

Customer Preferences in German Life Insurance Savings Products: A Conjoint Analysis Approach*

Michel Fuino, Liselotte Maichel-Guggemoos, Joël Wagner[†]

Abstract

Guaranteed interest rates and capital guarantees have been standard features in life insurance savings products in German-speaking countries. Life insurers sold products with interest rate guarantees up to 4% in the 1990s and still had an average guaranteed rate of about 3% in their in-force books in 2014. Since savings contracts are long-term contracts, the duration of such policies typically exceeds the duration of the insurers' assets. Thus, the current low-interest rate environment has increased pressure on the profitability of life insurers. As a consequence, insurers are developing products with alternative return schemes and moving away from fixed interest rate guarantees. This raises the question to what extent guaranteed interest rates and capital guarantees are valued by the customers and if these features can be compensated for by other benefits like higher expected returns or alternative investment profiles. To provide an answer to this question, we analyze data from a unique representative market study of the German population carried out in Germany in 2014. Based on a choice-based conjoint analysis, we estimate individual part-worth utilities through the hierarchical Bayes model. Our main findings include that the guaranteed capital amount is the attribute affecting customer preferences the most. Further, participating life insurance products offering guarantees are always preferred even if alternative products without guarantees offer expected returns that are more than three times higher. Such results are highly relevant for the developing life insurance business.

Key words: life insurance · financial guarantees · customer preferences

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1 Introduction

Since the 1990s, the yields on government bonds with maturities of up to ten years have been decreasing within OECD countries (Holsboer, 2000; Li et al., 2007; Bernoth et al., 2012; Capelle-Blancard et al., 2019). While the returns have been significantly above 4% per annum in the past, they are nowadays below 1% and even negative in some countries (Arias et al., 2016; Tokic, 2017). This low-interest rate environment as well as the long running nature of life insurance contracts threaten the profit margin of insurers offering guaranteed interest rates or capital guarantees (Grosen and Jørgensen, 2000; Consiglio et al., 2008; Schmeiser and Wagner, 2015; Eling and Schaper, 2017). Recently, the European Insurance and Occupational Pensions Authority (EIOPA, 2015) has identified the low yield phenomenon as one of the main risks for European life insurers (Pablo et al., 2011; Becker and Ivashina, 2015). In fact, due to the significant amount of guarantees in their books, life insurers have experienced financial distress in the past, e.g., Equitable Life in England, Garantie Mutuelle des Fonctionnaires in France and Mannheimer Lebensversicherung in Germany (Rymaszewski and Schmeiser, 2011; Schmeiser and Wagner, 2015). To protect insurers' policyholders, regulators have revised solvency regulatory frameworks in the last decade. New standards require insurance companies to hold significant amounts of capital when proposing such guarantees (Devolder, 2011; Reuß et al., 2015; Niedrig, 2015). In this context, Germany has been one of the most affected countries since its market is characterized by a high share of long-term contracts with interest rate guarantees (Gatzert, 2010; Maurer et al., 2013; Möhlmann, 2017). As things stand, a prolonged phase of low interest rates would lead to the bankruptcy of many insurers (Kling et al., 2007; Kablau and Wedow, 2012; Berdin and Gründl, 2015). While German authorities have responded by adjusting (lowering) the maximum technical interest rate for new business (Deutsche Bundesbank, 2018), i.e. the maximum rate at which life insurance companies are allowed to discount future cash flows, insurers have developed products without fixed interest rate or capital guarantees (Gatzert and Schmeiser, 2013; Reuß et al., 2016). Indeed, this allows insurers to be less constrained to risk-free investments and enables to design products allowing for investments in more risky assets (Huang, 2010; Berry-Stolzle et al., 2011; Krieger, 2016). This is particularly relevant in times of low yields where such strategies allow for a win-win situation between insurers and their policyholders (Mirza and Wagner, 2018). Therefore, offering high financial guarantees currently appears outdated; nevertheless, at the moment, no substitute convincing all customers has been found. On the one hand, individuals have often non-rational preferences (Slovic et al., 2002; Cutler et al., 2008; Zweifel and Eisen, 2012) making the replacement of guarantees a complex topic. On the other hand, preferences are heterogeneous and depend on many socioeconomic factors (Feldman and Schultz, 2004; Bohnert et al., 2014; Braun et al., 2016). As a consequence, several major insurers like Zurich, Generali and ERGO have moved away from the classical guarantee business (Fromme, 2015).

