recommending the product to other people
>
> H1b: Positive consumer evaluations of an investment product augment as prices are abstractly presented. This comprises i) the perceived satisfaction with the product and ii) the perceived likelihood of recommending the product to other people.

The alternative hypotheses predict that the bundling or abstracting of price information have no effect on consumer evaluation.

> H2a: Consumer experience with insurance or investment products moderates the effects of bundling on consumer satisfaction. Specifically, experienced consumers are more satisfied / more likely to recommend the offer if prices are presented as a bundle and less satisfied if the prices are presented unbundled, whereas less experienced consumers do not show different reactions to different price bundling presentations.
>
> H2b: Consumer experience with insurance or investment products moderates the effects of guarantees on consumer satisfaction. Specifically, experienced consumers are more satisfied / more likely to recommend the offer if no investment guarantee is embedded and less satisfied if an investment guarantee is embedded, whereas less experienced consumers do not show different reactions to different price optic presentations.

The alternative hypotheses predict that experience has no moderating effect.

H3a: Consumer purchase intention of an investment product augments as prices are bundled presented.

H3b: Consumer purchase intention of an investment product augments as prices are abstract presented.

The alternative hypotheses predict that the bundling or abstracting of price information have no effect on consumer purchase intention.

H4a: The more experienced consumers are, the more likely they are to purchase the product.

H4b: The lower consumers perceive the price of the product, the more likely they are to purchase the product.

The alternative hypotheses predict that the experience or price perception have no effect on consumer purchase intention.

Figure 1
Model framework

	Study 1
Independent variables *Dependent variables* Bundling —H1a→ Consumer evaluation (satisfaction / re-commendation) Optic —H1b→	3 x 4 factorial between-subject design, using multivariate analysis of variance
a) *Moderator* Consumer experience *Dependent variable* *Independent variable* Bundling • bundled • unbundled —H2a→ Consumer evaluation (satisfaction / re-commendation) *b)* *Moderator* Consumer experience *Dependent variable* *Independent variable* Guarantee • without guarantee • with guarantee —H2b→ Consumer evaluation (satisfaction / re-commendation)	**Study 2** Between-subject design, using OLS regression ananlyses to assess the moderating effect of consumer experience on the relationship between a) bundling (bundled vs. unbundled price presentation) and consumer evaluation b) guarantee (without guarantee vs. with guarantee and single up-front costs) and consumer evaluation
Independent variables *Dependent variable* Bundling —H3a→ Optic —H3b→ Consumer purchase intention Consumer experience —H4a→ Price perception —H4b→	**Study 3** Binary logistic regression to assess the impact of the predictors bundling, price optic, consumer experience and consumer price perception on likelihood of purchase intention.

4 Unit-linked life insurance contracts

To determine different price optic and bundling of investment guarantees in unit-linked life insurance policies, we first model a unit-linked base contract without guarantee that contains a savings part invested in a mutual fund and a fixed death benefit D that is paid out if the policyholder dies during the term of the contract. In case of survival until maturity T, the policyholder receives the value of the mutual fund, which yields a stochastic payoff at maturity in the base contract. For administration costs, a percentage k of the gross premium P is charged. The risk premium for the death benefit payment is denoted by P_D and subtracted from the gross premium. The remainder constitutes the savings part and is invested in the mutual fund. To ensure a minimum survival payoff, the base contract is then extended to further offer a constant guaranteed minimum payoff G_T for an additional guarantee price P_G. The total premium paid into the contract including the additional costs for an investment guarantee can thus be split up into four components as laid out in Figure 2.

Figure 2: Premium decomposition of base contract with and without guarantee

$$
\text{Base contract (no guarantee)} \left\{
\begin{array}{ll}
& \text{Gross premium } P \\
- & \text{Risk premium for death benefit } P_D \\
- & \text{Administration costs } kP \\
= & \text{Savings premium } P_S \text{ (invested in mutual fund)}
\end{array}
\right.
$$

$$
\text{Base contract with guarantee} \left\{
\begin{array}{ll}
& \text{Gross premium } P \\
+ & \text{Investment guarantee costs } P_G \text{ (charged separately using} \\
& \text{different price presentations)} \\
= & \text{Total premium paid by policyholder } P_{\text{total}}
\end{array}
\right.
$$
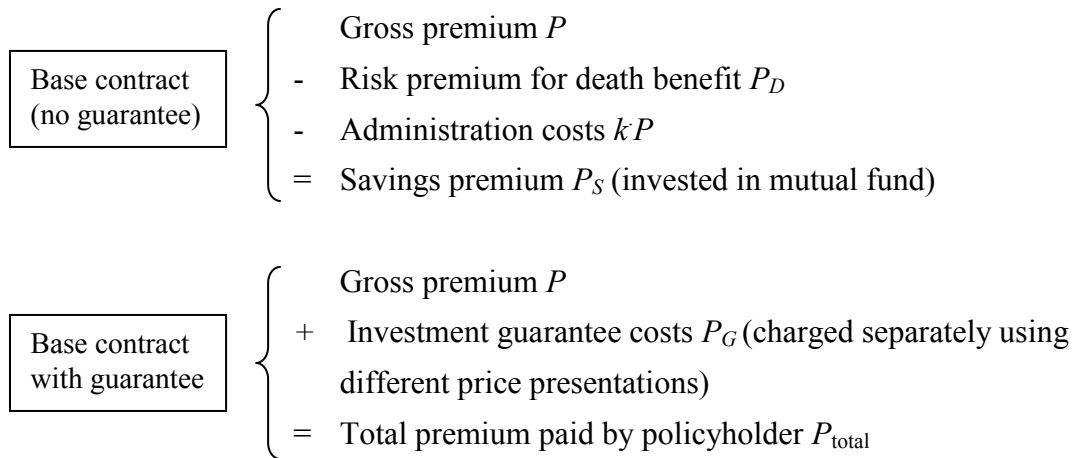
In the following, we first describe the dynamics and contract features as well as pricing for the base contract without guarantee and then show how to determine the additional guarantee costs. We thereby ensure that the guarantee

costs are the same and only the price presentation differs (absolute costs as single and annual premium and annual percentage fee of the fund value) to isolate the effect of the price presentation on consumer choice.

4.1 The base contract

Calculation of the risk premium for the death benefit

The risk premium for the death benefit payment is determined using an actuarial pricing approach (for the following, we refer to Gatzert and Schmitt-Hoermann, forthcoming). The one-year table probability of death of an *x+t*-year old male policyholder is given by q_{x+t}, $t = 0,\ldots,T-1$, and $_tp_x$ denotes the probability that an *x*-year old male policyholder will survive *t* years. For the mortality rates, the table of the German Actuarial Association DAV 2008 T is used. In case of death during policy year t (i.e., between time $t-1$ and t), the death benefit *D* is paid in arrears at the end of the year, i.e., at time $t \in 1,\ldots,T$. According to a standard actuarial valuation (see, for example, Bowers et al. 1997), the premium is determined based on the equivalence principle and hence based on the actuarial assumptions of a constant annual actuarial interest rate r_d (which henceforth corresponds to the discrete riskless interest rate) and probabilities of death according to the mortality table. For an insured age *x* at inception of the contract, the annual and single premiums are thus given by

$$P_D^{annual} \cdot \sum_{t=0}^{T-1} {}_tp_x \cdot (1+r_d)^{-t} = D \cdot \sum_{t=0}^{T-1} {}_tp_x \cdot q_{x+t} \cdot (1+r_d)^{-t+1} ,$$

$$P_D^{single} = P_D^{annual} \cdot \sum_{t=0}^{T-1} {}_tp_x \cdot (1+r_d)^{-t} . \qquad (1)$$

Modeling the mutual fund

For the underlying mutual fund, we refer to the model framework as described in Gatzert and Schmeiser (2009). In the case of constant annual

savings premium payments P_S^{annual} at time $t = 0,...,T\text{-}1$, premiums are invested in a mutual fund which results in a stochastic payoff in $t_N = T$. The unit price of the mutual fund at time t is given by S_t. The development of the unit price is modeled by a geometric Brownian motion with a constant average rate of return and constant standard deviation. Hence, under the objective measure P, the development of S_t is described by the following stochastic differential equation,

$$dS_t = S_t(\mu dt + \sigma dW_t),$$

with $S_0 = S(0)$, a drift μ, volatility σ, and a standard P-Brownian motion W_t with $0 \leq t \leq T$ on a probability space (Ω, Φ, P), where (Φ_t), $0 \leq t \leq T$, denotes the filtration generated by the Brownian motion. The solution of the stochastic differential equation yields (see, for example, Björk 2004)

$$S_t = S_{t-1} \cdot e^{(\mu - \sigma^2/2) + \sigma(W_t - W_{t-1})}$$
$$= S_{t-1} \cdot e^{(\mu - \sigma^2/2) + \sigma Z_t} = S_{t-1} \cdot R_t,$$

where Z_t are independent standard normally distributed random variables. In this context, the continuous one-period return $r_t = \ln(R_t)$ is normally distributed with an expected value of $\mu - \sigma^2/2$ and standard deviation σ.

After subtracting the costs for administrative expenses and death benefit payment from the gross premium in the base contract, the savings premium

$$P_S^{annual} = P \cdot (1-k) - P_D^{annual}$$

is invested in the fund and the value of the investment in t, F_t, is given by

$$F_t = (F_{t-1} + P_S^{annual}) \cdot \frac{S_t}{S_{t-1}} \tag{2}$$

and thus, at time T, we have

$$F_T = P_S^{annual} \cdot \sum_{t=0}^{T-1} \frac{S_T}{S_t}.$$

In the case of a single up-front premium, the savings premium is analogously invested as follows:

$$P_S^{single} = F_T \cdot \frac{S_0}{S_T}. \tag{3}$$

The payoff to the policyholder depends on the fund's development over time, and, thus, the terminal value of the investment can fall below a certain threshold (e.g., the sum of gross premium payments). To avoid such a situation, unit-linked life insurance contracts may include a guarantee providing a minimum payoff G_T of the investment at maturity T. In the presence of an additional investment guarantee, the policyholder's terminal payoff L_T^G consists of the value of the underlying fund at time T plus a put option on this value with strike price G_T:

$$L_T^G = \max(F_T, G_T) = F_T + \max(G_T - F_T, 0). \tag{4}$$

4.2 Calculation of guarantee costs and price presentations

For the calculation of guarantee costs, see also Gatzert and Schmeiser (2009): Without an investment guarantee, the survival payoff of the base contract is given by the value of the investment fund and no additional costs will be charged. If an investment guarantee is included in the contract, the policyholder has to pay the guarantee costs additionally to the ongoing premium payments, while the provider has to invest them in risk management measures, as for instance in equity capital, hedging strategies, or reinsurance. Its risk-adequate price is determined using risk-neutral valuation and presented in different ways in the empirical survey. First, a fixed single guarantee price is determined, second, an annual premium is calculated based on the single

premium derived in the first step, and, as a third price presentation, a fixed percentage fee α is subtracted from the fund value at the end of each year.

Absolute premium for the guarantee costs

In the case of a fund with a constant rate of return and standard deviation for the contract term), prices for investment guarantees at time $t = 0$ are given by the unique equivalent martingale measure $\mathbb{Q}$ (see Harrison and Kreps 1979), where the price process is driven by the riskless rate of return r, leading to

$$dS_t = S_t(r dt + \sigma dW_t^{\mathbb{Q}}),$$

where $W^{\mathbb{Q}}$ is a standard $\mathbb{Q}$-Brownian motion. The investment guarantee's value at time $t = 0$ is then determined by calculating the difference between the present value of the contract's payoff and the present value of the premiums paid. The present values are determined by the expected values of the payoffs under the risk-neutral measure $\mathbb{Q}$, discounted with the continuous riskless interest rate r. According to Equation (4), this implies that the cost of the investment guarantee is the price of a European put option value on the mutual fund at maturity, with strike G_T, weighted with probability of survival until maturity. Thus, the single up-front premium for the guarantee P_G^{single} is given by

$$P_G^{single} = E^{\mathbb{Q}}(e^{-rT} \cdot {}_T p_x \cdot \max(G_T - F_T, 0))$$

Using the Black-Scholes option pricing formula, closed-form solutions can only be derived in the case of a single up-front gross premium (see Equation (3)):

$$\begin{aligned} P_G^{single} &= e^{-rT} \cdot {}_T p_x \cdot E^{\mathbb{Q}}(\max(G_T - F_T^{single}, 0)) \\ &= {}_T p_x \cdot (G_T \cdot e^{-rT} \cdot N(-d_2) - P_S^{single} \cdot N(-d_1)) \end{aligned} \tag{5}$$

where

$$d_1 = \frac{\ln\left(\dfrac{P_S^{single}}{G_T}\right) + \left(r + \dfrac{\sigma^2}{2}\right) \cdot T}{\sigma \cdot \sqrt{T}}, \quad d_2 = d_1 - \sigma \cdot \sqrt{T}.$$

In the case of annual premium payments into the mutual fund, no closed-form solution is available and therefore, Monte-Carlo simulation is applied. The annual guarantee costs are thus, analogously to Equation (1), given by annuitizing the single payment,

$$P_G^{annual} = \frac{P_G^{single}}{\displaystyle\sum_{t=0}^{T-1} {}_t p_x \cdot (1 + r_d)^{-t}}.$$

Annual percentage fee for guarantee costs

Alternatively, guarantee costs can be charged by means of an annual percentage fee of the fund value at the end of each year. To make the case of an absolute guarantee premium and the annual percentage fee comparable, the same total annual premium is assumed to be paid by the policyholder, as in the case where guarantee costs are paid separately and in addition to the gross premium of the base contract, i.e., $P_{total}^{annual} = P^{annual} + P_G^{annual}$. Hence, the adjusted savings premium invested in the mutual fund is residually given by

$$P_S^{annual,\alpha} = P_{total}^{annual} \cdot (1 - k) - P_D^{annual} = (P^{annual} + P_G^{annual}) \cdot (1 - k) - P_D^{annual}.$$

Thus, the sum of annual premium payments for the contract with guarantee, when subtracting a percentage fee, is the same as in the first price presentation when guarantee costs are charged in addition to the gross premium.

Let $F_{t,-}^{\alpha}$ denote the value of the investment fund at the end of the *t*-th year *before* subtracting the fee and $F_{t,+}^{\alpha}$ the value of the investment fund *after* subtracting the fee (after the first year for the first time), i.e.,

$$F^{\alpha}_{t,+} = F^{\alpha}_{t,-} \cdot (1-\alpha), \, t = 1,...,T. \tag{6}$$

Thus, the development of the fund is described analogously to Equation (2) by

$$F^{\alpha}_{t,-} = (F^{\alpha}_{t-1,+} + P^{annual,\alpha}_{S}) \cdot \frac{S_t}{S_{t-1}} = (F^{\alpha}_{t-1,-} \cdot (1-\alpha) + P^{annual,\alpha}_{S}) \cdot \frac{S_t}{S_{t-1}}. \tag{7}$$

Due to the annual subtraction of the percentage fee, the fund value is reduced, which in turn has an impact on the value of the investment guarantee (still fixed at G_T). From the insurer's perspective, α must be calibrated in such a way that the present value of the fee income

$$I^{\alpha}_{G} = E^{\mathbb{Q}}\left(\sum_{t=1}^{T} \alpha \cdot F^{\alpha}_{t,-} \cdot {}_t p_x \cdot (1+r_d)^{-t} \right) = \sum_{t=1}^{T} \alpha \cdot {}_t p_x \cdot (1+r_d)^{-t} \cdot E^{\mathbb{Q}}(F^{\alpha}_{t,-})$$

equals the value of the guarantee at time $t = 0$, i.e.,

$$P^{\alpha}_{G} = E^{\mathbb{Q}}({}_T p_x \cdot (1+r_d)^{-T} \cdot \max(G_T - F^{\alpha}_{T,+}, 0)).$$

Hence, the following must hold for the calibrated value of α:

$$P^{\alpha}_{G} \overset{!}{=} I^{\alpha}_{G}.$$

Thus, for both price presentations of the guarantee costs (absolute and percentage fee) the policyholder pays the same annual premium.

4.3 Calibration of the model

For the empirical survey, the model is calibrated as follows: Contract duration $T = 10$ years, age of the male insured $x = 30$ years, the gross premium $P = 100$, administrative costs $k = 8\%$, the guarantee $G_T = 12{,}000$ (sum of gross premiums), which in the present setting, corresponds to a guaranteed interest rate of 1.68% on the savings premium. Regarding the underlying mutual fund,

we follow Gatzert, Huber, and Schmeiser (2011) (medium-risk fund) and assume that $\sigma = 8.61\%$, that there is a continuous riskless rate of return of $r = 2.15\%$, and that the corresponding discrete riskless rate is $r_D = \exp\ r\ -1 = 2.17\%$. To enhance the understandability of the product, we provide monthly premiums in the questionnaire approximated by $P^{monthly} = P^{annual} / 12$. The resulting prices for different types of price optic and price bundling are laid out in Table 1.

Table 1

Calibrated premiums for empirical survey (payments per month if not stated differently)

Price bunding factor	No Guarantee	Price optic factor	
			Guarantee level: 12,000
Bundling (P)	100	644 first month, then 100	105 / 105 / 1% p.a.
Partial bundling			
Base contract (P)	100	100	100 / 105
Inv. guarantee costs (P_G,)	0	544 up-front	5 / 1% p.a.
No bundling			
Risk premium (P_D)	1	1	1 / 1
Savings premium (P_S)	91	91	91 / 96
Administrative costs (kP)	8	8	8 / 8
Inv. guarantee costs (P_G, α)	0	544 up-front	5 / 1% p.a.

5 Experimental study

5.1 Experimental design for variations in price presentation

To test the hypotheses and to examine under which price presentation conditions an additional interest rate guarantee is chosen, we conducted an experimental study using variations of price presentations of a unit-linked life insurance offer with a guarantee level of 12,000 at the end of the contract term. The offers only differed in the price presentation of the additional guarantee, varying along three conditions of price bundling and three conditions of price optic (see Table 1). The *bundling factor* consists of a single bundled price for the unit-linked life insurance product and the investment guarantee, a partially bundled price with separate prices for the guarantee and the base contract, and a unbundled price presentation with separate prices for the guarantee, the risk premium, the savings premium, and the administration costs. The *optic factor* consists of a product without any guarantee (and thus, no guarantee costs; this product serves as contrast product), a product with an investment guarantee presented as single up-front guarantee cost, a product with monthly guarantee costs, and a product with guarantee costs as a % of the annual fund value. Thus, we find a 3 (bundling: bundled price vs. partially bundled price vs. unbundled price) x 4 (price optic: no guarantee vs. guarantee with single up-front costs vs. guarantee with monthly cost vs. guarantee with costs in percent of the annual fund value) between-subject design, consisting of twelve different variations of price information. Table 2 summarizes the variation of the product cards, corresponding to Table 1.

Table 2

Product offers (No. 1 to No. 12)

| Price bundling factor | *Price optic factor* | | | |
| | *No guarantee* | *Guarantee level: 12,000* | | |
	No guarantee costs	*Single up-front guarantee costs*	*Monthly guarantee costs*	*Guarantee costs in % of the annual fund value*
Bundled (combined price for unit-linked life insurance and guarantee)	Offer 1	Offer 4	Offer 7	Offer 10
Partially bundled (prices for unit-linked life insurance and guarantee are separately presented)	Offer 2	Offer 5	Offer 8	Offer 11
Unbundled (prices for unit-linked life insurance, split up into risk premium, savings premium and fees, and guarantee are separately presented)	Offer 3	Offer 6	Offer 9	Offer 12

_____

One single product card has been given for evaluation to every participant. The product cards are identical over all offers and differ only in the price presentation. They have been pretested from May 3, 2010 to May 4, 2010 in a small Swiss panel (n = 106) regarding the understandability of the product card and the used termini. Accordant adjustments have been made, for example, avoidance of technical terms or definitions to explain inevitable technical terms.[4]

5.2 Sample and survey procedure

The overall experimental design consisted of an online survey (originally in German and French) in which the evaluation of the product cards has been embedded. Within a five day period from May 14, 2010 to May 17, 2010 the questionnaire has been answered by a Swiss panel. The sample of n = 647 is representative for Switzerland regarding gender and region (here only focusing the German and the French speaking part of Switzerland). Thus, there is a subsample of around n = 55 for each product card.