The aim of this paper is twofold. First, we want to find out, which product characteristics are the ones that have the highest affect an individual utility. Second, we analyze under which conditions a customer would purchase a product without fixed guarantees in Germany. More precisely, we investigate on changes in preference for guarantees when an individual can choose among products with different risk-return features. We base our study on novel data stemming from a survey conducted in 2014 among 1 000 individuals. Using the theoretical framework of choice-based conjoint (CBC) analysis as well as the hierarchical Bayes (HB) model, we are able to evaluate consumer preferences along demographic and socioeconomic factors.

While customer preferences have been broadly studied in non-life and health insurance (see, e.g., Costa-Font and Font-Vilalta, 2004, Van den Berg et al., 2008, and Tselentis et al., 2018), only few studies have clearly analyzed customer preferences for life insurance savings products with financial guarantees (Boyle and Tian, 2008; Branger et al., 2010). Based on a CBC framework, Braun et al. (2016) analyze customer preferences and the willingness-to-pay for term life insurance contracts. In their study, they find that the premium, the insurance brand, the presence of a critical illness cover and the underwriting procedure are the major factors influencing customer choices. Customer preferences for participating life insurance contracts under the assumption of a fair pricing by the insurer are studied by, e.g., Døskeland and Nordahl (2008). Given different customer preferences regarding the various contract parameters guaranteed interest rate, annual surplus participation rate and terminal surplus participation rate, Gatzert et al. (2012) recommend a segmentation of customers according to their preferences to maximize the customers utility and thereby willingness-to-pay while keeping the contract value fixed for the insurer (see also Gatzert et al., 2011). Although the optimal level of the guaranteed interest rate depends on the individual customer, a lower rate can be beneficial for the customer (Schmeiser and Wagner, 2015). Indeed, given the recently introduced solvency requirements, guarantees are expensive in terms of the capital needed by the insurers. More risky but potentially rewarding investment strategies are difficult to put in place. Chen et al. (2019) study the optimal asset allocation guided by policyholders' preferences in innovative retirement products. An explanation why customers nonetheless favor products with guarantees can be derived by using a behavioral model which factors in the concept of loss aversion (Døskeland and Nordahl, 2008). Some papers try to explain the demand for guarantees by Kahnemann/Tversky's prospect theory (see, e.g., Døskeland and Nordahl, 2008, Dierkes et al., 2010, Chen et al., 2015, Ruß and Schelling, 2018). In the present research, we use a CBC framework with HB estimations to analyze the preferences when choosing insurance (Wellman and Vidican, 2008). When compared to ratings and rankings, the CBC approach is the most suited for measuring individual preferences since it requires less detailed comprehension of the marketplace and therefore can be representative of the whole population (Huber, 1997). Indeed, choice tasks closely mirror real purchase situations of potential customers and the method has become common in market research. Further arguments for the method and a discussion of the theoretical foundations from random utility theory can be found in Braun et al. (2016, Sect. 2.1 and 2.2). The theoretical framework for a CBC is best presented by the series of Sawtooth Software CBC-related research publications, see, e.g., Orme (2009).

The key results from our study indicate that individuals have strong preferences for guaranteed life insurance products when confronted with riskier alternatives proposing higher yields in the absence of financial guarantees. Analyzing customer preferences, we find that the amount of guaranteed capital is the attribute with the highest influence on the product selection. In such context, one could think that individual demographic, socio-related and economic savings characteristics importantly shape preferences. Indeed, risk preferences may be different in men and women and investment preferences vary among customers with different income or education levels. However, our outcomes do not support such hypotheses and highlight that decisions are mostly driven by product characteristics such as the presence of guarantees and the highlighted expected returns. Aside these conclusions, we state that individual preferences are heterogeneous and that the granularity of our analysis does not allow to properly distinguish decision patterns. Therefore, most of our results focus on mean preferences. By studying combinations

of guarantees and expected returns, we note that a product offering a higher level of flexibility and an individualized asset allocation, letting customers reallocate assets in a secure investment if desired, appears to be the preferred alternative to the traditional products with guarantees. Nevertheless, such schemes are only considered by customers when the expected returns are high enough.

The remainder of this article is organized as follows. In Section 2, we review the German life insurance market describing the main products as well as the development of premium shares, technical interest rates and rates of returns. We describe the survey design and provide descriptive statistics on the observed responses in Section 3 and we outline the theoretical framework of the CBC approach and the HB model in Section 4. We present and discuss our results along part-worth utilities, relative attribute importance and product switching behavior with respect to the shares of preferences in Section 5. We conclude in Section 6.

2 Landscape of the life insurance business in Germany

In the following, we describe the size and structure of the life insurance market and consider the regulatory and economic framework in Germany (Section 2.1). Then, in Section 2.2, we showcase the development of the business to highlight the specifics of the German market with its high prevalence of products with guaranteed interest rates. We also discuss the increasing pressure on profitability on both the new and the in-force business in an ongoing low interest rate environment.

2.1 German life insurance market

In terms of premiums volume, the German life insurance sector ranks among the ten largest markets worldwide (Swiss Re, 2019).¹ Five products are sold by German life insurers: First, endowment insurance pays out a lump sum at maturity to the policyholder in case of survival or to a designated beneficiary in case of death. Second, annuities and pension insurance guarantee recurrent payments under specific conditions and for a specific period of time. Both products are participating life insurance contracts and usually include a guaranteed interest rate. Each year policyholders participate in the insurer’s surplus and the interest rate guarantee is of cliquet-style type. This means that the policyholder’s reserves are credited with the technical interest rate on a yearly basis. All returns are locked in, increase the guaranteed amount and next periods’ interest rates are applied to them (Bohnert and Gatzert, 2011; Eling and Holder, 2013b). Then, unit-linked contracts of endowment and annuity types differ from the previous ones by promising higher returns but leaving the financial risk to policyholders. Unit-linked investments are separated from those of traditional contracts since neither the capital nor the interest rate are guaranteed. Instead, benefits are determined based on the fair value of units of a mutual fund (CEA, 2007). Finally, group life insurance covers a body of people typically working within the same company and the bucket “supplementary insurance” includes, e.g., accident or disability insurance riders (Gesamtverband der Deutschen Versicherungswirtschaft, GDV, 2019).

¹In Germany, with 45.8% of the premiums, life insurance business is more important than non-life (34.5%) and private health insurance (19.7%, Gesamtverband der Deutschen Versicherungswirtschaft, 2019).

The sector has undergone important regulatory and economic changes in the past years. On a national level and based on the pension reform from 2001, the “Riester-Rente”, a State-sponsored retirement provision, was introduced in January 2002 (GDV, 2004). Further, the life insurance reform act (“Lebensversicherungsreformgesetz”) and the retirement income act (“Alterseinkünftegesetz”) became fully effective in 2015. The first law was enacted by the regulator to ensure the financial viability of life insurance companies and thereby the protection of insurance customers in the prevailing low interest rate environment (Elsner, 2015). The second act changed the way pensions are taxed in Germany (Bundesministerium der Finanzen, BMF, 2019). Other regulatory changes such as the introduction of the European General Data Protection Regulation (Goddard, 2017) and the Insurance Distribution Directive (De Maesschalck, 2017) have affected insurance companies. From an economic perspective, the burst of the dot-com bubble at the beginning of the century and the global financial crisis with the resulting difficult market conditions and low interest rate environment have put pressure on the life insurance business (Hieber et al., 2015; Demary and Matthes, 2014).

2.2 Premium shares, technical interest rates and rates of returns

Premium shares In Figure 1, based on numbers reported by GDV (2019), we lay out the development of premium shares along life insurance products in Germany for the period from 1990 to 2018. We observe three main developments in that period. First, endowment products lose their dominant market position from 82% in 1990 to about 26% in 2018 while annuity and pension products increase their market share from 5% to 31%. In absolute numbers, endowment policies are with almost 23€ bn in 2018 on the same level of gross written premiums than in 1990, showing the overall increase of the life insurance business in Germany. To a large extent, this is due to regulatory changes increasing the attractiveness of annuity and pension products while lowering the one of endowment products. For example, the introduction of the “Riester-Rente” contributed to a rising popularity of annuity and pension products. The Riester pension plan is a private plan where customers profit from State subsidies and tax exemptions. It has largely contributed to the shift towards pension products in Germany. Indeed, this product was