The survey was divided into three sections. In the first section, a product card has been shown to the participants for evaluation. Every subsample only received one product card for evaluation. The consumer evaluation included three dependent variables (selected from Johnson, Herrmann, and Bauer 1999):

- the perceived satisfaction with the offer, measured on a 5 point scale from 1 (not satisfied) to 5 (satisfied),
- the likelihood of recommending the offer, measured on a 5 point scale from 1 (disagree) to 5 (agree),

_____

[4] For the pretest, we gave the participants one product card (in this case, Offer 9) for evaluation. The evaluation included a question where participants evaluated the product regarding its overall understandability on a 7-point scale from 1 = not at all understandable to 7 = absolutely understandable, a list of the used words where the participants had to mark the words they did not understand, comprehension questions where the participants had to mark the right answers, as well as open questions where participants could address criticism and suggestions.

- and the purchase intention, measured on a binary scale from 0 (no) to 1 (yes).

In the second section of the survey, the moderating variable "consumers' experience with financial and insurance products" has been measured, including multiple measures regarding:

- expertise in general selecting the items of Mishra, Umesh and Stem (1993),
- expertise on a personal level selecting the items of Mitchell and Dacin (1996),
- expertise regarding the product prices selecting the items of Kopalle and Lindsay-Mullikin (2003).

These items have been adjusted to the insurance and financial product context and the scales have been unified to a five-point scale ranging from 1 (disagree) to 5 (agree). Additionally, we measured participants' price perception of the product using the items of Adaval and Monroe (2002) and Suri and Monroe (2003), which includes three five-point semantic differentials.

In the third section of the survey, sociodemographic and socioeconomic attributes have been measured, using age, gender, living region, working situation, family status, household income (net), number of children under 18 years, and educational level. Regarding the age of the participants, we concentrated on 25 to 35 year olds.

6 Results of the experimental survey

6.1 Descriptive statistics

Table 3 displays the descriptive statistics and shows that the sample of this age group (25-35 years) is representative for Switzerland regarding gender and region, whereby the quota for region only focused on the German and French speaking part of Switzerland, due to proportions. Most of the participants have an apprenticeship (44.2%) or even a university degree (37.4%) as their highest educational level, work at a fulltime job (60.0%), are married (34.2%) or live in a relationship (30.6%), and have no children under 18 years of age living in their household (64.5%). In addition, most participants have a net household income between CHF 3,000 and CHF 5,000 (32.1%) and between CHF 5,000 and CHF 7,000 (30.4%) per month. To summarize, most of our respondents have a solid educational background, a full-time job, and live with a partner (marriage or relationship) without children.

To test our hypotheses, we conducted three studies as shown in Figure 1: Study 1 uses multivariate analyses of variance (MANOVA) models to test the hypotheses regarding consumer evaluation, based on consumer satisfaction and likelihood of recommending, as is done by, for example, Bauer, Neumann, and Huber (2006) or Johnson, Herrmann, and Bauer (1999). Study 2 uses OLS regression analyses to test the moderating effect of consumer experience. Finally, Study 3 uses logistic regressions to test the hypotheses regarding consumer evaluation, based on their purchase intention. Furthermore, a principal component analysis is conducted in order to reveal the experience factor, our moderating variable, and the price perception factor.

Table 3
Descriptive statistics

Gender

Male	Female	Total
327 (50.5%)	320 (49.5%)	(100%)

Age

25–35 years	Total
647 (100%)	(100%)

Region (of Switzerland)

part	part	Other	part	Total
456 (70.5%)	185 (28.6%)	4 (0.6%)	2 (0.3%)	(100%)

Highest educational degree/diploma

Elementary school	Apprenticeship	Secondary school	University / Technical college	Other	Total
38 (5.9%)	286 (44.2%)	69 (10.7%)	242 (37.4%)	12 (1.9%)	(100%)

Actual job situation

Full-time job	Part-time job	Jobless	Retired	Home-maker	Student (full-time)	Total
388 (60.0%)	138 (21.3%)	19 (2.9%)	4 (0.6%)	56 (8.7%)	42 (6.5%)	(100%)

Household income per month (net, in TCHF)

Under 3	3 - <5	5 - <7	7 - <9	9 - <12	Over 12	Total
92 (14.2%)	208 (32.1%)	197 (30.4%)	84 (13.0%)	51 (7.9%)	15 (2.3%)	(100%)

Family status

Married	In a relationship	Divorced / Widowed	Single	Total
221 (34.2%)	198 (30.6%)	27 (4.2%)	201 (31.1%)	(100%)

Children (under 18 years) living in the household

No child	1 child	2 children	children	Total
417 (64.5%)	121 (18.7%)	89 (13.8%)	20 (3.1%)	(100%)

Table 4 provides a first insight regarding the cell means across product cards and illustrates that consumer evaluation of the 12 different product cards differs only marginally. For example, looking at the satisfaction with the offer, consumer evaluation ranges between 3.19 (Offer 8, partially bundled - monthly guarantee costs) and 2.58 (Offer 12, unbundled price - guarantee cost as a %). The same result can be observed with regard to the likelihood of recommending and the purchase intention. Even the average across the dimensions shows little variance of the means, which suggests that the presentation of price information has only a marginal impact on consumer evaluation. However, further analyses are needed in order to test the hypotheses.

6.2 Principal component analyses

As the basis for the two studies and to test the four hypotheses stated in Section 3, we first conduct two principal component analyses to derive factors describing consumer experience (Study 1 and 2) and price perception (Study 2). Results of the first principle component analysis with orthogonal rotation on the ten collected items that relate to the participants' experience with insurance and financial products are displayed in Table 5.

The Kaiser-Meyer-Olkin measure, KMO = .917, verified the sampling adequacy for the analysis, and all KMO values for individual items were greater than .89. Bartlett's test of sphericity resulted in $\chi^2 = 3656.802$, df = 45, p < .001, and shows that correlations of items were sufficiently large. We retained two factors with an Eigenvalue greater than one (5.562, 1.105), explaining in combination 66.68% of the variance. The component loadings are presented in Table 5. We call the first factor "Consumer Experience (direct)" since these items ask for consumers' experience with insurance or investment products in a direct way. Factor 2 is called "Consumer Experience (indirect)" due to the indirect measurements. We will use these two factors as moderator variable in our model to test Hypothesis 3.

Table 4
Cell means across product cards regarding satisfaction with the offer

Price bundling factor		Price optic factor Guarantee level: 12,000				
		No Guarantee	Single up-front guarantee costs	Monthly guarantee costs	Guarantee costs in % of the annual fund value	Average
Bundled (combined price for unit-linked life insurance and guarantee)	Satisfaction	2.61	2.9	2.89	2.69	2.77
	Likelyhood of recommendation	2.43	2.56	2.63	2.47	2.52
	Purchase intention	0.24	0.73	0.3	0.33	0.29
Partially bundled (prices for unit-linked life insurance and guarantee are separately presented)	Satisfaction	2.95	2.61	3.19	2.76	2.88
	Likelyhood of recommendation	2.56	2.3	2.92	2.54	2.58
	Purchase intention	0.35	1.75	0.33	0.29	0.31
Debundled (prices for unit-linked life insurance, splitted up into risk premium, savings premium and fees, and guarantee are seperately presented)	Satisfaction	2.95	2.59	2.81	2.58	2.73
	Likelyhood of recommendation	2.61	2.44	2.54	2.33	2.48
	Purchase intention	0.35	1.74	0.31	0.23	0.29
Average	Satisfaction	2.84	2.7	2.96	2.68	
	Likelyhood of recommendation	2.53	2.43	2.7	2.45	
	Purchase intention	0.31	0.26	0.31	0.28	

Table 5

Principal component analysis of experience (rotated factor loadings)

Extraction method: Principal component analysis; rotation method: varimax with Kaiser normalization; rotation converged in 3 iterations

	Factor loading	
	Experience (direct)	Experience (indirect)
I am well informed about insurance or investment products.	.775	.375
I have a clear idea about which insurance or investment products I need.	.767	.106
I am familiar with insurance or investment topics.	.763	.400
I have a clear idea about which features in a insurance or investment product contract I need.	.752	.294
I am inexperienced in insurance or investment products. (Rotated)	.728	.287
I know very little about insurance or investment products.	.712	.274
I enjoy telling people how much they might expect to pay for different insurance or investment products.	.172	.798
My family and friends seek my advice in purchase situations of insuarnce or investment products.	.292	.771
I am considered somewhat of an expert when it comes to knowing the price of insurance or investment products.	.264	.753
My friends think of me as a good source of price information regarding insurance or investment products.	.435	.753
Eigenvalue	5.562	1.105
% of variance	37.464	29.212
Cronbach's α	.889	.842

Table 6

Principal component analysis of price perception

	Factor loading Price perception
Extraction method: Principal component analysis; rotation method: varimax with Kaiser normalization	
The price for this product was: low/high	.898
I felt that the product was: cheap/expensive	.895
The price for the product hurts little / a lot to pay	.785
Eigenvalue	2.225
% of variance	74.155
Cronbach's α	.817

The results of the second principal component analysis with orthogonal rotation on the three collected items that relate to participants' price perception of the product are displayed in Table 6. The Kaiser-Meyer-Olkin measure, KMO = .678, verified the sampling adequacy for the analysis, and all KMO values for individual items were greater than .64. Bartlett's test of sphericity resulted in $\chi^2 = 800.789$, df = 3, p < .001, and shows that correlations of items were sufficiently large. We retained one factor with an Eigenvalue of 2.225 and thus greater than one, explaining 74.16 % of the variance, which we call "Price Perception" that will be used as a predictor variable for the logistic regression with component loadings presented in Table 6.

6.3 Study 1: Basic model using MANOVA

In the first study, we use multivariate analyses of variance (MANOVA) models to test the hypotheses regarding consumer evaluation, based on consumer satisfaction and likelihood of recommending. Hypothesis 1a predicts that consumer evaluation of the product augments as prices are bundled presented. Looking at the average satisfaction (Figure 3, left graph) or average likelihood of recommending (Figure 3, right graph) across conditions, no clear trend of an increase or decrease of consumer satisfaction or likelihood of recommending can be observed. Additionally, there is only a low variance of means and a centered tendency in the response behavior. MANOVA analyses confirm this observation. Using Pillai's trace criterion, there was no significant effect of the price bundling dimension on consumer evaluation, as F(df = 4, error df = 1270) = 0.363, p = .835. This implies that there are no significant differences between bundled, partially bundled, and unbundled price conditions regarding the satisfaction with the product and the likelihood of recommending. Thus, Hypothesis 1a has to be rejected. Positive consumer evaluation of an investment product does not augment when price information is bundled.

Figure 3

Average satisfaction (left graph) and average likelihood of recommendation (right graph) across conditions
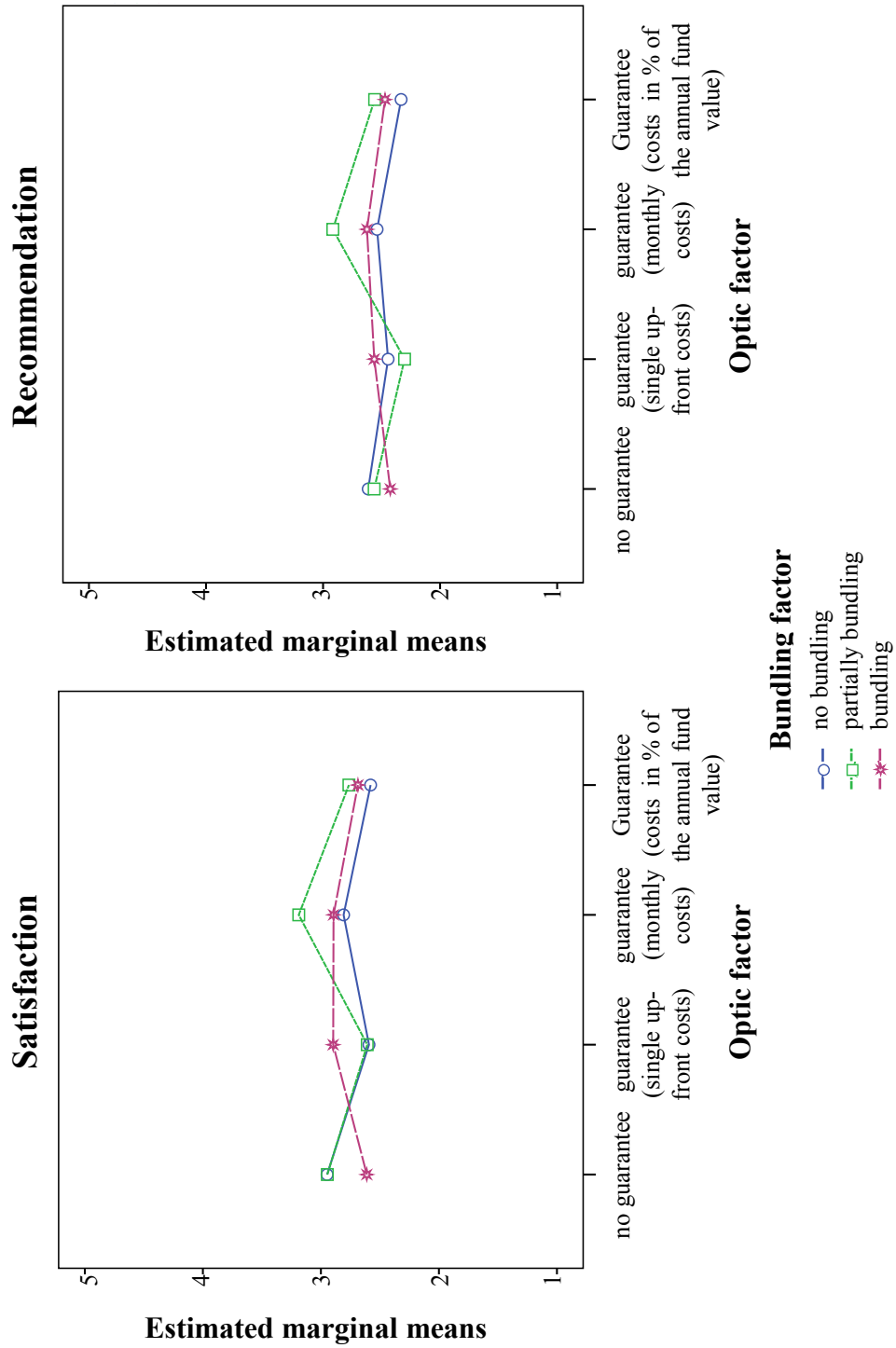
Hypothesis 1b predicts that positive consumer evaluations of an investment product augment as prices are abstractly presented. Again, the cell means of Table 4 do not show any trend, but a strong centered tendency in the response behavior. This can be confirmed by MANOVA. Pillai's trace does not show any significant differences between no guarantee cost, the initial up-front premium, monthly guarantee costs or guarantee costs as a percentage, regarding the satisfaction with the product and the likelihood of recommending, $F(df=6,$ error df $= 1270) = 0.859$, $p = .525$. Therefore, Hypothesis 1b must be rejected as well. Furthermore, there is no interaction between price bundling and price optic, $F(df=12,$ error df $= 1270) = 0.727$, $p = .726$, using Pillai's trace. The between-subject effects are displayed in Table 7, showing no significant effect.

6.4 Study 2: Moderated models

To understand the key drivers of different forms of price presentations on consumer evaluation, we enhance our base model by the moderator experience. To test our hypothesis, we conduct OLS-regression analyses. Firstly, we reduced our model to its most basic components by defining two dummy variables. Specifically, one dummy compares the unbundled versus the bundled price presentation, called "Bundling", while the other dummy, the without guarantee versus with guarantee (using the single up-front guarantee costs) condition, called "Guarantee". Secondly, in order to reduce multicollinearity, we use the factor "Experience (direct)" as moderator and include it as continuous predictor variable. Furthermore, we calculate the interactions between experience and the dummy variables.

Hypothesis 2a predicts that consumer experience with insurance or investment products will moderate the effects of bundling on consumer evaluation Specifically, experienced consumers will be more satisfied / more likely to recommend the offer if prices are presented as a bundle and less satisfied / less likely to recommend the offer if prices are presented unbundled, whereas less experienced consumers will not show different reactions to different price bundling presentations. Testing this hypothesis, we regress the

two dependent variables determining consumer evaluation on the moderator, the dummy variable "Bundling" and the interaction term. Our results show a significant main effect for experience ($b_{satisfaction}$ = -.252, p = .001, $b_{recommendation}$ = -.343, p = <.001). However, no significant interaction can be found. Hence, Hypothesis 2a cannot be confirmed. Table 8 summarizes the results.

Hypothesis 2b predicts that consumers' experience with insurance or investment products will moderate the effects of guarantees on consumer evaluation. Specifically, experienced consumers will be more satisfied / less likely to recommend the offer if no investment guarantee is embedded and less satisfied / less likely to recommend the offer if an investment guarantee is embedded, whereas less experienced consumers will not show different reactions to different price optic presentations. Testing this hypothesis, we regress the two dependent variables determining consumer evaluation on the moderator, the dummy variable "Guarantee" and the interaction term. Our results show a significant main effect for experience ($b_{satisfaction}$ = -.194, p = .016, $b_{recommendation}$ = -.191, p = .015), a non-significant effect for the dummy "Guarantee", and a significant interaction effect ($b_{satisfaction}$ = -.328, p = .040, $b_{recommendation}$ = -.455, p = .004), confirming Hypothesis 2b. Table 9 summarizes the results.

Table 7

MANOVA-based multivariate tests of significance, between-subject effects

Factor	Dependent variable	Between groups sum of squares	Between groups mean square	df	F-statistic	p
Optic	Satisfaction	8.442	2.814	3	1.453	.226
	Liklihood of recommendation	6.465	2.155	3	1.126	.338
Bundling	Satisfaction	2.405	1.203	2	.621	.538
	Liklihood of recommendation	1.186	.593	2	.310	.734
Interaction	Satisfaction	9.724	1.621	6	.837	.542
	Liklihood of recommendation	7.137	1.189	6	.622	.713

Table 8

OLS regressions with interaction term, analyzing the moderating effect of experience on the relationship between bundling and consumer evaluation

Independent variable	Dependent variable	Coefficient (standardized)	t-statistic	p
Experience	Satisfaction with the offer	-.252	-3.253	.001
	Likelihood of recommendation	-.343	-4.490	< .001
Bundling (unbundled vs. bundled)	Satisfaction with the fund	.239	1.535	.126
	Likelihood of recommendation	.215	1.395	.164
Experience × Bundling	Satisfaction with the fund	.202	1.308	.192
	Likelihood of recommendation	.221	1.448	.149

Table 9

OLS regressions with interaction term, analyzing the moderating effect of experience on the relationship between guarantee and consumer evaluation

Independent variable	Dependent variable	Coefficient (standardized)	t-statistic	p
Experience	Satisfaction with the offer	-.194	-2.434	.016
	Likelihood of recommendation	-.191	-2.457	.015
Guarantee (without vs. with)	Satisfaction with the fund	-.150	-.984	.326
	Likelihood of recommendation	-.108	-.727	.468
Experience × Guarantee	Satisfaction with the fund	-.328	-2.061	.040
	Likelihood of recommendation	-.455	-2.924	.004

Additionally, we plot the data using the extreme levels of the moderator variable (spotlight-analysis), by shifting the mean plus one standard deviation (high experience) and minus one standard deviation (low experience). The results for both dummy variables are displayed in Figure 4, using average consumer evaluation. Even though Hypothesis 2a cannot be statistically confirmed, the left graph of Figure 4 reveals the tendency that experienced consumers are more satisfied when product prices are bundled presented and less satisfied when product prices are unbundled presented. The right graph of Figure 4 reflects Hypothesis 2b: For the less experienced there is no difference in consumer evaluation between the without versus with guarantee condition, hence confirming again a centered answer behavior across the two conditions. However, consumer evaluation differs significantly across the two conditions for the more experienced consumers. Specifically, it decreases considerably, when the product is offered with an additional investment guarantee. Overall, the results of the moderated model indicate that the presentation of price information, particularly bundled versus unbundled, and the fact of embedding an additional investment guarantee, generally do not have any predicting power to impact the likelihood of consumer satisfaction with the product and the likelihood of recommending the offer. However, consumer evaluation differs between less and more experience consumers with insurance or investment products. Particularly, very experienced consumers are less satisfied with the product if prices are presented unbundled or additional investment guarantees are embedded.