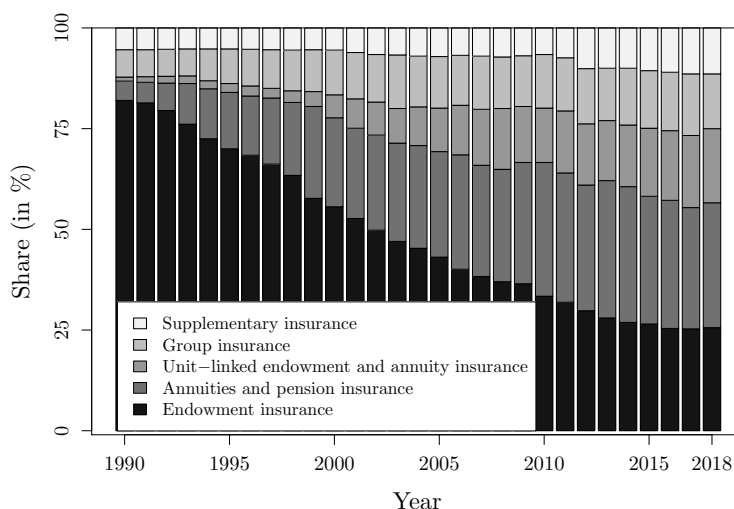


Figure 1: Development of life insurance product shares from 1990 to 2018.

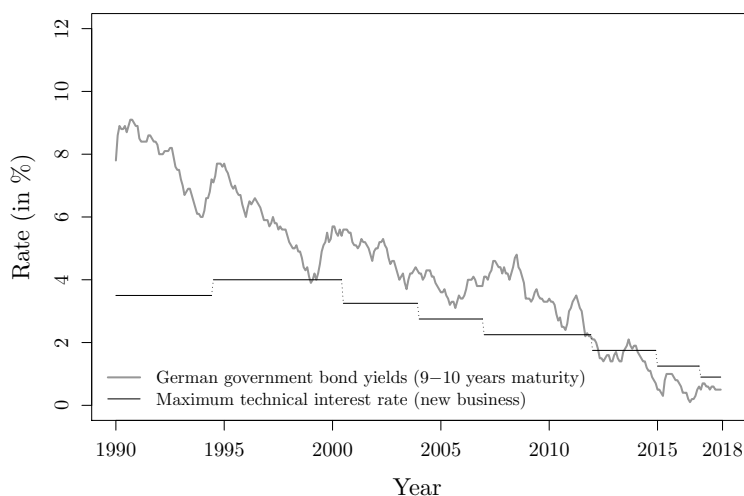


Figure 2: Government bond yields and maximum technical interest rates from 1990 to 2018.

introduced to close the pension gap from the statutory pension system and was heavily advertised (Eckardt et al., 2018). At the same time, following the retirement income act (GDV, 2004), taxation laws have become less favorable for lump sum payouts. Second, the life insurance business is dominated by products with interest rate guarantees, although their share is decreasing from 87% in 1990 to 57% in 2017 (sum of endowment, annuities and pension insurance). Third, unit-linked products gain market share. While almost nonexistent in 1990, the market share of unit-linked contracts has continuously grown up to 18% in 2018.

Technical interest rates The yield of government bonds and the maximum technical interest rate are key drivers for new life insurance business. Set by the BMF, the maximum technical interest rate represents the maximum rate at which life insurance companies are allowed to discount future cash flows. As a key matter for insurance companies, nonbinding recommendations are provided by the Federal Financial Supervisory Authority and the German Association of Actuaries.² In Figure 2, we report the evolution of the government bond yields and the maximum technical interest rate to be applied for new business in the period between 1990 and 2018. It is important to note that such changes only affect new business and not in-force contracts. Set at the level of 3.5% in 1990, the maximum technical interest rate has raised to 4.0% in 1994 to account for government bonds' yields above 8% (Favero et al., 1997; Koivu et al., 2005). The rate remained at 4.0% until July 2000, when it was lowered to 3.25%. From this date on, the rate has continuously decreased to 2.75% in January 2004, to 2.25% in January 2007, to 1.75% in January 2012 and to 1.25% in January 2015. The latest adjustment to 0.9% was made in January 2017, only two years after the last change. Despite these adjustments, the graph shows that since 2012 the maximum technical interest rate for new business is above the average yields on German government bonds. Thus, new business with guarantee products is hardly profitable