Figure 4

Average consumer evaluation across conditions of bundling (left graph) and guarantee (right graph) for the spotlight-analyses of experience
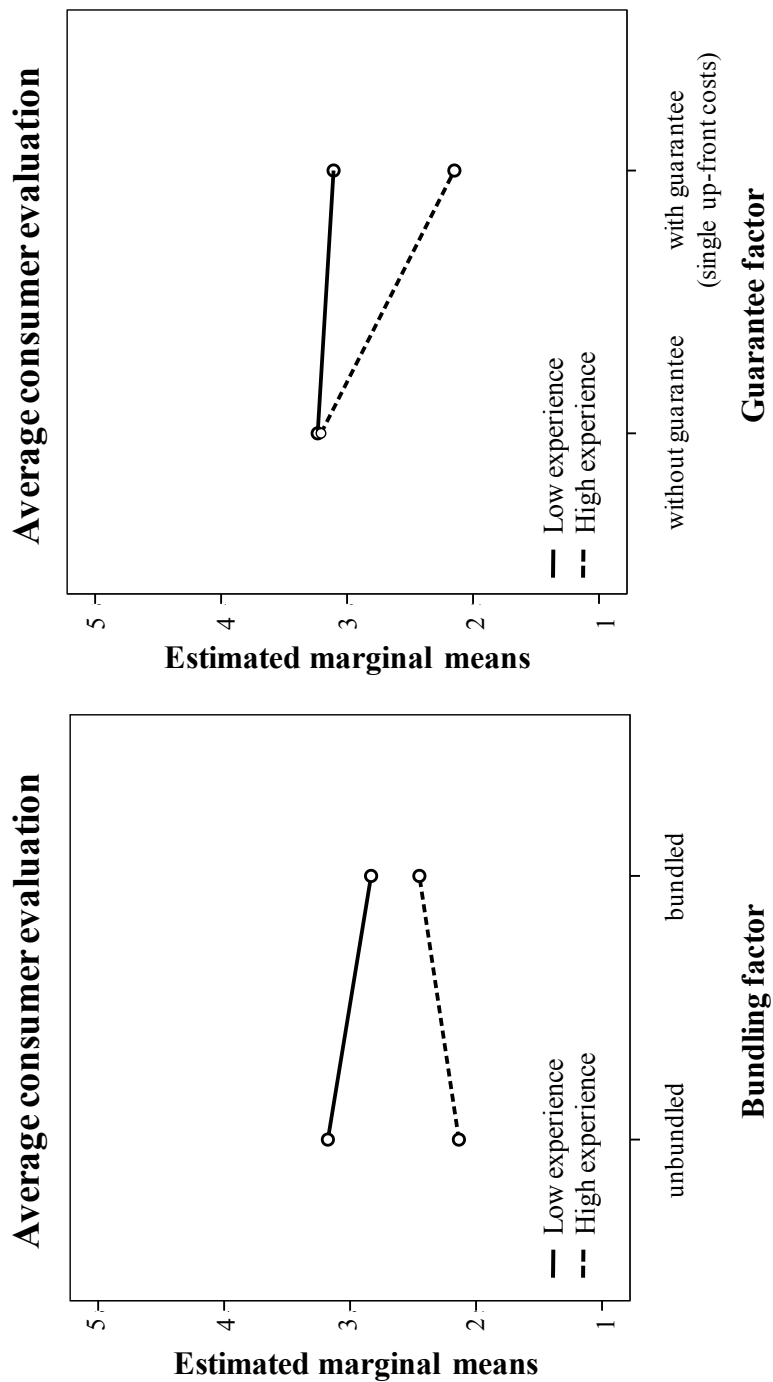
6.5 Study 3: Logistic regression

In the third study, we use binary logistic regressions to test the impact of bundling and price optic on the likelihood of consumer purchase intention of the product. Our hypotheses predict that consumer purchase intention of a product with investment guarantee augments when prices are bundled presented (H3a), and respectively when price are abstractly presented (H3b). Furthermore, we included consumers' experience (indirect) and consumers' purchase intention as predictors in the model to test Hypotheses 4a and 4b. Hypothesis 4a predicts that the more experienced consumers are, the more likely they are to purchase the product. Hypothesis H4b predicts that the lower consumers perceive the price of the product, the more likely they are to purchase the product.

The full model containing all predictors (bundling, optic, experience and price perception) is statistically significant, χ^2 (7, N=647) = 52.37, p < .001, indicating that the model is able to differentiate between participants purchasing and not purchasing the product. The model as a whole with the deviance-2LL=729.259 explains between 7.8% (Cox and Snell R^2) and 11.1% (Nagelkerke R^2) of the variance in purchase intention. Table 10 shows that the factors bundling and optic have no significant effect on the model and thus, Hypothesis 3a and Hypothesis 3b must be rejected. However, the two independent variables "Experience" and "Price Perception" contribute significantly to the model.

When looking at the Odds Ratios of Experience (Wald = 6.264, p = .012) and holding all other variables at their mean levels, we find that the more people that are experienced with insurance or investment products; the more likely it is that they will purchase the product. This confirms Hypothesis 4a. Additionally, when holding all other variables at their mean levels, the odds ratio of 0.55 for "Price Perception" is less than 1, indicating that for every unit that the price is regarded as too expensive, participants were 0.55 times less

likely to purchase the product, controlling for other factors in the model. This confirms Hypothesis 4b.

The results of the logistic regression indicate that the presentation of price information, particularly price bundling—no bundling, partial bundling, bundling—and price optic—no guarantee, guarantee with single up-front cost, guarantee with monthly costs or guarantee with costs in percent of the annual fund value) do not have any predicting power to impact the likelihood of consumers' purchase intention of the product. However, consumers' experience with insurance or investment products as well as consumers' price perception of the product contribute significantly to whether participants purchase or do not purchase the product.

Table 10

Binary logistic regression, predicting likelihood of participants' purchase intention of the product

Variables in the Equation

	β	S.E.	Wald	df	p	Odds ratio	95% C.I. for odds ratio Lower	Upper
Bundling								
no bundling			.011	2	.994			
partially bundled	-.016	.220	.005	1	.944	.985	.640	1.514
bundled	-.023	.223	.011	1	.918	.977	.631	1.514
Optic								
no guarantee			1.309	3	.727			
guarantee (single up-front costs)	-.189	.258	.540	1	.462	.827	.499	1.372
guarantee (monthly costs)	.103	.251	.169	1	.681	1.109	.678	1.813
guarantee (costs in % of the annual fund value)	-.058	.250	.054	1	.816	.943	.578	1.541
Expierence (indirect)	.226	.090	6.264	1	.012	1.253	1.050	1.496
Price perception	-.599	.096	39.149	1	< .001	.549	.455	.663
α	-.969	.093	108.338	1	< .001	.379		

7 Implications and summary

In this paper, we examine whether consumer evaluation (satisfaction and recommendation) and purchase intention for investment guarantees embedded in unit-linked life insurance products depend on different forms of price presentation (bundling and optic) of the guarantee costs by means of an experimental study for a representative Swiss panel. We calculate the prices for the guarantees using risk-neutral valuation and interpret the fair price as a reservation price for an insurance company offering these kinds of guarantees to their consumers. We then analyze whether different forms of price presentations (i.e., single up-front payment for the guarantee; monthly payment; guarantee price as a percentage of the value of the mutual funds) influence consumers' decision and evaluation of the contract. In addition, we allow for different forms of product bundling with respect to the price presentation. Here, products with identical present values are offered to the participants of the experimental study showing the overall price of the product versus viewing the pricing of the different product components (term life insurance with risk premium and savings premium, investment guarantee in the savings part, administration costs).

With regards to price presentation, it turns out from the empirical analysis that neither price bundling nor price optic has a statistically significant effect on consumer evaluation, or on consumer purchase intention of the product. No statistically significant differences between the bundled, partially bundled, and unbundled pricing forms can be confirmed in this analysis. In addition, combinations of different forms of price optic (guarantee prices in different absolute and relative terms) have no substantial impact on the decisions of the participants. Hence, our findings differ in relation to the outcomes of similar empirical studies in the area of consumer goods (see, for example, Johnson, Herrmann, and Bauer 1999). One interpretation is that insurance products are very complex and therefore, differences in the price presentation are not a relevant part of the consumers' decision processes. Another reason could be that at least the participants in our sample turn out to

be very rational decision makers and, in principle, use a present value calculation, in such a way that no differences in the products were noted. In any case and taking into account the fact that detailed price information may not be costless for the consumers, current regulatory efforts in many countries in the European Union that expect insurance companies to provide such kind of information to their consumers may be reconsidered and subject to further empirical studies to confirm or reject the usefulness of such requirements. For insurance companies, the possibility of obtaining new consumers through product bundling and price presentation seems rather limited against the background of the first findings of this study.

However, while the typical marketing mix strategy of different price presentation in the case of unit-linked life insurance products, contrary to typical consumer goods, does not show any statistically significant effects, the results of our empirical analysis show that especially other factors enhance consumer evaluation. Particularly, consumers' experience with insurance or investment products or consumers' price perception of the product turn out to be highly statistically significant predictors for explaining the relationship between the product offer with its price presentation and consumer evaluation or purchase intention of the product. Particularly, very experienced participants are less satisfied with a product if prices are presented unbundled or if additional investment guarantees are embedded, whereas the differences in product offer evaluations of less experienced participants are not significant. On the one hand, this finding confirms that consumers generally prefer bundled price presentations, which is in accordance with the stream of mental accounting literature. However, this only proves true for very experienced consumers. Thus, on the other hand, the finding approves the above mentioned interpretation of the high complexity of insurance products, making less experienced consumers not even register the differences in price presentation for their decision process. Even though further research is needed and other predictors could be additionally examined, it can be tentatively concluded that, in the case of life insurance products, insurance companies should set a stronger focus on more consumer-oriented and more emotionally charged

factors, along with a reduction of complexity, rather than on different price presentation formats, when intending to obtain new consumers.

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PART III

THE EFFECTS OF RATINGS ON FINANCIAL DECISION-MAKING

Abstract

How do investors evaluate financial products? We propose that investors' financial decisions are influenced by third-party information highlighted by product ratings or certifications. Particularly, we provide an experimental study to investigate the effects of ratings on financial decision-making. Results show that participants' product evaluations and risk perceptions differ if the investment product is framed by a positive versus negative versus no rating. Our findings also reveal that products are evaluated significantly higher for those with a positively framed rating and significantly lower for products with negatively framed rating compared to un-rated products. Furthermore, risk perception is lower for the positively framed and higher for the negatively framed products. Additionally, we find that risk perception has a mediating effect on the relationship between ratings and product evaluations. Lastly, we demonstrate the moderating role of participants' expertise and susceptibility to informational influence on this relation. Due to the considerable impact of ratings on product evaluations, these findings have crucial implications for companies' marketing strategies as well as for regulatory authorities regarding assurance of quality ratings and rating provider methods.[5]

1 Introduction

Consumer financial decision making has serious implications for the economy and society. But as the recent financial crisis demonstrates, consumers are often ill informed about the potential consequences of their investments. In this context, consumer financial literacy plays a crucial role. Generally, consumers have limited knowledge of financial and insurance products and thus, it is difficult for them to find appropriate investment products and make sound investment decisions (Hogarth 2006). Given this, consumers are prone to make inappropriate investment choices that can be costly and impacts inter alia consumer fortunes, savings, retirement planning, mortgage holdings and other investments (Lusardi and Mitchell 2009). Hence, the limited financial literacy of consumers is a concern for governments. Due to such low financial literacy levels, the Organization for Economic Cooperation (OECD) and other government-related organizations (The Financial Consumer Agency of Canada, National Endowment for Financial Education (NEFE), or National Pensions Awareness Campaign by the Pensions Board) launch several projects in recent years to improve financial education standards by developing common financial literacy principles resulting in better investment decisions and protection against (elder) poverty.

In order to improve product communication and understandability due to generally low levels of consumer financial literacy and also to differentiate from competitors, financial product providers are more often using product ratings or certifications for their advertisements. There are a number of financial services companies that work with solicited ratings and undertake an assessment by a ratings provider, which focus on different assessment criteria, for example the best rate-return ratio, quality of client services or even more abstract topics, such as the company's environmental engagement, etc. For instance, TÜV-SÜD[6], targeting private investors, assigns a certification to particular funds, confirming that the proofed company and the fund provide objective, independent fund selection and high-quality customer counsel in

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[6] www.tuev-sued.de/fondsauswahl

terms of their investment decisions. There are also a number of unsolicited ratings, such as Morningstar-Rating[7], which are used by private and professional investors to assess funds quantitatively, concerning risk-costs-return ratios and then rating them on a scale of one (very poor) to five stars (excellent), as well as qualitatively, by providing recommendations. These ratings or certifications aim to endow private and professional investors with neutral and objective third-party opinions, provide transparency for the fund or financial services company and thus, help investors navigate among numerous offers and consequently, make more fully-informed investment decisions.

However, the quality of ratings provider evaluations is not always fully given, for example, in cases where different time-horizons for the analyzed products are used, which leads to biased ratings results (see inter alia Morey 2002). Similarly, as the recent financial crisis shows, credit ratings by traditional rating agencies, such as Standard and Poor's, Moody's or Fitch, often do not fully correspond to the real default risk of a company, are temporally delayed, or not fully objective. Even regulations, such as, for example Basel II or Solvency II, cannot fully avert this tendency. However, strong trust in these ratings remains, even among financial professionals, who make their decisions based on such third-party opinions (Hellwig 2009). Furthermore, empirical evidence shows that there is also a strong market response to rating changes (see inter alia, Halek and Eckles 2010). This means that ratings, or certifications, might have a huge impact on investors' financial decision making, even when such ratings do not fully reveal all information, with an even more serious effect on less-knowledgeable investors.

In this paper, we provide an experimental study analyzing the effects of rating on investors' financial decision-making. Particularly, we examine whether ratings of investment products influence consumer evaluations of investment products as well as their risk perception, and hence, sway investor demand. In other words, does a third-party opinion—presented as a certification or product rating— influence investors' product evaluations and

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[7] www.morningstar.com

thus, dictate their choice of whether or not to invest in a particular financial product?[8] Further, we propose that ratings also have a significant influence on investors' risk perceptions of specific products, and shed further light on the relationship between ratings, risk perceptions and product evaluations by analyzing the mediating effect of risk perception. Lastly, we show that investment decisions are moderated by investors' expertise with financial products as well as their susceptibility to informational influence. We assume that the effects will be greater for individuals with little expertise and high susceptibility to informational influences. For the analysis, we conduct a between-subject design using under-graduate students that experimentally manipulates an investment fund with different rating conditions.

The paper is structured as follows. Section 2 provides a survey of the relevant literature and theoretical background on which we derive our hypotheses and experimental design as laid out in Section 3. Section 4 presents the results and Section 5 discusses implications and conclusion.

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[8] In this experimental study, the focus regarding third-party opinion is on ratings or certifications. Any effects of other third-party opinions, for example, those of financial intermediaries, are not considered in the experimental design.

2 Conceptual development

2.1 Ratings, certifications, and framing: The influence on financial decision-making

Framing effects are the result of reliance on how information is presented (Tversky and Kahneman 1981, 1986; Kahneman and Tversky 1984). Tversky and Kahneman (1981) show that different framing of the same problem leads to different perceptions of the decision problem as well as different evaluations of probabilities and outcomes. The authors also show that decision framing contradicts basic principles of rational choice (Tversky and Kahneman 1986). From normative theory, deviating behavior arises in the financial decision-making process with risky or probabilistic choices (see Johnson et al. 1993; Wakker, Thaler, and Tversky 1997; or for an overview, see, e.g., Camerer and Loewenstein 2003).

Similar to credit ratings by the major rating agencies (Doherty and Phillips 2002), product ratings or certifications are increasingly used as part of the marketing strategies of financial services companies as a potential competitive differentiator. For instance, US fund companies prefer to show ratings in their advertising materials rather than performance history (Morey 2005; Vinod and Morey 2002). This is especially because the use of performance information in the advertising of US registered firms is highly regulated and requires extensive disclosures. This concern can be avoided by using certifications or ratings in advertisements as differentiator. The literature also shows that ratings, in general, influence investors' financial decision-making: This proves true for average consumers in terms of selecting a provider or product as a result of a specific offer, when evaluating the product and defining their willingness to pay/invest (Berger, Cummins, and Tennyson 1992; Morey 2005; Vinod and Morey 2002) as it also does for professional investors in terms of indicating a firm's financial strength or investment risk, or avoiding providers or products with ratings under a certain threshold (Pottier and Sommer 1999).

Regarding the analysis process of rating providers, product ratings are based on different focuses, e.g., fund choice quality, client service quality, the environmental engagement of the company, understandability of the products, best rate-return relation, lowest fees, etc. Depending on the particular type of rating (solicited versus unsolicited) or the ratings provider, financial services companies are rated based on whether the company or its products fulfill a specific criterion catalogue. The result can provide investors with a positive feeling about a particular fund or company since the product or company is assessed by a third party, and therefore, may influence his or her investment choices. However, rating provider methodologies are not always perfectly objective, e.g., in the case of solicited ratings, or valid, e.g., regarding the focus of the criteria, or reliable and comparable, e.g., in the case of seasoned versus younger products. Thus, the results of ratings analyses can be biased (see, for example, Morey 2002).

Depending on how such ratings are analyzed and presented, fund or investment company ratings can show the rated product or company in a positive or negative light. Thus, we assume that ratings or certifications have a framing effect on consumer financial decision-making. However, as the literature shows, negative framing significantly influences decision-making, which is examined, generally, in the Asian disease problem (Tversky and Kahneman 1981). In the case of ratings, literature shows evidence of an asymmetric market response to analyst rating changes in terms of significant reactions to rating downgrades but only limited reactions to rating upgrades (see Eckles and Halek 2011; Halek and Eckles 2010; Epermanis and Harrington 2006; Goh and Ederington 1993; Hand, Holthausen, and Leftwich 1992). In the case of insurer ratings, Epermanis and Harrington (2006) find abnormal premium growth due to changes in financial-strength ratings. Particularly, they find a significant premium decline after a rating downgrade, but no significant changes in the premium volumes due to rating upgrades. Similarly, Halek and Eckles (2010) document a significant fall in share prices due to a rating downgrade, but only little effect of a rating upgrade on share prices. These asymmetric market reactions might be induced by a

corresponding asymmetric change in risk perception, which determines investor behaviors (see e.g., Sitkin and Weingart 1995; Slovic 1987, 2000).

Thus, in line with previous literature, we expect that participants over-evaluate (under-evaluate) products with a positive (negative) rating. Similarly, we expect that participants' risk perceptions decrease (increase) in the positive- (negative-) rating condition. In this context, we further assume a mediating effect of risk perception in the relationship between rating, risk perception and product evaluation. Thus:

H1: Compared to an un-rated investment fund, participants' positive evaluations of an investment fund increase (decrease) as the product is framed by a positive (negative) rating. This includes evaluations of perceived satisfaction with the fund, perceived likelihood of recommending the fund to others, perceived likelihood of investing in the fund, and perceived overall product impression.

H2: Compared to an un-rated investment fund, participants' risk perception of an investment fund decreases (increases) as the product is framed by a positive (negative) rating.

H3: Risk perception mediates the effect of different ratings conditions on product evaluations. This includes evaluations of perceived satisfaction with the fund, perceived likelihood of recommending the fund to others, perceived likelihood of investing in the fund, and perceived overall product impression.

The alternative hypotheses predict that rating has no effect on product evaluations and risk perception, respectively.

2.2 The moderating role of financial expertise on financial decision-making

We propose that participants' expertise with financial products and markets may emerge as a significant moderator in the relationship between

ratings and product evaluation. We base our hypothesis on the literature stream of financial literacy, i.e., the ability of understanding finance. Financial literacy plays a crucial role in financial decision-making since it enables consumers to make sound investment decisions inter alia regarding retirement planning or other important financial matters (see e.g., Hilgert, Hogarth, and Beverly 2003). Lusardi and Mitchell (2007) show a positive correlation between financial literacy and financial expertise (or a "self assessment of financial literacy" as they call it), thus finding financial expertise to be a good predictor of financial decision-making. Despite governmental efforts to improve financial education, and hence consumer financial literacy, studies show consumers largely remain financially illiterate, mostly among vulnerable demographic groups (e.g., those least educated and minorities); most consumers lack basic financial knowledge and numeracy (see, e.g., Bernheim 1995, 1998; Hilgert and Hogarth 2002; Lusardi and Mitchell 2007, 2008, 2009; Mandell 2008; Mitchell 2009; OECD 2005, etc.). Typical consumers lack even a basic understanding of financial concepts, such as interest rates, probabilities, risk diversification or inflation (Hancock 2002; Agnew and Szykman 2005).

Additionally, today's financial products are increasingly complex and sophisticated, a fact that enhances the need for better financial education. The recent financial crisis offers evidence that a combination of financial illiteracy and highly complex products can result in flawed consumer decision-making. Examining the connection between financial knowledge and behavior, Hilgert, Hogarth, and Beverly (2003) focus on four financial management activities: cash-flow management, credit management, saving, and investment to find that financial knowledge can be statistically linked to financial practice. Those with a greater financial knowledge or experience have higher index scores in financial practice. Further, individuals with limited financial literacy often choose mutual funds with higher fees (Hastings and Tejeda-Ashton 2008) and have a lower likelihood to invest in stocks (Christelis, Jappelli and Padula 2010; Rooij, Lusardi, and Alessie 2007). Likewise, Stango, and Zinman (2008) demonstrate that people unable to calculate interest rates correctly accumulate less and borrow more. These findings emphasize the importance of improved

financial education and literacy. However, they also have implications for financial product design, which might require simplification of the products themselves, as well as simplification of communication forms, such as avoiding percentage information, mathematical calculations, technical terms or numerical data. Lusardi and Mitchell (2009) suggest providing guidance and financial advice for financial decisions, an aspect that can also be achieved via third-party ratings.

Thus, in line with extant literature, we assume that the influence of ratings may be stronger for participants with less financial expertise since they are presumably less capable of analyzing the financial information given in a fact sheet. We predict that:

H4:   Financial expertise will moderate the effects of different rating conditions on product evaluation. Particularly, the higher financial expertise is, the lower is the effect of rating on product (satisfaction, likelihood of recommendation, likelihood of investing and overall product impression).

The alternative hypothesis predicts that there are no differences in product evaluations between the groups.

2.3 The moderating role of susceptibility to informational influence

Lastly, we assume a moderating effect of participants' susceptibility to informational influence based on the literature stream of susceptibility to interpersonal influence, i.e., the attitude of information seeking about products by orienting to the behaviors or opinions of other (more knowledgeable) individuals, the so called susceptibility to informational influences, or of conforming to others' expectations regarding purchase decisions, the so called susceptibility to normative influences (see Bearden, Netemeyer, and Teel 1989, 1990). In this study, we focus on the informational influences that arise either from an active request for information or knowledge about a product from

others or from a passive observation of the behavior of others (Park and Lessig 1977). In doing so, the decision-maker increases his/her knowledge in order to make sounder and better-informed decisions.

The literature on susceptibility to interpersonal influence focuses primarily on its impact on decision-making regarding conspicuous products, such as garments, cosmetics or cars (see inter alia Bearden, Netemeyer, and Teel 1989, 1990; Bearden and Rose 1990; Chao and Schor 1998; Mangleburg, Doney, and Bristol, 2004; Meyer and Anderson 2000; or Mourali, Laroche, and Pons 2005). However, especially in the case of uncertainty or risk, humans often use social information in the decision-making process (Mitchell and McGoldrick 1996). Thus, susceptibility to informational influences might especially prove true for choices about investment products. Hoffmann and Broekhuizen (2009) confirm this, showing that consumers who lack the necessary investment-related knowledge are highly susceptible. Additionally, they demonstrate that particular susceptibility to informational influence plays a significant role in influencing consumer investment choices and shaping investment behaviors.

Furthermore, susceptibility to social influences in investment behavior is also linked to herding behavior (De Bondt 1998; Hoffmann and Broekhuizen 2009). Herding, i.e., the similar investment behavior of groups based on actual trends or information, often results in an amplification of volatility, market destabilization and possibly, in bubbles in the financial system (Hirshleifer 2001; Shiller 1995). Hence, susceptibility to informational influences plays a crucial role in financial decision-making. We assume that ratings provide an informational source to investors, particularly in the case of non-professional investors.

Thus, we propose:

H5: Susceptibility to informational influences moderates the effects of different rating conditions on product evaluation. Particularly, the

higher susceptibility to informational influences is, the higher is the effect of rating on product (satisfaction, likelihood of recommendation, likelihood of investing and overall product impression).

The alternative hypothesis predicts that there are no differences in product evaluations between the groups.

In order to examine the effects of ratings on financial decision-making, the complete conceptual research model is presented in Figure 1. The framework's underlying logic is that, depending on the rating information (no rating versus positive rating versus negative rating) participants evaluate products differently. Our analysis can be outlined as follows. In the first step, we check for the influence of different rating conditions on product evaluation and risk perception. In the second step, we shed further light on the relationship between rating, risk perception and product evaluation and analyze the mediating effect of risk perception. Finally, we investigate the moderating role of participant expertise in financial products and markets and participant susceptibility to informational influence on this relationship.

Figure 1

Research model

	Base model
Independent variable ... *Dependent variables* Rating • *un-rated* • *positive* • *negative* → H1 → Product evaluation; → H2 → Risk perception	**Base model** Between-subject design using multivariate analysis of variance
Mediator Risk perception; *Independent variable* Rating • *un-rated* • *positive* • *negative*; *Dependent variable* H3 → Product evaluation	**Mediated model** Between-subject design using OLS regression analyses to assess the mediating effect of risk perception on the relationship between rating and product evaluation
Moderators • Expertise • Susceptibility to informational influence; *Independent variable* Rating • *un-rated* • *positive* • *negative*; *Dependent variable* H4 H5 → Product evaluation	**Moderated model** Between-subject design using OLS regression analyses to assess the moderating effect of participants' expertise and susceptibility to informational influence on the relationship between rating and product evaluation.

3 Experimental study

To test our hypotheses, we conduct an experimental study that examines the relationship between a fund product rating and product evaluation, regarding satisfaction, likelihood of recommendation, likelihood of investing in the product and overall product impression, as well as participant risk perceptions to test whether a ratings framing effect exists. To do so, we ask participants to evaluate an investment fund fact sheet with a positive rating versus a negative rating versus an un-rated fund. Hence, we provide a one-factor (rating: no rating versus positive rating versus negative rating), between-subject design to test the basic effect of ratings on participant evaluations and risk perceptions.

3.1 Independent variable manipulation

The investment product depicted by the fact sheet (Appendix, Figure A.1) is a fund that invests nearly 100% of its holdings in select Swiss stocks of the SMI Index. Performance is presented for the current year (1 January 2011 – 28 March 2011), with a total return (μ) of 4.95%, including dividends and net of fees to the fund manager, and with a volatility (σ) of 24.32%. The fact sheet per se, presented in Figure A.1 in the Appendix, is designed in the style of typical fact sheets provided by banks, insurance companies or other fund providers. We manipulate our independent variable by including (removing) a rating in the fact sheet of the investment fund. The manipulated factor is whether the investment product is described in the fact sheet with a positive, negative or no rating. The rating is pretested regarding its appearance as a serious and professional certification from a trustworthy and recognized institution. The positively framed rating is presented as a ―five of five stars - excellent fund" emphasizing product excellence while the negatively framed rating is a ―one of five stars - very poor fund," emphasizing poor product rating from a known institution (see Figure A.2 in the Appendix).

3.2 Sample

A total of 241 undergraduate business administration students (69% men, 31% female, mean age = 22) from the University of St. Gallen, Switzerland, participate in the study. Since the aim of this study is to test the general statistical effect of ratings on financial decision-making, we use a knowledgeable sample, in order to avoid any biases or centered answer behaviors due to lack of understanding for the financial terms used in the fact sheet.

We control for participants' financial literacy using the sophisticated financial literacy items of Lusardi and Mitchell (2007), and obtain 77% of correct answers on average. Further, participants have completed finance and accounting classes and are thus able to deal with and evaluate the financial information provided in the fact sheet and aware of rating agency criticisms inter alia during the financial crisis.

3.3 Procedure

Participants are randomly assigned to one of the three conditions (no rating versus positive rating versus negative rating) in the between-subjects design and asked to evaluate the offer via questionnaire. The questionnaire is originally developed in German and contains the following parts, in order: i) cover letter; ii) questionnaire measuring financial expertise and susceptibility to informational influence; iii) a customary fact sheet of the investment fund for the participant to evaluate (see Figure A.1 in the Appendix); iv) questionnaire for evaluation of the investment fund and participant risk perceptions; v) checks of the control variables (regarding financial literacy, income and gender); and vi) manipulation checks.

The fact sheet is introduced by the following setting:

"Assume that you would like to invest a part of your savings in the stock market and you already own a small portfolio. During your research, you find a new fund that invests nearly 100% in Swiss stocks, which would fit very well in your portfolio. The following fact sheet is available for your assessment of the fund."

In the end, participants are thanked for their participation. Furthermore, as an incentive, participants can sign up for a chance to win free movie tickets.

3.4 Measurements

All items in the study are measured on an eight-point scale and the wording is modified for the context. Three dependent variables are collected: product evaluation, risk perception and trust. Adapted from Johnson, Herrmann, and Bauer (1999), evaluation of the fact sheet is measured via four items regarding: perceived satisfaction with the fund ("not satisfied / satisfied"); the likelihood of recommending the investment fund ("not likely / very likely"); the likelihood of investing in the fund ("not likely / very likely"); and the overall product impression ("very poor impression / very good impression"), reaching a reliability level of $\alpha = .914$. Perceived risk is measured using four items ("There is a good chance I will make a mistake if I invest in this fund;" "I have a feeling that investing in this fund will really cause me a lot of trouble;" "I will incur some risk if I invest in this fund;" and "An investment in this fund is risky," $\alpha = .888$), using the items of Laroche et al. (2005), respectively and Stone and Grønhaug (1993).

Furthermore, the two moderator variables, financial expertise and susceptibility to informational influence, are gauged. Consumer financial expertise is measured using four items of Mishra, Umesh, and Stem (1993) ("know only little / know very much about," "inexperienced / experienced," "uninformed / informed," "novice buyer / expert buyer"), reaching a reliability level of $\alpha = .929$. Susceptibility to informational influence is measured via four informational items ("To make sure I buy the right product or brand, I often

observe what others are buying and using;" "If I have little experience with a product, I often ask my friends for advice;" "I often consult other people to help choose the best alternative available from a product class;" and "I frequently gather information from friends or family about a product before I buy," $\alpha = .829$) selected from Bearden, Netemeyer, and Teel (1989). Lastly, to measure the financial literacy control variable, we use the questionnaire of Lusardi and Mitchell (2007), which includes eight questions on sophisticated financial literacy. We create a financial literacy index by summing the number of correct answers for each participant.

4 Results and discussion

To test our hypotheses, we first test the base model to examine the effects of rating on evaluation of the investment product, based on participant satisfaction, likelihood of recommendation, likelihood of investing and overall product impression using multivariate analyses of variance (MANOVA) and on participant risk perceptions of the investment product using univariate analyses of variance. In the second step, we test the enhanced models to gather further insights by examining the mediating role of risk perception on the relationship between rating and product evaluation as well as the moderating role of participants' financial expertise and susceptibility to informational influence using OLS regressions.

4.1 Manipulation checks

Manipulation checks are conducted to ensure that the three rating conditions are manipulated successfully. Participants rate the stimulus on the following three eight-point, Likert scales: "The rating evaluated the investment fund positively." ($M_{without Rating} = 2.96$, $M_{pos. Rating} = 6.89$, $M_{neg. Rating} = 1.60$; $F(df=2) = 241.339$, $p < .001$); "The rating evaluated the investment fund negatively." ($M_{without Rating} = 2.58$, $M_{pos. Rating} = 1.84$, $M_{neg. Rating} = 7.25$; $F(df=2) = 595.401$, $p < .001$); "No rating information existed on the fact sheet." ($M_{without Rating} = 7.12$, $M_{pos. Rating} = 1.45$, $M_{neg. Rating} = 1.27$; $F(df=2) = 756.301$, $p < .001$). Hence, it we can conclude that the rating manipulation is successful.

4.2 Test of group homogeneity and financial literacy

Before hypotheses testing, we use several ANOVAs to assess whether the three experimental groups are homogenous regarding the exogenous variables gender and age. Results show that there are no differences with respect to gender ($p > .190$) and age ($p > .432$). Furthermore, we tested group homogeneity of the individual variables financial expertise, susceptibility to informational influence and financial literacy which we use as moderator and

control variables. The analyses reveal that the three groups do not differ regarding financial expertise ($p > .133$), susceptibility to informational influence ($p > .407$) and financial literacy ($p > .377$). Results of the ANOVAs confirm homogeneity between the three experimental groups. Furthermore, analyses of the financial literacy questionnaire reveal that participants reach, on average, an overall level of 77% correct answers. The single percentage of correct answers per question is displayed in Table 1, which indicates a relatively high level of financial literacy.

4.3 Base model

Hypothesis 1 predicts that, compared to the un-rated investment fund, participants' positive evaluations of the investment fund increases as the product is framed by a positive rating and decreases as the product is framed by a negative rating. For product evaluation, we use the items: perceived satisfaction with the fund, perceived likelihood of recommending the fund to other people, perceived likelihood of investing in the fund and perceived overall product impression. Table 2 presents the cell means and standard deviations across the various rating levels. As expected, the average product evaluation is better for the fund that includes a positive rating than for the product without any rating or with a negative rating. However, the differences in participants' evaluations tend to be more substantial between the un-rated product and the negative rating product than between the un-rated product and the positive rating product.

Table 1

Results of sophisticated financial literacy questionnaire

Sophisticated financial literacy	% of correct answers
Function of stock market	92.90
Knowledge of mutual funds	88.00
Relationship between interest rates and bond prices	42.30
Safer: company stock or mutual fund	63.50
Riskier: stocks or bonds	84.60
Long period returns	85.50
Highest fluctuations	61.00
Risk diversification	89.60

Table 2

Cell means of product evaluation across rating levels (standard deviations parentheses)

	Negative rating (n=74)		Un-rated (n=81)		Positive rating (n=86)		Average (n=241)	
Satisfaction with the fund	3.14	(1.34)	4.38	(1.61)	4.86	(1.55)	4.17	(1.67)
Likelihood of recommendation	2.24	(1.02)	3.51	(1.63)	4.01	(1.70)	3.30	(1.66)
Likelihood of investing	2.08	(1.18)	3.33	(1.67)	3.78	(1.74)	3.11	(1.71)
Overall product impression	3.04	(1.18)	4.15	(1.28)	4.74	(1.39)	4.02	(1.46)
Average	2.63	(1.18)	3.84	(1.54)	4.35	(1.60)	3.65	(1.63)

Table 3

MANOVA-based multivariate tests of significance, between-subject effects

Factor	Dependent variable	Between groups sum of squares	Between groups mean square	df	F-statistic	p
Rating	Satisfaction with the fund	117.899	58.950	2	25.817	< .001
	Likelihood of recommendation	126.622	63.311	2	28.319	< .001
	Likelihood of investing	113.597	56.799	2	23.258	< .001
	Overall product impression	112.988	56.494	2	33.702	< .001

The left part of Figure 2 illustrates this tendency using the scale mean of the items: perceived satisfaction, likelihood of recommendation, likelihood of investing and overall product impression. MANOVA analyses confirm this observation, controlling for financial literacy. Using Pillai's trace criterion, there is a significant main effect of rating on product evaluation, as F(df=8, error df=466) = 8.256, p < .001. This implies that there is a significant main effect between the un-rated, positive- and negative- rated conditions regarding participant satisfaction, likelihood of recommendation, likelihood of investing and overall product impression. The between-subject effects are displayed in Table 3, showing a significant effect of each item on a p < .001 level.

Additionally, we compare the groups using simple contrast procedures that involve comparison between: (a) the positive-rating and un-rated condition and (b) the negative-rating and un-rated condition. As expected, the positive-rating condition produces a more positive product evaluation than the no-rating condition for all four product evaluation items (Satisfaction: $M_{\text{without Rating}}$ = 4.38, $M_{\text{pos. Rating}}$ = 4.86, p = .035; Recommendation: $M_{\text{without Rating}}$ = 3.51, $M_{\text{pos. Rating}}$ = 4.01, p = .050, Likelihood of investing: $M_{\text{without Rating}}$ = 3.33, $M_{\text{pos. Rating}}$ = 3.78, p = .082; Overall product impression: $M_{\text{without Rating}}$ = 4.15, $M_{\text{pos. Rating}}$ = 4.74, p = .003, whereas the negative-rating condition induces a significantly lower product evaluation for all four items (Satisfaction: $M_{\text{without Rating}}$ = 4.38, $M_{\text{neg. Rating}}$ = 3.14, p < .001; Recommendation: $M_{\text{without Rating}}$ = 3.51, $M_{\text{neg. Rating}}$ = 2.24, p < .001; Likelihood of investing: $M_{\text{without Rating}}$ = 3.33, $M_{\text{neg. Rating}}$ = 2.08, p < .001; Overall product impression: $M_{\text{without Rating}}$ = 4.15, $M_{\text{neg. Rating}}$ = 3.04, p < .001). Thus, hypothesis 1 is confirmed.

Hypothesis 2 predicts that, compared to un-rated investment funds, participant risk perceptions of an investment fund decreases (increases) as the product is framed by a positive (negative) rating. Table 4 presents the cell means and standard deviations across the various rating levels. As expected, this illustrates that participant risk perceptions are greater for products with negative ratings than for those without any rating than for those with a positive

rating. Again, the difference in risk perception tends to be more substantial between the un-rated product and the negative rating product than between the un-rated product and the positive rating product; see also the right graph of Figure 2.

Table 4

Cell means across rating levels (standard deviations in brackets)

	Negative rating (n=74)		Un-rated (n=81)		Positive rating (n=86)		Average (n=241)	
Perceived risk	5.40	(1.49)	4.94	-1.53	4.69	(1.21)	5.01	(1.41)

A single-factor (rating: without, with positive rating, with negative rating) ANOVA confirms this observation, controlling for financial literacy. This analysis reveals a main effect for the kind of rating condition on participant risk perceptions, $F(df=2, \text{ error } df=235) = 4.174$, $p = .017$, which implies that there is a significant main effect between the un-rating, positive-rating and negative-rating conditions regarding participant risk perceptions. Additionally, we compare the groups using simple effect procedures, which involve comparison between: (a) the positive-rating and un-rated condition and (b) the negative-rating and un-rated condition. While there is no significant difference between the un-rated condition and the positive-rating condition ($M_{\text{without Rating}} = 4.94$, $M_{\text{pos. Rating}} = 4.69$, $p = .278$), the negative-rating condition creates a significantly higher risk perception than the no-rating condition ($M_{\text{without Rating}} = 4.94$, $M_{\text{neg. Rating}} = 5.40$, $p = .075$). Hence, hypothesis 2 is partially confirmed.