²For setting the maximum technical interest rate, the BMF uses a method based on the five-year rolling average of the yields of German government bonds (AAA-rated) with maturities between 9 and 10 years (GDV, 2014). Thereby, the new rate must not exceed 60% of the calculated average (Eling and Holder, 2013a). Since the introduction of the Solvency II regime in 2016, the regulatory requirements for the maximum technical interest rate and its calculation method are no longer mandatory. Nonetheless, the BMF decided to continue with the current system until sufficient experience with the new solvency regime has been gained.

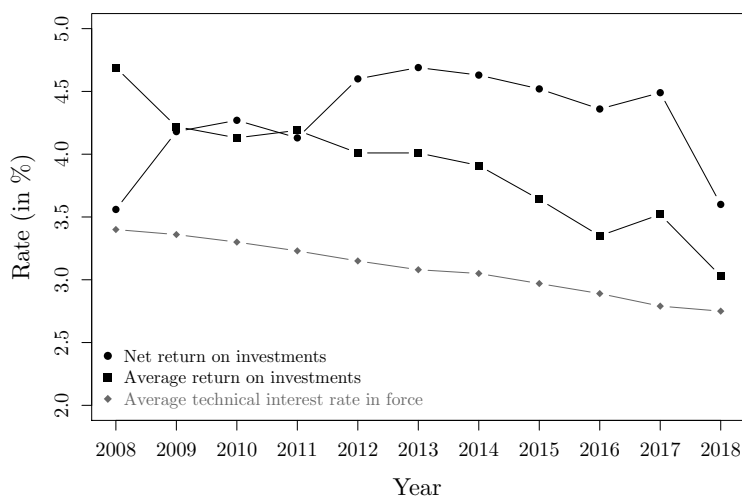


Figure 3: Investment returns and market portfolios' average technical interest rate between 2008 and 2018.

in the current low-interest rate environment.

Rates of returns In Figure 3, we illustrate the development of the net return on investment, the alternative return on investment and the market portfolios' average technical interest rate (numbers are taken from Deutsche Bundesbank, 2018). The overall average technical interest rate has slowly decreased (from 3.4% in 2008 to 2.75% in 2018), because changes in the rate only affect new contracts (as described above). Average returns on investments, representing the net return on investment adjusted for extraordinary income and expenditures, have continuously decreased from 4.7% in 2008 to less than 3.5% in 2018. In comparison, the net return on investments, computed as the investment income minus the investment expenses divided by the annual average investments, has followed a different trend over the same period (German Council of Economic Experts, 2016). This is relevant, since German life insurers have improved their net return on investment by realizing high amounts of valuation reserves. As a consequence, the net return on investments still exceeds the portfolios' average technical interest rate by 0.9 percentage points in 2018. When adjusted for extraordinary effects, the excess is only 0.3 percentage points. The increasing profitability pressure on new business and the in-force portfolio requires insurers to develop products with alternative policyholder return schemes. They need to move away from fixed interest rate guarantees, but need to develop products that are nonetheless attractive to customers. This raises the question to what extent guaranteed interest rates and capital guarantees are valued by the customers and if these features can be compensated for by other benefits like a higher expected return or an attractive investment concept. Finding an answer to this question using data from a customer survey is the objective of this study.

Guarantee: security for your pension	Real estate: stable return hedged with first-rate real estate	Anti-cyclic: capital market opportunities & active risk control	Opportunity: promising return
<ul style="list-style-type: none"> • You invest in the strong traditional fund of the insurer and profit from its diversified investment and high safety level. • The insurer guarantees a payout of g of the initial capital at the term of the contract. • With this safe investment you can expect an annual return of r_G. 	<ul style="list-style-type: none"> • You invest in first-rate commercial real estate situated in top locations in Germany. • Given the stable rental income of the real estate in the portfolio, annual returns have not dropped below 3% in the last five years. • With this investment you can expect a medium-term annual return of r_R. 	<ul style="list-style-type: none"> • The investment offers an asset management notion allowing to participate in market developments. • You are protected against return fluctuations by a hedging strategy. • You can expect medium-term annual returns of r_A. • Historical returns show that target returns have rarely been missed and only when unusual market developments occurred. 	<ul style="list-style-type: none"> • You design your own investment strategy from more than 100 funds of various providers. • You can invest high yield and expect a medium-term annual return of r_O. • If desired, you can invest or reallocate your assets in secure investments, e.g., in times of unfavorable market developments.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Would you buy the selected product if it would be offered on the market?