Figure 2

Average product evaluations across conditions (left graph) and average risk perception across conditions (right graph)
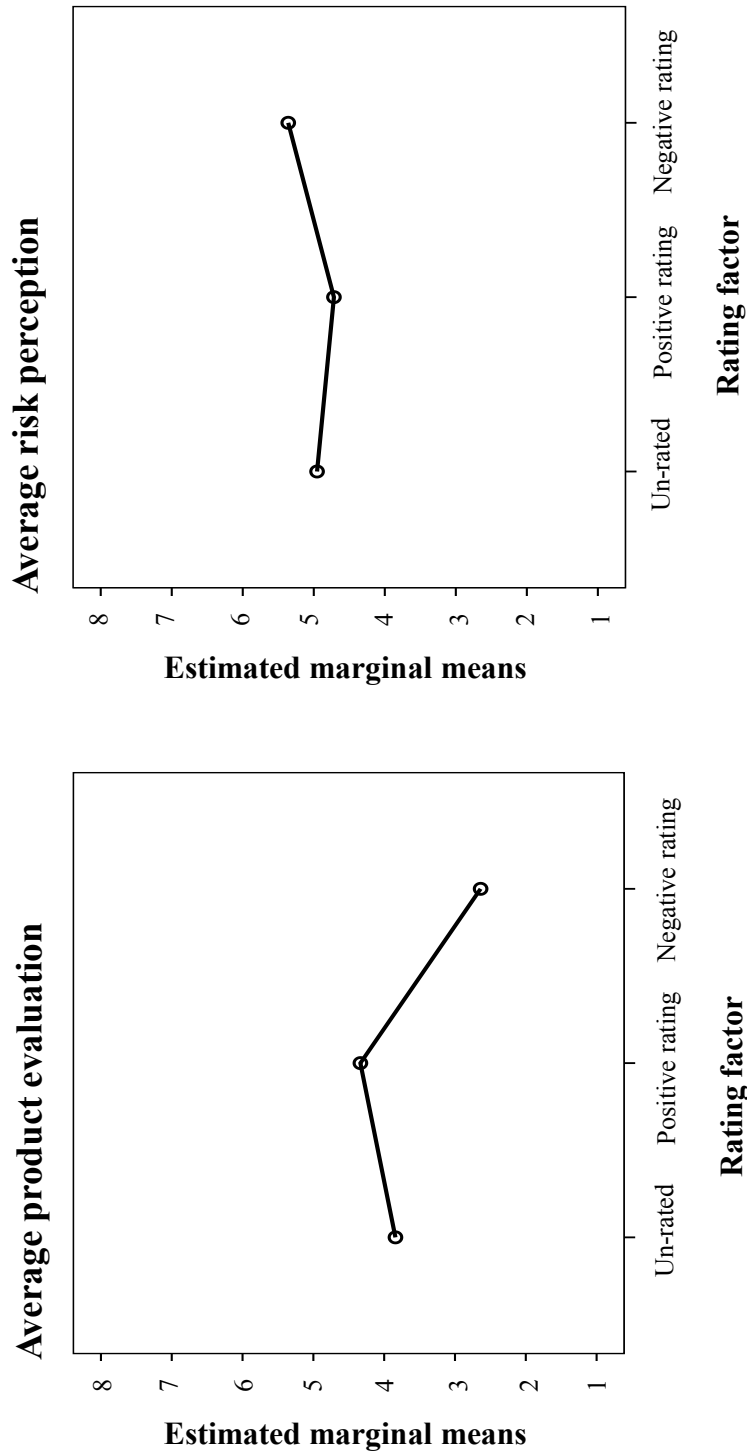
4.4 Mediated model

In order to better understand the relationship of ratings, risk perceptions and product evaluations, further analysis is undertaken, examining the mediating role of risk perceptions on the influence of ratings on product evaluation (Hypothesis 3). For this analysis, we effect coded the independent variable (negative rating = -1, without rating = 0, positive rating = 1) and follow the recommendations of Baron and Kenny (1986), as well as Preacher and Hayes (2004). Firstly, the different rating conditions are significantly related to the four product evaluation related variables ($b_{satisfaction}$ = .85, $p < .001$; $b_{recommendation}$ = .87, $p < .001$; $b_{investing\ intention}$ = .84, $p < .001$; $b_{overall\ impression}$ = .71, $p < .001$). Secondly, the rating conditions have a significant impact on risk perceptions ($b_{satisfaction}$ = -.35, $p < .01$; $b_{recommendation}$ = -.35, $p < .01$; $b_{investing\ intention}$ = -35, $p < .01$; $b_{overall\ impression}$ = -35, $p < .01$). Thirdly, the moderator is significantly related to the independent variables ($b_{satisfaction}$ = -53, $p < .001$; $b_{recommendation}$ = -.58, $p < .001$; $b_{investing\ intention}$ = -.57, $p < .001$; $b_{overall\ impression}$ = -.51, $p < .001$). Finally, regressing the dependent variables on both the independent variable and the mediator, risk perception remains a significant predictor of the dependent variables ($b_{satisfaction}$ = -.45, $p < .001$; $b_{recommendation}$ = -.50, $p < .001$; $b_{investing\ intention}$ = -.49, $p < .001$; $b_{overall\ impression}$ = -.45, $p < .001$), whereas the impact of the rating decreases ($b_{satisfaction}$ = .70, $p < .001$; $b_{recommendation}$ = .70, $p < .001$; $b_{investing\ intention}$ = .67, $p < .001$; $b_{overall\ impression}$ = .55, $p < .001$). A Sobel test is significant for all four variables ($z_{satisfaction}$ = 2.83, $p < .001$; $z_{recommendation}$ = 2.89, $p < .001$; $z_{investing\ intention}$ = 2.86, $p < .001$; $z_{overall\ impression}$ = 2.87, $p < .001$). Thus, Hypothesis 3, which postulates that risk perception moderates the relationship between rating conditions and product evaluations, is confirmed. Table 5 summarizes the results.

Table 5

Regressions analyzing the mediating role of risk perception for the un-rated versus the negative rating conditions

Dependent variable	Procedure	Coefficient (unstandardized)	t-statistic	p	Sobel test
Satisfaction with the fund	YX	.8529	7.0983	<.001	
	MX	-.3476	-3.1155	.002	
	YM	-.5303	-7.9308	<.001	2.83 ***
	YM.X	-.4521	-7.1361	<.001	
	YX.M	.6958	6.2409	<.001	
Likelihood of recommendation	YX	.8746	7.3289	<.001	
	MX	-.3476	-3.1155	.002	
	YM	-.5818	-8.9585	<.001	2.90 ***
	YM.X	-.5032	-8.2256	<.001	
	YX.M	.6997	6.4999	<.001	
Likelihood of investing	YX	.8388	6.7457	<.001	
	MX	-.3476	-3.1155	.002	
	YM	-.5688	-8.3949	<.001	2.86 ***
	YM.X	-.4939	-7.6271	<.001	
	YX.M	.6671	5.8546	<.001	
Overall product impression	YX	.7102	6.3365	<.001	
	MX	-.3476	-3.1155	.002	
	YM	-.5109	-8.4600	<.001	2.87 ***
	YM.X	-.4487	-7.7014	<.001	
	YX.M	.5542	5.4066	<.001	

Note: *** $p < .01$; X=independent variable, Y=dependent variable, M=mediator variable.

4.5 Moderated model

To shed more light on the effect of ratings on financial decision-making, we enhance our base model by two moderators, namely participant expertise with financial products (Hypothesis 4) and consumer susceptibility to informational influence (Hypothesis 5). To test our hypotheses, we conduct OLS-regression analyses. Firstly, we define two dummy variables for the kind of rating condition. Specifically, one dummy compares the un-rated condition to the negative-rating condition (Dummy A) while the other dummy, the un-rated condition to the positive-rating condition (Dummy B). Secondly, in order to reduce multicollinearity, we mean-center the expertise and susceptibility to informational influence scores and include them as continuous predictor variables. Furthermore, we calculate the interactions between expertise and the dummy variables as well as susceptibility to informational influence and the dummy variables.

Testing hypothesis 4, the moderating effect of expertise, we regress the four dependent variables that determine product evaluation on the moderator, the two dummy variables and the two interaction terms regarding expertise. The analyses reveal a significant effect for Dummy A, comparing the un-rated versus the negative-rating condition for all four independent variables ($b_{satisfaction} = -1.21$, $p < .001$; $b_{recommendation} = -1.28$, $p < .001$; $b_{investing\ intention} = -1.24$, $p < .001$; $b_{overall\ impression} = -1.13$, $p < .001$), and a less significant effect for Dummy B, comparing the un-rated versus the positive-rating condition for three of the independent variables ($b_{satisfaction} = .47$, $p = .060$; $b_{recommendation} = .47$, $p = .073$; $b_{investing\ intention} = .45$, $p = .092$) and a non-significant effect for the variable overall product impression ($b_{overall\ impression} = .26$, $p = .247$). Furthermore, for the un-rated versus the negative-rating condition, the results show significant interaction effects between Dummy A and expertise scores for three of the dependent variables ($b_{satisfaction} = .24$, $p < .093$; $b_{recommendation} = .24$, $p < .074$; $b_{overall\ impression} = .30$, $p < .023$) as well as a non-significant interaction effect for investing intention ($b_{investing\ intention} = .06$, $p = .686$). For the un-rated versus the positive-rating condition, the results show no significant interaction

effects between Dummy B and expertise scores for the dependent variables, except for likelihood of recommendation ($b_{recommendation} = .16$, $p < .060$), which is plausible since individuals might be more likely to offer product recommendations, the more expert they are in the product, independent of the rating condition. Tables 6 and 7 summarize the results.

Additionally, we plot the data using the extreme levels of the moderator variable, by shifting the mean plus one standard deviation (high expertise) and minus one standard deviation (low expertise). The results for both dummy variables are presented in the left graph of Figure 3.

Overall, these results support Hypothesis 4, showing that for the un-rated condition, there is no difference between participants with high and low expertise, while for the negative-rating condition, there is a significant difference between the groups with high versus low expertise regarding their product evaluations. For the positive-rating condition, there is no significant difference between participants with high and low expertise in terms of their evaluations, however the graph shows that participants with a high expertise evaluate the product better, which might be an indicator for a confirmation bias. Thus, expertise plays a particularly important role in investment product evaluation in cases of negative ratings.

Table 6

OLS regressions with interaction terms, analyzing the moderating effect of expertise for the un-rated versus the negative rating conditions

Independent variable	Dependent variable	Coefficient (standardized)	t-statistic	p
	Satisfaction with the fund	-.047	-.497	.620
	Likelihood of recommendatic	-.152	-1.766	.079
Expertise	Likelihood of investing	.002	.022	.983
	Overall product impression	-.103	-1.210	.228
	Satisfaction with the fund	-1.208	-5.016	< .001
Dummy A (un-rated vs. neg. rating)	Likelihood of recommendatic	-1.281	-5.769	< .001
	Likelihood of investing	-1.236	-5.190	< .001
	Overall product impression	-1.134	-5.189	< .001
	Satisfaction with the fund	.241	1.690	.093
Expertise × Dummy A	Likelihood of recommendatic	.237	1.802	.074
	Likelihood of investing	.057	.405	.686
	Overall product impression	.298	2.302	.023

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Table 7

OLS regressions with interaction terms, analyzing the moderating effect of expertise for the un-rated versus the positive rating conditions

Independent variable	Dependent variable	Coefficient (standardized)	t-statistic	p
Expertise	Satisfaction with the fund	-.047	-.464	.643
	Likelihood of recommendation	-.152	-1.450	.149
	Likelihood of investing	.002	.019	.985
	Overall product impression	-.103	-1.146	.254
Dummy B (un-rated vs. pos. rating)	Satisfaction with the fund	.467	1.891	.060
	Likelihood of recommendation	.467	1.806	.073
	Likelihood of investing	.449	1.693	.092
	Overall product impression	.257	1.162	.247
Expertise × Dummy B	Satisfaction with the fund	.132	.894	.373
	Likelihood of recommendation	.293	1.893	.060
	Likelihood of investing	.164	1.034	.303
	Overall product impression	.130	.981	.328

Figure 3

Average product evaluations across conditions for the spotlight-analyses of expertise (left graph) and susceptibility to informational influence (right graph)
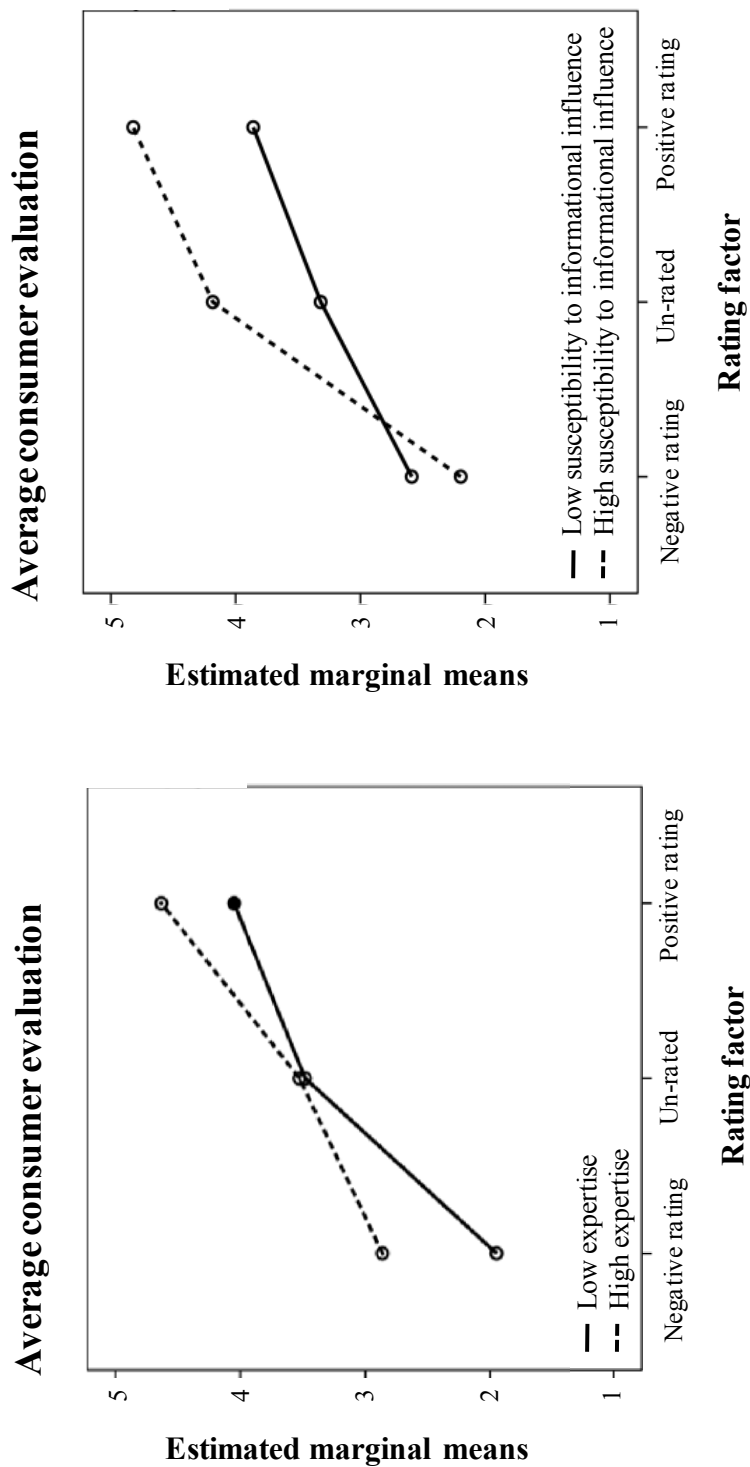
Testing Hypothesis 5, the moderating effect of susceptibility to informational influence, we regress the four dependent variables, determining product evaluation, on the moderator, the two dummy variables and the two interaction terms regarding expertise. Analyses reveal a significant effect for Dummy A, comparing the un-rated versus with the negative-rating condition for all four independent variables ($b_{satisfaction}$ = -1.23, p < .001; $b_{recommendation}$ = -1.25, p < .001; $b_{investing\ intention}$ = -1.24, p < .001; $b_{overall\ impression}$ = -1.16, p < .001), and a less significant effect for Dummy B, comparing the un-rated versus positive-rating condition for three of the independent variables ($b_{satisfaction}$ = .52, p = .035; $b_{recommendation}$ = .54, p = .038; $b_{investing\ intention}$ = .47, p < .073) and a non-significant effect for the variable overall product impression ($b_{overall\ impression}$ = .32, p = .140). Furthermore, for the un-rated versus with a negative-rating condition, the results show significant interaction effects between Dummy A and the susceptibility of informational influence scores for three of the dependent variables ($b_{satisfaction}$ = -.47, p < .013; $b_{recommendation}$ = .29, p < .099; $b_{overall\ impression}$ = -.33, p < .061) as well as a non-significant interaction effect for investing intention ($b_{investing\ intention}$ = -.21, p = .267). For the un-rated versus with the positive-rating condition, the results show no significant interaction effects between Dummy B and susceptibility to informational influence scores for the dependent variables. Tables 8 and 9 summarize the results.

Additionally, we plot the data using the extreme levels of the moderator variable, by shifting the mean plus one standard deviation (high susceptibility to informational influence) and minus one standard deviation (low susceptibility to informational influence). The results for both dummy variables are presented in the right graph of Figure 3.

Table 8

OLS regressions with interaction terms, analyzing the moderating effect of susceptibility to informational influence for the un-rated versus the negative rating conditions

Independent variable	Dependent variable	Coefficient (standardized)	t-statistic	p
	Satisfaction with the fund	.298	2.149	.033
Susceptibility to informational influence	Likelihood of recommendation	.207	1.603	.111
	Likelihood of investing	.142	1.033	.303
	Overall product impression	.249	1.954	.053
	Satisfaction with the fund	-1.229	-5.192	< .001
Dummy A (un-rated vs. neg. rating)	Likelihood of recommendation	-1.246	-5.635	< .001
	Likelihood of investing	-1.241	-5.269	< .001
	Overall product impression	-1.135	-5.211	< .001
	Satisfaction with the fund	-.473	-2.515	.013
Susceptibility to informational influence × Dummy A	Likelihood of recommendation	-.292	-1.661	.099
	Likelihood of investing	-.209	-1.119	.265
	Overall product impression	-.327	-1.888	.061

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Table 9

OLS regressions with interaction terms, analyzing the moderating effect of susceptibility to informational influence for the un-rated versus the positive rating conditions

Independent variable	Dependent variable	Coefficient (standardized)	t-statistic	p
Susceptibility to informational influence	Satisfaction with the fund	.298	2.005	.047
	Likelihood of recommendation	.207	1.323	.188
	Likelihood of investing	.142	.894	.373
	Overall product impression	.249	1.884	.061
Dummy B (un-rated vs. pos. rating)	Satisfaction with the fund	.518	2.126	.035
	Likelihood of recommendation	.538	2.092	.038
	Likelihood of investing	.472	1.803	.073
	Overall product impression	.322	1.481	.140
Susceptibility to informational influence × Dummy B	Satisfaction with the fund	-.284	-1.349	.179
	Likelihood of recommendation	.046	.209	.835
	Likelihood of investing	.216	.956	.341
	Overall product impression	-0.34	-.181	.856

Overall, these results support Hypothesis 5, showing that for the un-rated condition, there is no significant difference between participants with high versus low susceptibility to informational influence, while for the negative-rating condition, there is a significant interaction effect between the susceptibility to informational influence and negative rating on product evaluations. For the positive-rating condition, there is no significant difference between participants with high versus low susceptibility in terms of their evaluations. Thus, again the moderator susceptibility to informational influence plays an especially important role in investment product evaluation in the case of a negative rating due to its significant interaction effect with negative rating information.

5 Implications and summary

In this paper, we examine the effect of ratings on financial decision-making, particularly on product evaluation and risk perception. In this context, we use the product ratings of investment offers rather than company credit ratings. In an experimental study, we manipulate an investment fund by providing a fact sheet without any rating, one with a positive rating, and another with negative-rating information. Hence, we use a one-factor (rating: no rating versus positive rating versus negative rating) between-subject design to test the basic effects of ratings on product evaluations and risk perceptions. As a sample for testing statistical effects, we use undergraduate business administration students specialized in finance and accounting with a financial literacy level of 77% (sophisticated financial literacy) to avoid biases or centered-answer behaviors due to lack of understanding for the terms used in the fact sheet.

Our results reveal that even for this very knowledgeable sample, rating has a significant effect on product evaluation and risk perception. In particular, compared to the un-rated condition, positive evaluation of the investment fund increases as the product is framed by a positive rating and decreases as the product is framed with a negative rating. Interestingly, the negative-rating condition leads to a significantly stronger change in product evaluation than the positive-rating condition. This finding is in accordance with previous literature regarding credit ratings, finding an asymmetric market response to the ratings changes of companies by credit rating agencies such as Standard and Poor's, Moody's or Fitch.

Furthermore, ratings not only have a significant effect on product evaluation, but also on risk perception. In particular, compared to the un-rated condition, risk perception of the investment fund decreases in the positive-rating condition and significantly increases in the negative-rating condition. Again, the effect of the negative-rating condition is stronger than the positive-rating condition. In order to shed further light on the relationship between

rating, risk perception and product evaluation, we conduct further analyses and find a mediating role of risk perception on the relationship between un-rated versus negatively rated investment products and product evaluation. This means that a negative-rating condition enhances risk perception, which consequently, decreases positive product evaluation.

Additionally, we examine the moderating role of participants' expertise with financial products as well as their susceptibility to informational influence. Overall, the analyses regarding the moderating effects of expertise reveal a significant difference in product evaluations between the groups with high versus low expertise for the negative-rating condition and no significant difference for the positive-rating condition. Again, this confirms the asymmetric market response literature to a negative rating, but also shows that the less-expert participants (but still those with high financial literacy) react stronger to downgrades than do the high-expert participants. Thus, expertise plays an important role in financial decision-making. Similarly, the analyses regarding the moderating effect of susceptibility to informational influence reveal a significant difference in product evaluations between participants with high versus low susceptibility to informational influence for the negative-rating condition and no significant difference for the positive-rating condition.

Hence, our findings from this experimental study demonstrate that rating has a strong effect on financial decision-making; particularly, negative rating information has a significant impact. However, to test the general statistical effect of ratings, we use a knowledgeable sample with a high financial literacy level that is capable of understanding and evaluating the information provided on the fact sheet and also is aware of the criticism of rating agencies inter alia during the financial crisis. Particularly against the background of the moderating role of expertise, it may be plausible that our findings prove even more true for a less homogenous sample regarding financial literacy, i.e., for a representative consumer sample. Furthermore, it would be interesting to examine if these effects are significant for a professional investor sample as well. These might be interesting aspects for further research in order to

generalize the following tentative implications.

In any case, and taking into account that rating information might have a critical role in the economy and society due to its significant influence on financial decision-making, the quality of such ratings must be assured. This implies that inter alia rating agencies require professionalism regarding their analyses, i.e. the objectivity, validity and reliability in their procedures. Additionally, the assessment criteria must be transparently communicated, relevant to the topic and comparable, e.g., using the same time-history of the funds or consistent performance measures in order to provide investors with serious and credible third-party opinions for their financial decision-making. In this context, the question of regulation arises. In particular, is regulation of rating providers—and thus, a "rating of ratings"—necessary in order to ensure the aforementioned quality standards are met in the assessment and analyses process of rating providers and also to create market entry barriers for potential ratings providers? Or is self-regulation sufficient to decrease the credibility of unprincipled ratings agencies as a result of dilution in numerous ratings providers and/or only positive rating results?

Lastly, financial services companies often actively tout ratings in their advertisements rather than use, for example, performance history. Here, the question of disclosure must be discussed: Should reporting of a rating agency's result be voluntary or obligatory for financial services providers, for example fund companies, especially in the case of solicited ratings? Particularly against the background of our finding that above all, negative rating information has the strongest impact on financial decision-making, hiding versus reporting negative rating information could significantly sway investor behavior.

Appendix

Figure A.1
Fact sheet for a fund that is invested almost 100% in Swiss stocks without any rating label

European Value Fund

Fund Development	28.03.2011

Growth from 1000 (CHF)

1.179	
1.048	
917	
786	
655	
524	
393	
	2007 2008 2009 2010 2011

● Fund (European Value Fund)
● Index (MSCI Europe Value NR USD)
● Benchmark (European Standard Value Stocks)

Performance p.a. (%)	28.03.2011
current year	4.95
3 years p.a.	10.47
5 years p.a.	2.68
10 years p.a.	12.38

Asset Allocation	% Long	% Short	% Asset
Stock	98.03	0.00	98.03
Bond	0.00	0.00	0.00
Cash	1.89	0.00	1.89
Other	0.08	0.00	0.08

Overview	
NAV (28.03.2011)	CHF 30.52
Funds Volume (m)	CHF 29.66
Issuance Fee (max.)	5.00%
TER	2.12%
Redemption Fee	none
Inception Date	31.01.1998
Fundmanager Management Team	Inception Date 31.01.1998
Volatility Standard Deviation	24.32%

Regional Exposure (Top 5 Regions)	%
Eurozone	69.22
Europe – ex Euro	28.15
UK	2.62
US	0.00
Canada	0.00

Sector Breakdown (Top 5 Sectors)	%
Industrial Materials	45.58
Software	10.97
Healthcare	10.24
Telecommunications	8.08
Consumer Services	6.87

Figure A.2

Manipulation of the ratings, labeled by *Starrating* as "excellent" versus "very poor"

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PART IV

TO BUY OR NOT TO BUY INSURANCE? THE ANTECEDENTS IN THE DECISION-MAKING PROCESS AND THE INFLUENCE OF CONSUMER ATTITUDES AND PERCEPTIONS

Abstract

Real world decision-making under risk and uncertainty presents one of the most challenging areas of research nowadays. To date, only little is known about the underlying attitudes that present the foundation of decision-making. We develop a causal model examining the antecedents of consumers' purchase behavior in the context of long-term savings, particularly unit-linked life insurance products. Our experimental approach (n = 929) builds on two theoretical foundations: the *risk as analysis* and *risk as feeling* perspective (Loewenstein et al. 2001; Slovic et al. 2004), which we apply to shed further light on the formation of product perceptions. Our research identifies a pivotal role of risk avoidance and uncertainty avoidance. Moreover, we complement our findings by investigating the conditions under which the two components exert their full influence on purchase behavior. The results indicate moderating effects of trust in the industry, product guarantees, as well as expertise, which underline the *risk as feeling* and *risk as analysis* perspective.[9]

1 Introduction

Research on consumer decision-making in a state of risk and uncertainty[10] is a cornerstone of various research disciplines, as for instance economics, psychology, marketing, or finance. The common purpose of studies in this area is to better understand how consumers make decisions, thereby deriving crucial theoretical and practical implications. Recent studies have started to investigate the underlying processes of consumers' decision-making, such as information-processing, emotions, attitudes, or risk perceptions, finding several underlying factors that play a crucial role in the decision-making; however, this research stream is still at its infancy, particularly in the area of consumer financial decision-making. Especially the perceptions of a product's risk influence the decision-making process. Research shows that an individual's perception of risk has a significant influence on purchase behavior (Kim, Ferrin, and Rao 2008). Furthermore, while financial theory suggests that risk and return are positively correlated, empirical evidence shows that under certain conditions, consumers perceive risk and return as negatively correlated (Diacon and Ennew 2001). Literature on consumers' risk perception confirms an emotional involvement in risk perception and consequently decision-making (for an overview see Ricciardi 2008; or Slovic 2000). Building on this, Loewenstein et al. (2001) come up with their novel theoretical concept of *risk as feelings*, where they provide an emotions-driven approach to decision-making and thus an alternative to the existing cognitive concepts. Slovic et al. (2004) develop this notion further by conceptually summing up its components, which entail *feeling* on the one side and *analysis* on the other.

However, while other scholarly areas, for instance consumer behavior, are more advanced in explaining phenomena in decision-making, research on

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[10] While in a state of certainty the decision maker knows for sure, what (future) outcome will occur, a state of risk and uncertainty leads to more ambiguity. Normative theory distinguishes between risk, i.e., the decision-maker can allocate objective or subjective probabilities of occurrence to all possible situations, and uncertainty; i.e., a forecasting based on probability of occurrence is not possible. However, this distinction is not as relevant for the behavioral perspective, since biases have been detected in the both risky and uncertain situations (see inter alia over/underestimation of probabilities).

consumer financial decision-making regarding investment or insurance products presents a rather new research area. Few studies conducted in this area include Diacon and Ennew's (2001) study on consumers' perceptions of financial risk, Aspara and Tikkanen's (2011) study on the role of affects on investors' behavior, and Wang, Keller, and Siegrist's (2011) study on the influence of the familiarity heuristic and the home bias on the risk perception of financial products. Despite this burgeoning research in the field of behavioral finance, only little literature focuses insurance even though initial contributions in this area arise our suspicion that further research can have huge implications for researchers, practitioners and regulation. For instance, research on the demand for an insurance premium valuation under default risk shows that awareness of even a very small positive probability of insolvency extensively influences customers' choice and reduces customer willingness to pay (Wakker, Thaler, and Tversky 1997; Zimmer, Schade, and Gründl 2009). This calls for further research and underlines the importance of an examination of the underlying processes of the formation of consumers' risk perceptions and consumers' financial decision-making.

In this article, we develop a causal model examining the antecedents of consumers' perceptions in the state of risk and uncertainty. The purpose of this article is to provide initial empirical evidence regarding the antecedents of consumers' financial decision-making. By doing so, we contribute to the growing research interests in the effects of emotions and risk perception on consumer decision-making. Particularly, we aim to reveal the two components that influence decision-making under risk and uncertainty: *feelings and analysis*. Thereby, we draw upon research on consumers' underlying attitudes in decision-making and use consumers' risk and uncertainty avoidance to determine the influence of *feelings and analysis* on decision-making. We assume that these factors crucially influence perceptions of products, namely perceived transparency, perceived risk, and perceived protection by the product, which in turn directly determine buying behavior. We provide further evidence for the *risk as feeling* and *risk as analysis* perspective by suggesting that several moderators drive this relationship, namely, consumer expertise, consumer trust, and the prevalence of investment guarantees. For our analysis, we use a

comprehensive experimental framework filled with data from a panel representative for Switzerland in terms of gender and region. We use structural equation modeling to assess the complex relationships.

Our research context, life insurance, provides several advantages. First, it is a highly relevant field when considering potential social, economic, and political consequences of elderly poverty. Herein, life insurance products, and particularly unit-linked life insurance products, can provide an attractive investment solution due to a significant demographic change in most western countries and a declining confidence in state-run pension schemes. Second, life insurances can be acknowledged as complex, multi-attributed products, leaving a large portion of risk and uncertainty with the consumer (e.g., Crosby and Stephens 1987; Puelz 1991). Lastly, we assume that insurance products and particularly unit-linked life-insurance products are ideal applications to test our model, since these products are generally less emotionally loaded and associated as for example stocks, derivatives or other financial products, which have been strongly under-fire during the financial crisis.

Our findings build on this upcoming research stream of consumer financial decision-making and will give crucial theoretical implications in terms of shedding light on the antecedents of financial decision-making from the *risk as feelings* and *risk as analysis* perspective. Furthermore, examining decision-making regarding unit-linked life insurance may provide profound practical implications, improving customer acquisition and product development. Insights about the consumers' decision-making also provide companies with thorough advantage when designing, positioning and selling products. Finally, this study can provide regulatory authorities and governmental institution with important policy implications.

The paper is structured as follows. Section 2 reviews the relevant literature and develops the conceptual framework and hypotheses. Section 3 describes the experimental study's procedures and methods. Section 4 presents analysis and the results, and Section 5 concludes by discussing the findings and giving an overview of implications and avenues for future research.

2 Conceptual development

2.1 The influence of emotions in the decision-making process under risk and uncertainty

Research on judgment and decision-making under risk and uncertainty has made fundamental empirical and theoretical contributions. Generally, the literature acknowledges two basic approaches, cognitive and emotional, to examine human judgment and decision-making under risk and uncertainty. The normative expected utility theory (Neumann and Morgenstern 1944; Edwards 1954) and the behavioral prospect theory (Kahneman and Tversky 1979) provide important frameworks for the cognitive approach. Under both theories, expected utility theory and prospect theory, the decision-maker integrates information regarding the value and likelihood of potential outcomes based on expectation-based calculus (Loewenstein et al. 2001).

Although normative choice theory and respective deviations have been extensively described in literature, the antecedents of the human decision-making process, such as feelings, emotions, attitudes, or perceptions, have hardly been examined. In this context, the relatively young field of research on emotional processes has developed to examine human judgment and decision-making under risk and uncertainty. First evidence of the substantial influence of feelings on decision-making in risky or uncertain situations has been introduced for instance by Zajonc (1980) or Forgas (1995). From a conceptual side, especially Loewenstein et al. (2001) advance literature with their risk-as-feeling-hypothesis, presenting risk as a feeling rather than as cognitive calculation. Doing so, they emphasize the role of affect experienced the moment a decision is made. They point out the divergence between cognitive and emotional evaluations of risky situations and suggest that in those situations, decision-makers' behavior is often driven by emotional reactions rather than cognitive considerations. Additionally, they distinguish between anticipated, i.e., experienced in the future, and anticipatory, i.e., immediately viscerally experienced, emotions. While anticipated emotions that have already been discussed in the literature (see cognitive appraisal theories, cf. Folkman and

Lazarus 1988), Loewenstein et al. (2001) argue that especially emotions that are experienced at the point of decision-making, hence anticipatory emotions, play an important role. This argumentation is mainly based on a) behavioral evidence showing that emotions process cognitive evaluations; therefore, may constitute an affect heuristic, generally accelerating the decision-making process and leading to cognition-independent decisions (Zajonc 1980), and more importantly b) neurobiological evidence (cf. the somatic marker hypothesis by Damasio 1994; and Bechara and Damasio 2005; or for a later literature example Dalgleish 2004). This shows that emotions can affect behavior as well as mediate the relationship between cognitive evaluations of risk and its related behaviors.

Adding to this, Slovic and colleagues (Slovic 1987, 2000; Slovic et al. 2004; Slovic et al. 2005; Slovic and Peters 2006) propose a particularly attractive notion, seeing humans' perceptions and behavior regarding risk in two fundamental ways. That is, while the analytic system - called *risk as analysis* - uses normative rules, algorithms, logic, and reason, the experiential system - called *risk as feelings* - works with humans' fast, instinctive, and intuitive reactions and gut feelings. The latter is characterized mainly by its affective basis, using intuitive reactions and feelings to inform the decision-making process. They conclude that humans are not able to understand the meaning of simplest numbers, measures, or statistics of risk and thus, they are not able to make rational decisions when not experiencing risk affectively. While these findings have mainly been examined in the fields of natural hazards or clinical aspects, Bechara and Damasio (2005) prove their validity in economic or financial decision-making. In line with Bechara and Damasio (2005), we argue that our area of interest, which is insurance, is an abstract and complex area involving a high degree of risk and uncertainty compared to other products and services; therefore, emotions and feelings will have a huge effect on decision-making.

Shiv and Fedorikhin (1999) provide one of the few empirical evidences in the field of consumer research. In two experimental studies, they show that besides cognitive influences, mainly affective reactions influence decision-making. Thus, consumers tend to choose an alternative superior on the affective

rather than on the cognitive dimension, especially in the case when information is rarely available. In contrast, research in the fields of economics, finance, or insurance describes mainly decision biases or deviations of normative theory caused by investors' psychology and emotions (see for example Hirshleifer 2001; Kahneman and Riepe 1998; Johnson et al. 1993), even though the importance of further research regarding emotions (Elster 1998; De Martino et al. 2006) or visceral factors (Loewenstein 2000) is emphasized in economic theory. An initial empirical study is conducted by Hsee and Kunreuther (2000), who investigate the influence of affect on decisions regarding the purchase of insurance and regarding the motivation of going through a claim in case of a damage. They show that the more affection people feel towards an object, the more they are willing to purchase the insurance or file a claim.

Our model framework builds on this research stream. In our study, we experimentally investigate attitudes in the field of financial decision-making, particularly long-term savings, and the effect of feelings on decision-making. Incorporating consumer attitudes and perceptions into the decision-making process can help to better explain human choice. Our conceptual framework aims to measure the antecedents of the intention to buy unit-linked life insurance products, building on the research of Loewenstein et al. (2001) and Slovic et al. (2004). In addition, we consider the dual-process theories of thinking, knowing, and information processing by Epstein (1994) and later Chaiken and Trope (1999) as well as Sloman (1996), which suggest that in addition to analytical processes, consumers' affect and emotions play an substantial part in decision-making. We argue that these can be expressed by product perceptions, namely the perceived risk of the product, the perceived transparency of the product, and the perceived degree of protection by the product. Since literature shows that behavior and emotions correlate strongly with attitudes (for an overview, see for example Manstead 1996), we propose that consumers' attitudes towards risk, reflecting the *risk as feelings* perspective, and consumers' uncertainty avoidance, reflecting the *risk as analysis* perspective, determine consumers' perceptions. Risk avoidance can be classified as rather emotional component of aforementioned attitudes, reflecting the notion that consumers rely on their feelings rather than rational thoughts (Loewenstein et al. 2001). Conversely,

uncertainty avoidance reflects the cognitive component. We argue that uncertainty avoidance is a rather rational attitude appearing in situations where risk and uncertainty is prevalent. Thus, regarding the influence of attitudes on perceptions, we hypothesize:

H1a: Risk avoidance positively influences perceived risk.
H1b: Risk avoidance negatively influences perceived transparency.
H1c: Risk avoidance positively influences perceived protection.

H2a: Uncertainty avoidance positively influences perceived risk.
H2b: Uncertainty avoidance positively influences perceived transparency.
H2c: Uncertainty avoidance negatively influences perceived protection.

However, Finucane, Peters and Slavic (2003) and Slovic et al. (2004) recognize that both components are not completely distinct from each other, which is reflected in an suggested interaction between the emotional and the analytic system. Adding to this, Zajonc (1980) demonstrates that in case of a stimulus, the very first reaction of humans involves affective emotions, which generally provide mechanisms for processing information cognitively in order to finally derive at a judgment. Damasio (1994) confirms this thesis by its somatic marker, showing that affect and emotions are both fundamental to rational decision-making and behavior. In line with this literature, we suggest that the two components - *risk as feeling* and *risk as analysis* - cannot be expected to be fully independent from one another. That is, risk avoidance drives uncertainty avoidance to a certain degree. Thus, we hypothesize

H3: Risk avoidance positively influences uncertainty avoidance.

Following the arguments of Loewenstein et al. (2001) as well as the literature on the influence of attitudes, we assign a mediating role to perceptions. Therefore, we suggest that perceived risk, perceived transparency, and perceived protection, exert a mediating effect on consumers' choice, which is presented by their intention to buy a unit-linked life insurance product in our study. Additionally, we assign a central role to perceived transparency that determines

perceived risk and perceived protection. That is, when the product attributes of the unit-linked life insurance are perceived as clear and well delineated, consumers assign a higher level of protection and less risk to the product. Thus, we hypothesize

> H4a: Perceived transparency negatively influences perceived risk.
> H4b: Perceived transparency positively influences perceived protection.

> H5a: Perceived risk negatively influences buying.
> H5b: Perceived transparency positively influences buying.
> H5c: Perceived protection positively influences buying.

2.2 The moderating role of expertise and trust in the decision-making process under risk and uncertainty

Additionally, our conceptual framework also proposes that the individual dimensions of trust in financial companies and markets as well as consumers' self-perceived expertise in financial and insurance products moderate consumers' product perceptions. This is consistent with previous literature, which documents that risk perception is multidimensional, with trust and expertise playing an important role (Diacon and Ennew 2001; Olsen 1997; or cf. the factor-analytic representation of risk by Slovic 1987). What is more, trust and expertise can be assigned to both the emotional and cognitive components of risk. The nature of trust is emotional and affective rather than cognitive. Similar to trust, we see that trust can also be established artificially, namely through a product guarantee. On the other side, expertise strongly relates to the cognitive part.