Yes, that looks like a good product for me.

No, I would rather look for other offers.

Note: The attributes g , r_G , r_R , r_A and r_O take different values (levels) in each scenario. The original cards are presented in German language.

Figure 4: Illustration of the survey set up with four proposed products per investment scenario.

3 Survey design and descriptive statistics

3.1 Concept of the survey and collected covariates

Survey design The survey is composed of two parts. In the first part, participants are asked to provide information on demographic (gender and age), socio-related (children, income, employment, financial decisions and education) and economic factors (savings motivations and products). In the second part, respondents are guided into a choice-based study and set into the following situation (translated from the original German text):

“You would like to invest 10 000 € for your retirement provision. Your financial advisor presents you four products that meet all your requirements but differ regarding the expected risks and returns. You have to evaluate product information in eight scenarios and in each scenario you have to choose the product that is most appealing to you.”

After reading the aforementioned text, participants are exposed to eight different investment scenarios. In each scenario, they must choose one among four products with different risk-return characteristics and say if they would or would not buy the selected product. Participants are always facing the same combination of four types of products. We illustrate one such scenario in Figure 4. As we lay out below, in each of the scenarios the proposed attributes have different levels and product types are presented in a randomized order.

The first proposed product is named “guarantee” (G) and offers both capital and interest

rate guarantees. In the CBC design, this product has two attributes. They are the capital guarantee as percentage g (110%, 100% or 90%) of the initial capital and the guaranteed interest rate r_G that takes values conditioned by the value of g . When g is equal to 110%, the interest rate r_G can take the following three low, medium and high values: 1.6%, 2.0% and 2.4%. When g equals 100%, r_G can be either 2.0%, 2.5% or 3.0%. Finally, when g is equal to 90%, proposed values for r_G are among 2.4%, 3.0% or 3.6%. The second product is called “real estate” (R) as it invests the policyholder’s capital in real estate. It offers stable returns that are hedged with first-rate German commercial real estate. While this products does not propose any guarantees, the considered expected returns r_R of 4.0%, 5.0% or 6.0% are higher when compared to the guarantees in the first product. The characteristics of this product are close to the ones of the “Swiss Life Premium Immo” product offered by Swiss Life (2019). We call the third product “anti-cyclic” (A) since it combines investment that participate in market developments with a return smoothing strategy protecting the portfolio against strong fluctuations. Without guarantee, this product is expected to provide annual returns r_A of 4.0%, 5.0% or 6.0%. The design and the values of this product are based on the “Global Absolute Return Strategy Fund” product offered by Aberdeen Standard Investments previously branded Standard Life (2001). The last product is named “opportunity” (O) and lets customers make their own investment decisions. In fact, customers can define the asset allocation by selecting investments from a range of 100 funds from different providers. The product is said to provide expected returns r_O of 4.8%, 6.0% or 7.2%. Such product is representative of the product “Super for Life” from the Australian financial group BT. We provide a synopsis of the attributes and the surveyed levels in Table 1.

Attribute	Levels
Type of product (p)	Guarantee (G), real estate (R), anti-cyclic (A) and opportunity (O)
Capital guarantee (g)	90%, 100% and 110%
Interest rate (r_G)	1.6%, 2.0% and 2.4% if $g = 110\%$ 2.0%, 2.5% and 3.0% if $g = 100\%$ 2.4%, 3.0% and 3.6% if $g = 90\%$
Interest rate (r_R)	4.0%, 5.0% and 6.0%
Interest rate (r_A)	4.0%, 5.0% and 6.0%
Interest rate (r_O)	4.8%, 6.0% and 7.2%

Table 1: Summary of the attributes and levels used in the survey study.