Therefore, we assume trust to be a moderator in determining consumers' product perceptions, especially from the *risk as feelings* perspective. Trust has been examined in various disciplines, including technological, organizational, social, economical or behavioral, and plays a crucial role in the decision-making in various purchase situations (for an overview see for example Balasubramanian, Konana, and Menon 2003; Dirks and Ferrin 2001; Gambetta

1990; Goodwin 1996; Hollis 1998; Jeffries and Reed 2000; Kim, Ferrin, and Rao 2008). This includes not only trust in the salesperson, but also in the product, the company, or the industry (Plank, Reid, and Pullins 1999). Particularly in risky or uncertain situations, trust in the decision-maker plays a crucial role in information processing that involves evaluating the situation and deciding (Gambetta 1990; Rousseau et al. 1998). Furthermore, there is a strong relationship between trust and risk perception. An increase of consumers' trust decreases their risk perception, which might lead to a higher purchase intention (Bhattacherjee 2002; McKnight, Cummings, and Chervany 1998; Kim, Ferrin, and Rao 2008). Therefore,

> H6a: Trust moderates the relationship between risk avoidance and perceived risk.
>
> H6b: Trust moderates the relationship between risk avoidance and perceived transparency.
>
> H6c: Trust moderates the relationship between risk avoidance and perceived protection.

In a risky or uncertain situation, the trusting parties are to some extent vulnerable to the outcome and / or behavior of the trusted party (Moorman, Zaltman, and Deshpande 1992). Regarding insurance, an investment guarantee might on the one hand force insurance companies to act and invest responsibly which in turn provides the potential policyholder, i.e., the trusting party, with confidence since a minimum payout at maturity is guaranteed. Furthermore, Mitchell argues that the trusting parties have to "hedge against uncertain states of nature, adverse selection and ethical hazard through formal contractual means such as guarantees, insurance mechanisms and laws" (Mitchell 1999, p. 174). In this respect, a product guarantee can be acknowledged as a substitute for trust to some level. Therefore, we add an investment guarantee as additional product feature and assume that it has a moderating effect on consumers' product perceptions. Thus,

> H7a: Guarantee moderates the relationship between risk avoidance and perceived risk.

H7b: Guarantee moderates the relationship between risk avoidance and perceived transparency.

H7c: Guarantee moderates the relationship between risk avoidance and perceived protection.

Finally, consumers' expertise with financial and insurance products also becomes apparent as significant moderator of the relation between consumers' attitudes and consumers' product perceptions. However, as outlined above, we acknowledge that self-perceived expertise is especially relevant from the *risk as analysis* perspective. In the case of marketing offers in general, Alba and Hutchinson (1987) have already shown the effects of consumer expertise on their product evaluations. While experts usually act more systematically in the decision-making process and rely on their complex knowledge structures and established decision criteria, novices are more likely to rely on the product's surface characteristics as well as their affects and emotions to the offer by using bottom-up processing strategies (Mitchell and Dacin 1996; Peine, Wentzel, and Herrmann 2010; Wood and Lynch 2002). In line with this, Heath and Tversky (1991) show that people prefer choice contexts in which they feel knowledgeable rather than ignorant in order to influence their perception. The same is true especially for products that are more complex, such as financial products. Past studies have shown that the perceived risk of financial products is highly correlated with investor's expertise of the products rather with the objective risk measures (Wang, Keller, and Siegrist 2011). Although previous studies have mainly checked for the direct influence of expertise on product perceptions, we argue that expertise can also be acknowledged as a moderator of the cognitive component. Thus,

H8a: Expertise moderates the relationship between uncertainty avoidance and perceived risk.

H8b: Expertise moderates the relationship between uncertainty avoidance and perceived transparency.

H8c: Expertise moderates the relationship between uncertainty avoidance and perceived protection.

The model that aims at investigating the antecedents of purchase behavior in the context of long-term saving and life insurance is displayed graphically in Figure 1. Reading from left to the right, attitudes influence perceptions, which in turn determine the probability to buy. Trust, guarantee, and expertise are shown as the moderators of the relationship between attitudes and perceptions. The presented model in Figure 1 allows us to investigate the direct and indirect effects of the antecedents simultaneously. The framework's underlying logic is that consumers' buying decision is based on product perceptions regarding risk, transparency, and protection, presenting a typical decision-making chain (Ajzen and Fishbein 1980). These are in turn determined by the consumers' attitudes, which on the one hand belong to emotional dimension using risk avoidance as attitude and trust and guarantee as moderators, and on the other hand analytical dimension using uncertainty avoidance as attitude and expertise as moderators.

Figure 1
Research model
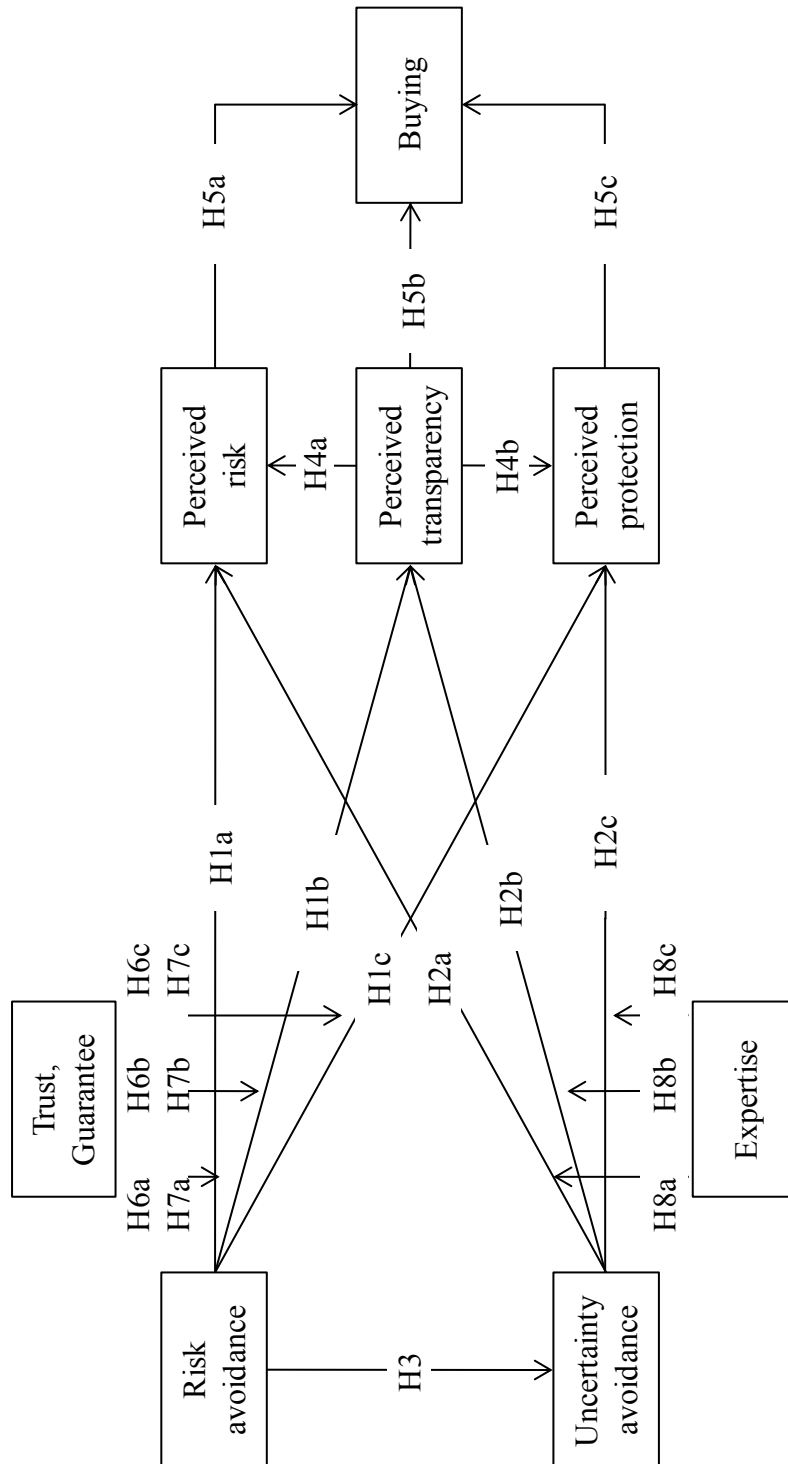
3 Experimental study

Based on previous literature about *risk as feelings* and *risk as analysis*, we examine the effect of various antecedents on the human decision-making, and particularly on buying behavior. To test our hypotheses, we conduct an experimental study using a unit-linked life insurance offer with and without an additional investment guarantee. Hence, we provide a one-factor (with versus without additional investment guarantee) between subject design.

3.1 Manipulation of the experimental setting

The offer consists of an unit-linked life insurance product containing several components (unit-linked life insurance product, its parameterization, and calculations of the single product features are adopted from Huber, Gatzert, and Schmeiser, 2011). We provide a term life insurance, including a savings part, that is invested in a mutual fund and a fixed death benefit, which will be paid out in case of death of the policyholder during the contract term. In the event of survival until maturity, the policyholder receives the mutual fund value including a stochastic payoff, based on μ-σ-dynamics of the underlying investment fund. Concerning calibrations, we fix the gross premium P at CHF 100 per month for a contract duration of $T = 10$ years. Furthermore, we provide an additional investment guarantee in the savings part for this base contract. This assures that a minimum amount is remunerated to the policyholder even if the mutual fund value falls below a predefined guarantee level; thus, it implies additional costs to the ongoing premium payments. Concerning guarantee, we determine the sum of the gross premiums, thus $G_T = $ CHF 12,000. The guarantee costs P_G are calculated using risk-neutral valuation amounting to CHF 5 per month.

Thus, we use two different product cards for the experimental study, characterizing the unit-linked life insurance product and its features (payoff in case of death; payment in case of survival) and the premium payments for the features. The product cards are identical for the two offers and differ only in the

investment guarantee (without guarantee and without additional guarantee costs versus with guarantee and additional guarantee costs).

3.2 Sample and procedure

Overall, 929 participants representative of Swiss population in terms of gender (male = 50.8%; female = 49.2%) and region (here only focusing the German (73.0%) and the French (25.9%) speaking part of Switzerland) participated in the experimental study based on an online survey (originally in German and French). Regarding the age of the participants, focus is on 25 to 35 year olds due to the calibration features of the life insurance product. All participants completed questionnaires consisting of the following parts, in order: a cover letter, the questionnaire measuring participants' chronic risk avoidance and chronic uncertainty avoidance, a product card of the unit-linked life insurance product with or without an additional guarantee, a questionnaire for the evaluation of the offer regarding participants' perceived risk, participants' perceived transparency of the product, participants' perceived protection by the product, participants' attitude towards the price and participants' buying intention of the product, control variable checks (regarding participants' financial expertise, participants' trust into financial markets and companies, and sociodemographic attributes). Every subsample only received one product card to evaluate. The product card has been introduced by describing the following scenario:

> "Assume that over the next 10 year, you would like to save around CHF 12,000 for your retirement by a unit-linked life insurance. Your goal is to pay monthly a certain amount. Now, you are offered the following product. For the assessment of the fund the following fact sheet is available."

3.3 Measurements

To conceptualize the constructs of our model, we rely on existing scales wherever possible. However, few alterations are necessary to fit the constructs to our context. The first attitude employed is risk avoidance, which has been broadly investigated by research in other areas. Specifically fitting to our context, Quintal, Lee and Soutar (2005) put forth a construct for risk avoidance with six items that we employ and adapt based on our results. The same source is used to construct a measure for uncertainty avoidance. Next, as no scale has yet been proposed for perceived transparency, we develop a four-item scale, which is tested using the confirmatory factor analysis and described in detail later. The four-item scale captures the costs and services included in the product and assesses whether the consumers feel well informed. Perceived risk is assessed by two separate constructs, one representing financial risk, which appears to be especially relevant for our unit-linked life insurance product. To conceptualize this measure, we use the scale proposed by DelVecchio and Smith (2005). Further, we add the construct performance risk, likewise suggested by aforementioned authors, to complement the first scale. Contrary to the original scale, we merged items to one latent factor because our data indicate unidimensionality.

Perceived protection (Bosmans and Baumgartner 2005) is measured on a four-item scale initially measuring a product's ability to prevent negative outcomes. The first moderator, trust, is measured on a self-constructed three-item scale representing trust in the financial services industry. Finally, to evaluate consumers' self-perceived expertise, we rely on two constructs. The first construct measures an individual's reflectively perceived expertise, that is, the perceived expertise from the point of view of others (Kopalle and Lehmann 1995), while the second construct asks individuals directly to indicate the level of their expertise (Mishra, Umesh, and Stem 1993). Like perceived risk, we merge both constructs based on the results of the confirmatory factor analysis, which is described below. For all scales, we use 7-point Likert-type scales ranging from "strongly disagree" to "strongly agree". To sum up, we mainly rely on existing, well-delineated constructs; however, we adapt them to our context,

which appears necessary as only few constructs are specified for our research area.

4 Data analysis and results

4.1 Test of validity and reliability

In terms of testing validity and reliability of our measures, we first use confirmatory factor analysis (CFA). We include all constructs of the structural equation model as well as the moderators within this analysis to ensure convergent and discriminant validity. Global fit measures are provided as follows: chi-square/degrees of freedom [$\chi2$/df] = 3.08, comparative fit index [CFI] = .94, Tucker-Lewis index [TLI] = .93, root mean square error of approximation [RMSEA] = .047, and goodness-of-fit index [GFI] = .91). Hence, all values indicate a good model fit except $\chi2$/df, which is recommended to be below 3, and thus can be classified only as acceptable. Similarly, the CFA indicates a good convergent validity, as all item loadings exceed .50 threshold suggested by Anderson and Gerbing (1988), with most items having loadings above .70. All the items' paths are significant (p < .001), indicating a common underlying construct (Bauer, Falk, and Hammerschmidt 2006). Table 1 shows all corresponding loadings, the average variance extracted, as well as fit measures for the CFA. Moreover, Cronbach's alphas range from .73 to .89 exceeding the recommended threshold value of .70 (Nunnally 1978). To investigate if our model performs well in terms of discriminant validity, we use the Fornell and Larcker (1981) test. Table 2 summarizes the values of this analysis and indicates good convergent and discriminant validity of our model. To sum up, our results by far exceed the suggested threshold levels of commonly used fit criteria and display a high degree of reliability and validity.

4.2 Test of base model

We establish a structural equation model to examine our hypotheses because of its ability to simultaneously estimate the results and compare models. In the base model, all the hypothesized relationships are included and ran simultaneously. Fit measures display considerably good values, with a chi-square per degrees of freedom [χ^2/df] of 3.085 indicating a very good fit of the model. Although a p-value of .00 typically is an evidence for poor fit, it is

typical for large samples as in our case (n = 929) as p-values are sensitive to sample size (Jöreskog 1969). The supplementary fit indices, in this study goodness-of-fit (GFI), root mean square error of approximation (RMSEA), comparative fit index (CFI), are less affected by sample size. GFI of .93, RMSEA of .047, CFI of .95 in this study indicate that our data fit the model well. Accordingly, a Tucker-Lewis index (TLI) of .94 provides us with further evidence of good fit. Thus, the values of indices exceed the commonly followed recommendations of Hu and Bentler (1999); therefore, we can conclude that our model is acceptable.

Overall, the variance explained is considerably high for most of our constructs. Beginning with the lowest, perceived transparency, our model explains 9 percent of the variance in the variable. Furthermore, the model explains 21 percent of the variance in perceived protection, 27 percent of the variance in buying behavior, and 38 percent of the variance in perceived risk. Although the first two values are relatively low, we want to remind readers that the objective of our paper is to investigate the influence of the two generic attitudes risk avoidance and uncertainty avoidance, as well as the moderating roles of trust, guarantee, and expertise on buying behavior.

As can be seen from the model in Figure 2, all of our hypotheses regarding the base model have highly significant values. Similarly, both underlying attitudes significantly influence perceptions of the product (H1-H2). Risk avoidance exerts the highest influence on perceived risk ($\beta = .30$, $p < .01$), as stated by hypothesis H1a. Similarly, risk avoidance influences perceived transparency ($\beta = .08$, $p = .076$) as well as perceived protection ($\beta = .08$, $p = .057$). Likewise, uncertainty avoidance considerably influences product perceptions.

Table 1
Measurement scales and respective indicators

Items and constructs	Mean	SD	FL	AVE	CA
Risk avoidance				.57	.87
I look for guarantees in risky purchases	4.64	1.5	.64		
I avoid risky things	4.90	1.6	.76		
I would rather be safe than sorry	5.20	1.5	.84		
I do not choose risky alternatives	4.83	1.5	.86		
I only make a decision when I think I can predict the outcomes	4.66	1.5	.66		
Uncertainty avoidance				.63	.87
Rules and regulations are important because they inform me of what I can expected	5.12	1.3	.65		
I want that all there is a detailed description in my contract about how my money is invested	5.54	1.4	.79		
It is important to have instructions spelled out in detail so that I always know what I am expected to do	5.70	1.3	.88		
It is important that for insurance and financial products all costs are displayed in detail, so I always know what I pay for	5.79	1.3	.84		
Perceived transparency				.49	.79
I know exactly what service I get from the product	4.27	1.7	.68		
I know exactly what I have to pay for the product	4.54	1.8	.71		
I had a clear overview about the product's costs	4.57	1.7	.73		
I felt well informed about the product	3.87	1.6	.68		
Perceived risk				.44	.75
Considering the investment involved, purchasing the product would be risky	3.89	1.6	.80		
Given the financial expenses associated with purchasing the product, there is substantial financial risk	3.57	1.6	.72		
It is possible that the product's performance will bring me in financial problems	3.71	1.6	.69		
I could lose a significant amount of money if I ended up with a product that didn't work	4.03	1.8	.73		
If the product malfunctions, the consequences can be fairly severe	3.90	1.8	.71		
There is little that can go wrong when buying this product	3.78	1.5	-.55		
You need to be careful when buying this product since a lot can go wrong	4.25	1.7	.77		

Table 1 (continued)
Measurement scales and respective indicators

Items and constructs	Mean	SD	FL	AVE	CA
Perceived protection				.67	.89
The product can prevent problems	3.36	1.5	.81		
With the product I can prevent negative outcomes in my life	3.36	1.6	.08		
With the product I obtain a sense of security	3.37	1.6	.81		
The product is able to protect me	3.36	1.6	.85		
Expertise				.56	.73
My friends think of me as a good source of price information regarding financial services products	3.08	1.6	.87		
I am considered somewhat of an expert when it comes to knowing the price of financial services products	2.61	1.5	.76		
I enjoy telling people how much they might expect to pay for financial services products	3.04	1.6	.70		
When buying financial services products, friends and family ask me for advice	3.13	1.7	.76		
I am well informed about financial services products	3.57	1.6	.73		
I am an expert buyer for financial services products	3.03	1.6	.79		
I am inexperienced with financial services products (reversely coded)	4.19	1.7	-.58		
Trust				.63	.83
I fully trust financial markets	2.53	1.4	.83		
I fully trust banking industry	2.89	1.5	.82		
I fully trust insurance industry	2.91	1.4	.73		

Notes: SD = standard deviation; FL = factor loading; AVE = average variance extracted; CA = Cronbach's alpha.

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Table 2

Fornell and Larcker test

	Perceived transparency	Perceived risk	Perceived protection	Expertise	Trust	Risk avoidance	Uncertainty avoidance
Perceived transparency	.70						
Perceived risk	-.45	**.67**					
Perceived protection	.41	-.33	**.82**				
Expertise	.12	-.06	.15	**.75**			
Trust	.23	-.17	.37	.36	**.80**		
Risk avoidance	.01	.34	.02	-.14	-.10	**.76**	
Uncertainty avoidance	.15	.15	-.03	-.14	-.15	.50	**.80**

Note: Correlations, square root of average variance extracted on diagonal (in bold).

The influence of uncertainty avoidance on perceived transparency ($\beta = .20$, p = <.01) is the strongest, supporting Hypothesis H2b. Concerning H3c, the results reveal a negative significant influence of uncertainty avoidance and perceived protection ($\beta = -.14$, p = <.01). Hypothesis 2a, which proposes a significant influence of uncertainty avoidance on perceived risk displays a significant influence only at the .05 level ($\beta = .08$, p = .045).

Further, hypothesis 3, which states that risk avoidance highly influences uncertainty avoidance with a value of $\beta = .50$ (p < .01) can be confirmed. Following the notion that perceived transparency has a primary influence on other product perceptions, the results reveal highly significant regression weights on perceived protection ($\beta = .46$, p < .01) and perceived risk ($\beta = -.48$, p < .01), supporting the hypotheses 4a and 4b. Finally, all perceptions about a product indicate a significant effect on the intention to buy (H5a-H5c). Here, perceived protection ($\beta = .45$, p < .01) has the highest influence, which seems intuitive since the product investigated is a unit-linked life insurance. The aim of an insurance product is to alleviate people's fears, and thus the perceived protection seems to be the closest to the basic objective of insurance products and delineates the product's ability to make people feel safe. Additionally, to reflect the binary coding of intention to buy, we use a Markov Chain Monte Carlo (MCMC) estimation with a logistic coupling function to obtain results for the probabilistic influence of product perceptions on intention to buy. As intuitively expected, our results show higher standardized regression results as obtained by the initial maximum likelihood estimation. Perceived risk has a regression weight of -.10, perceived transparency has a weight of .16, and perceived protection has a value of .58. Similarly, the variance explained in buying changes considerably. We acknowledge that the results of our logistic coupling function are more accurate and thus the values of the ML estimation are shown in bold in Figure 2. Nearly all hypotheses with respect to the formation of product perceptions are supported. We confirm that personal attitudes directly affect product perceptions, which in turn determine the probability of intention to buy.

Figure 2

Results for the base model
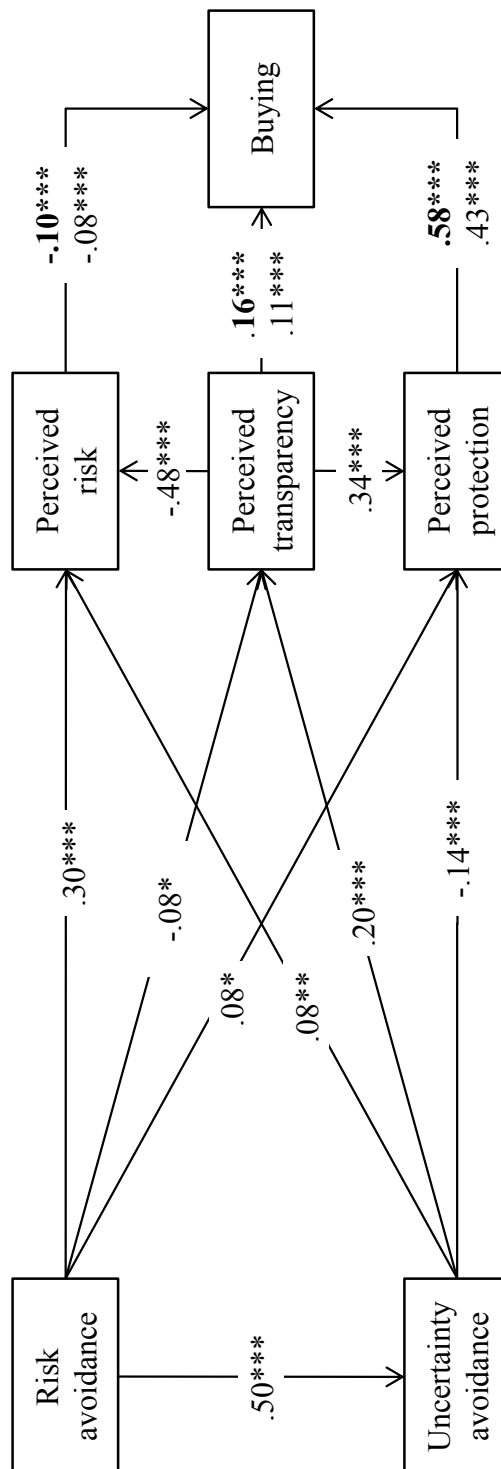
Note: Standardized regression weights; standardized MCMC regression weights shown in bold, * p <.10, ** p <.05, *** p < .01.

4.3 Test of alternative model specification

Our model assumes that perceptions of the product influence the intention to buy directly while general attitudes influence the intention to buy only through aforementioned perceptions. This model specification is guided by the theory stipulating attitude-perception-intention relationships (Manstead 1996). However, to evaluate our model's specification, we additionally test full or partial mediation by checking if the direct paths from risk avoidance and uncertainty avoidance are significant. The results provide reasonable basis for our model, as the additional path is non-significant, and the fit of the resulting model does not improve significantly ($\Delta\chi^2$/df = .1/1; p = .75). We test for mediation regarding uncertainty avoidance in the same manner. Accordingly, the direct path from uncertainty avoidance to buying is non-significant, and the fit of the overall model does not improve ($\Delta\chi^2$/df = 1.1/1; p = .29). We conclude by stating that our initial model best explains the underlying relationships.

4.4 Test of moderation

The initial findings suggest that underlying attitudes significantly influence product perceptions. Moreover, risk avoidance presents a rather emotional component while uncertainty avoidance is rather analytical, lending support to previous notions of *risk as feelings* and *risk as analysis* in the area of risk (e.g., Slovic et al. 2004). To complement initial findings, we investigate specific moderation effects, classifying trust and an additional investment-guarantee as intuitive and emotional moderators and expertise as a cognitive moderator. In doing so, that is, by adding a product characteristic (a prevalent guarantee), we don't rely only on self-perceptions. To investigate moderation effects of continuous factors, namely trust and expertise, we follow the method suggested by Little, Bovaird and Widaman (2006). In the first step, we calculate the product terms for each indicator of the latent moderator factor and each indicator of the moderated construct. Second, we orthogonalize the product terms by regressing each product on both latent constructs' items. For instance, we regress the product term of item 1 of the latent construct trust and item 1 of risk avoidance on all items of trust and on items 1-5 of risk avoidance. For each

product term, we save the residuals for this calculation as new variable, in our case, we add 43 new variables to the data set for six expected moderation effects (trust and expertise on risk avoidance and uncertainty avoidance). In the structural model, the respective regression residuals, for instance 15 for the moderation effect of trust on the relation between risk avoidance and purchase behavior, form a new latent factor, which we then regress on risk avoidance. Thus, the construct contains information about the product of the original constructs. If new latent factor significantly influences the latent construct (i.e., perceived risk), a moderation effect would be in place (Kenny and Judd 1984).

The moderation effect of a risk guarantee (coded categorical) is analyzed by dividing the sample into two subsamples. On this basis, we calculate two different models. First, the respective structural path is estimated without setting restrictions. Second, an alternative model is specified where this path is constrained to be equal across samples. The significant χ^2-difference between both models and varied influence of the independent variable on the dependent variable (e.g., from risk avoidance on perceived risk) would confirm the respective hypothesis. This method follows common practice of other researchers (e.g., Walsh, Evanschitzky, and Wunderlich 2008; Paridon, Carraher, and Carraher 2006) for testing moderation effects of categorical variables. Table 3 reports the results of the moderation analysis.

Table 3
Test and results of moderation hypotheses

Moderator	Structural relations	Group	n	β	Δχ¹/df	p-value	Result
Guarantee							
	Risk avoidance => PR	Guarantee	634	.28	3.310	.069	*Support for H7a*
		No guarantee	295	.34			
	Risk avoidance => PT	Guarantee	634	-.07	.100	.750	*No support for H7b*
		No guarantee	295	-.13			
	Risk avoidance => PP	Guarantee	634	.07	.904	.340	*No support for H7c*
		No guarantee	295	.08			
Trust							
	Trust => PR			-.01		.683	*Support for H6a*
	Risk avoidance => PR			.31		<.001	
	Trust × Risk avoidance => PR			-.11		<.001	
	Trust => PT			.26		<.001	*No support for H6b*
	Risk avoidance => PT			-.07		.140	
	Trust × Risk avoidance => PT			-.01		.960	
	Trust => PP			.28		<.001	*Support for H6c*
	Risk avoidance => PP			.08		.040	
	Trust × Risk avoidance => PP			.06		.069	
Expertise							
	Expertise => PR			.05		.970	*Support for H8a*
	Uncertainty avoidance => PR			.09		.030	
	Expertise × Uncertainty avoidance => PR			-.12		<.001	
	Expertise => PT			.14		<.001	*Support for H8b*
	Uncertainty avoidance => PT			.21		<.001	
	Expertise × Uncertainty avoidance => PT			-.11		.002	
	Expertise => PP			.08		.020	*No support for H8c*
	Uncertainty avoidance => PP			-.13		.003	
	Expertise × Uncertainty avoidance => PP			.00		.970	

Note: PR = perceived risk, PT = perceived transparency, PP = perceived protection; standardized regression weights are shown.

Our tests support several of our hypotheses. With a p-value of .069, a prevalent guarantee moderates the relationship between risk avoidance and perceived risk. That is, supplementing the unit-linked life insurance with a guarantee significantly lowers the influence of risk avoidance on the perception of the product's risk. However, the results don't support the prevalence of a moderation effect of guarantee on the influence of risk avoidance on perceived protection or perceived transparency. Hence, contrary to our hypotheses H7b and H7c, the variable *guarantee* moderates only the direct relationship between risk avoidance and perceived risk (H7a). The second moderator, trust in the financial service industry, is hypothesized to weaken the influence of risk avoidance on product perceptions similarly to a guarantee (H6a - H6c). A significant moderation effect is found for the influence of trust on the relationship between risk avoidance and perceived risk ($\beta = -.11$, $p = <.001$). This implies that risk avoidant persons tend to perceive less risk when having high trust in the financial service industry as such. On the other hand, for persons with less trust in the industry, risk avoidance influences risk perceptions stronger than trust does.

Trust also moderates the relationship between risk avoidance and perceived protection. That is, trust increases the relationship between risk avoidance and perceived protection of a product ($\beta = .06$, $p = .069$). Nevertheless, the hypothesized moderation of trust (H6b) on the relationship between risk avoidance and perceived transparency cannot be confirmed ($\beta = -.01$, $p = .960$). All of the above moderation effects concern the component of *risk as a feeling*. To sum up, three of six hypotheses can be accepted. Both guarantee and trust moderates the relationship between risk avoidance and perceived risk to a considerable degree.

Figure 3
Significant moderation effects of continuous moderators (standardized results for interactions are shown)

a) Conditional influence of risk avoidance on perceived risk

b) Conditional influence of risk avoidance on perceived protection

c) Conditional influence of uncertainty avoidance on perceived risk

d) Conditional influence of uncertainty avoidance on perceived transparency
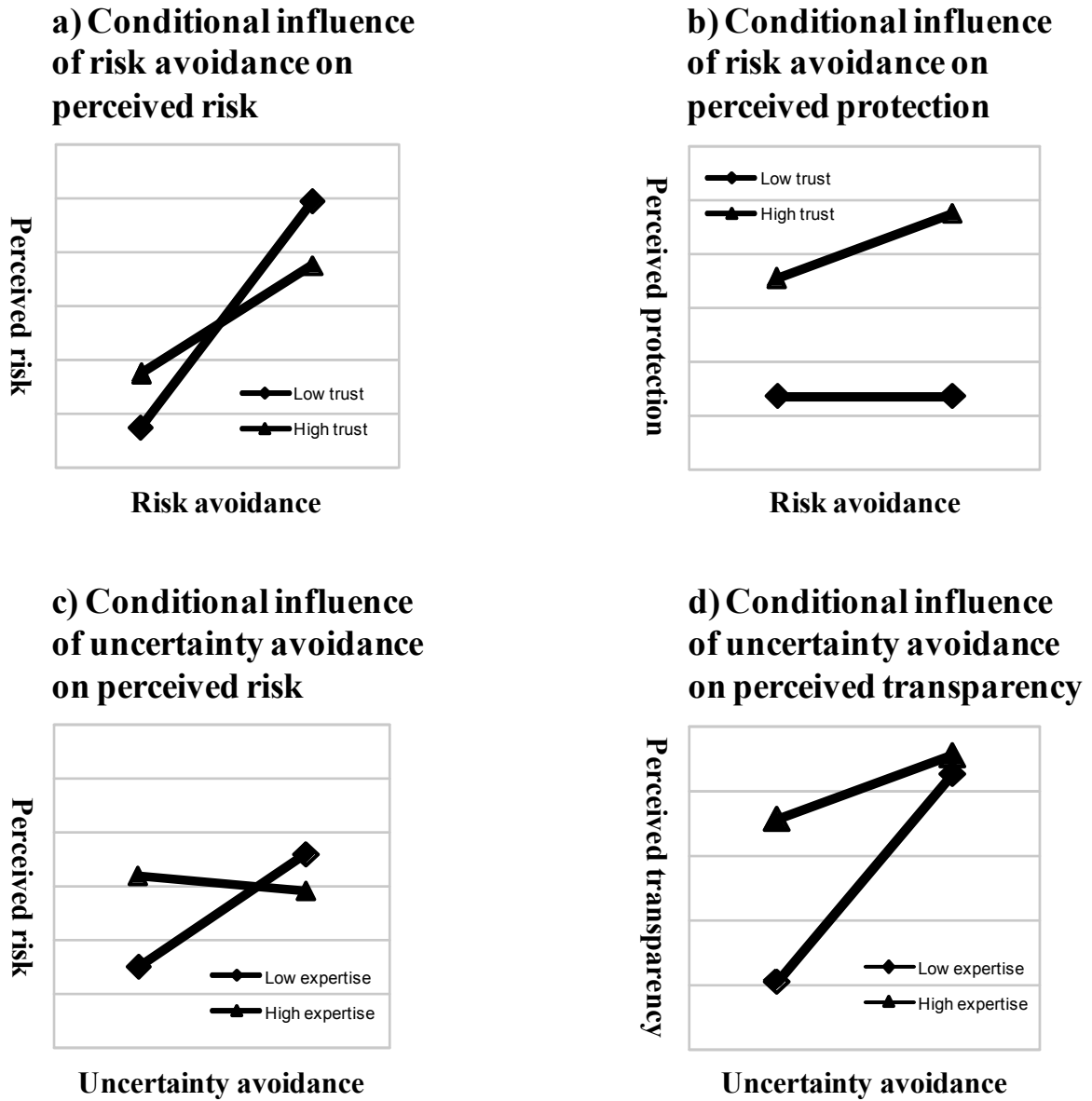
Additional moderation effects are determined when considering perceived expertise in terms of *risk as analysis* in decision-making. Our results support two out of three proposed hypotheses. First, our results support a moderation effect of expertise on the influence of uncertainty avoidance on perceived risk ($\beta = -.12$, $p < .01$), as hypothesized by H8a. Similarly, we find a significant moderation effect supporting H8b, that is, expertise moderates the relationship between uncertainty avoidance and perceived transparency ($\beta = -.11$, $p = .002$). In other words, people high on uncertainty avoidance and expertise realize that a product offers less transparency. Here, perceived expertise considerably decreases the highly positive influence of uncertainty avoidance on perceived risk of a product, as seen in Figure 3D. However, we find no moderation effect of expertise on the relation between uncertainty avoidance and perceived protection (H8c).

Checking the robustness of our hypotheses, we split perceptions into two components and additionally interchange the effects of our moderators. That is, we test for moderation effects of trust on the influence of uncertainty avoidance, as well as moderation effects of expertise on the influence of risk avoidance. This test additionally lends support to our hypotheses that delineate two distinct components, as we don't find additional moderation effects.[11]

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[11] We do not display the results of the additional tests, however results can be provided on request.

5 Discussion and implications

Our study sheds light on the antecedents of financial decision-making by delineating the relationships between fundamental attitudes, product perceptions, and the intention to buy a product in the highly relevant context of unit-linked life insurances. Moreover, we describe the moderating roles of trust, expertise, and investment guarantees. Doing so, we position our paper within the field of behavioral finance and behavioral insurance and contribute to the research on the antecedents and particularly the influence of attitudes on perceptions and subsequently behavior in the financial decision-making process. Likewise, we confirm the link between product perceptions and behavioral intentions (e.g., Diacon and Ennew 2001). However, we believe that the main contribution of the article is that it investigates not only product perceptions, but also the underlying attitudes that determine perceptions. Particularly, we examine the influence of consumers' attitude of risk avoidance and consumers' attitude of uncertainty avoidance on the product perceptions perceived risk, perceived protection, and perceived transparency. Our results highlight the significant influence of these attitudes on product perceptions, hence emphasizing an attitude-perception-behavior chain in the financial decision-making context.

Furthermore, we do not only test these initial links of attitudes, perceptions, and behavior empirically, but also the two components of decision-making, namely *risk as feeling* and *risk as analysis,* in a state of risk and uncertainty as proposed by Slovic and colleagues (Slovic et al. 2004; Slovic and Peters 2006). While aforementioned articles are mainly conceptual, we provide empirical evidence of these two underlying components. We define consumers' attitude of risk avoidance as the feelings component and consumers' attitude of uncertainty avoidance as the analytical component. Further, we specify trust and the prevalence of a guarantee as moderators of the *risk as feeling* as well as self-perceived expertise as a moderator of the *risk as analysis* path (Slovic et al. 2004) and find several significant moderating effects. Especially trust and self-perceived expertise provide basis for the conceptualization of the decision-making process in two components. That is, trust significantly moderates the

emotional component, while self-perceived expertise influences the relationship between uncertainty avoidance and product perceptions, which provides even stronger support for our model that partitions decision-making into two components. Moreover, we want to point out that we additionally test moderators of trust on uncertainty avoidance as the cognitive component and moderators of expertise on risk avoidance. The insignificance of both moderation effects, which would competitively influence both components, underlines the existence of two distinct components in the decision-making process in a state of risk and uncertainty. Although hypothesizing moderation effects of an investment guarantee, we only find a significant moderation effect for one of the links, specifically the link between risk avoidance and risk perceptions. Overall, these findings empirically confirm the *risk as feeling* and *risk as analysis* components and shed further light on the antecedents of financial decision-making.

Besides these important theoretical implications, we further emphasize the practical value of this study, even though the following implications are tentative since our study does not entail a real buying situation and proves true only for the sample representative for Switzerland. Knowing about consumers' reasons for buying and the antecedents of their decision-making processes is one of the most crucial issues when companies design, advertise, and sell products (e.g., Zeithaml 1988). This proves true especially for unit-linked life insurance products, since decision-making under risk and uncertainty is somewhat more complex compared to decision-making under certainty and indicates very specific circumstances, as insurance products appear less accessible to consumers compared other products and entail longer lasting relationships. Hence, a thorough understanding of consumers' decision-making process and reasons for buying can be considered crucial for companies that focus on the consumer. Even though it is difficult for insurance companies to understand consumers' attitudes, our results show that it might be worthwhile to know more about consumers' attitudes since they significantly influence product perceptions and finally consumers' purchase intention. However, the corresponding moderators of trust and expertise might be easier to assess.

Our findings about consumers' financial decision-making provides a basis for segmentation approaches, as previous research has shown (e.g., Hultén 2007; Dimitriadis, Kouremenos, and Kyrezis 2011). Hence, companies are better capable of adjusting product features and the distribution channel, as well as offer the product to customers based on their attitudes; thus, using a more individually tailored marketing strategy to acquire customers. In this context, knowing about the influence of perceptions on purchase intention, purchase intention can be influenced by decreasing consumers' perception of risk and enhancing consumers' perceived transparency and perceived protection. Our moderators provide evidence that this can be done by enhancing consumers' trust in the insurance agent, e.g., through a harmonized customer relationship management, or in the company, e.g., through a sound risk management and a transparent communication. Furthermore, regulatory authorities and governments should also be aware of the influence of trust in the financial markets on consumers purchase intention to buy or not to buy an life insurance product, since those products are an essential part of old-age provision. Further, the addition of investment guarantees provides an interesting product feature enhancing the *risk as feeling* component in the decision-making process. Finally, regarding the *risk as analysis* component of the decision-making process, it might enhance consumers' expertise with financial products promoted by not only governmental organizations, but also insurance companies through financial literacy education by explaining the product features and their risks in order to influence the financial decision-making process.

Even though further research is needed, e.g., in terms of extending the sample across countries and including cultural aspects as frequently done when testing models (Becker-Olsen et al. 2011; Jung, Yammarino, and Lee 2009), or testing our model using other financial products, it can be concluded that consumer attitudes and product perceptions play a crucial role in determining financial purchase behavior. Hence, research as well as financial services companies and regulators should consider the antecedents of financial decision-making considering both the *risk as feeling* and *risk as analysis* components.

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