Covariates While the CBC study allows gathering potential customers’ preferences, the first part of the survey is devoted to collecting participants’ characteristics.³ First, respondents indicate their gender, their age along classes (see Table 3 for details) and if they have children. Further, they give information about their yearly gross income. Then, they report their current employment situation and their highest degree of education. For both, employment situation and education, the proposed classes are taken from the standard categories proposed by the German statistical office (Statistisches Bundesamt, 2017). Due to additional complexity,

³The order in which the questions are asked in the study is not ideal since demographic and social-related data should be collected at the end of the survey. Indeed, a conjoint analysis requires high cognitive effort of the participants and therefore these questions about the products should be asked first. Nevertheless, socio-demographic information is necessary to operate and balance the selection of participants to ensure a pool that is representative of the population.

Product	N	Yes (in %)	No (in %)
Guarantee	3 482	56.98	43.02
Real estate	1 283	60.56	39.44
Anti-cyclic	1 138	58.08	41.92
Opportunity	2 065	62.08	37.92

Note: The overall sum of N is equal to 7 968 and corresponds to the 996 respondents choosing 8 cards each. The columns “Yes (in %)” and “No (in %)” respectively refer to share of responses selecting “Yes, that looks like a good product for me.” and “No, I would rather look for other offers.” to the question “Would you buy the selected product if it would be offered on the market?” (see Figure 4). Values are expressed in % of N for each product.

Table 2: Descriptive statistics of the product selection and the willingness to buy.

financial literacy is not controlled for. The present work only provides information through proxies like age, employment and education. Further, participants provide information on their involvement in financial decisions by indicating who makes the financial decisions in the household. Respondents must select one of the three following propositions: “I make the decisions concerning finances in the household alone”, “I make the decisions concerning finances in the household after coordinating with other members of the household”, and “Another member of the household makes the decisions concerning finances in the household, taking into account my opinion”. Respondents that are not involved in the financial decision taking are excluded from the survey since we are interested in the subpopulation familiar with a household’s financial matters. Thereafter, a set of questions focuses on economic behavior regarding savings. Participants indicate their top three personal motivations to save among the following: fulfillment of specific wishes (e.g., car, furniture, consumer electronics and vacation), real estate acquisition, provisions for difficult times (e.g., unemployment, sickness), asset preservation and growth, planning for retirement, provisions for children, and other.

3.2 Available data and descriptive statistics

The data for our study comes from the survey described in Section 3.1 and commissioned by the Boston Consulting Group GmbH in 2014. The available dataset comprises complete records from 996 participants. The pool of respondents is a representative subset of the general German population. In order to avoid selection bias, the survey process and participant recruiting has been outsourced to a professional polling company.

Product choice In each of the eight scenarios, the 996 respondents chose their preferred product and indicate their willingness to buy the selected option (yes/no from the additional question in Figure 4). Therefore, we account for 7 968 ($= 8 \times 996$) responses informing on product selection and willingness to buy. Among them, 3 482 choose the guarantee product, 2 065 the opportunity product while 1 283 and 1 138 responses relate to the real estate and anti-cyclic options, respectively (see the column N in Table 2). When considering the willingness to buy, we note a quite homogeneous behavior along products, i.e. higher percentages indicating rather a positive answer (yes) than a negative answer (no) to the question “Would you buy the selected product if it would be offered on the market?”. Nonetheless, we note that responses in favor of buying the opportunity product account for the highest share in willingness to buy (62%). In Table 2, we report the product choices and the willingness to buy the selected products.

<i>Demographic factors</i>								
Age			Gender					
18 – 24	%	12.0	Male	%	49.0			
25 – 34	%	14.0	Female	%	51.0			
35 – 44	%	18.0						
45 – 54	%	19.0						
55 – 64	%	14.0						
> 65	%	23.0						
<i>Socio-related factors</i>								
Children			Employment		Education			
Yes	%	64.0	Employed	%	58.9	No school degree	%	0.1
No	%	36.0	In training	%	9.1	Secondary school	%	9.5
Yearly gross income (in €)			Retired/inactive	%	29.4	Intermediate school	%	26.7
< 20 000	%	20.6	Unemployed	%	2.6	Grammar school	%	18.8
20 000 – 39 999	%	34.3	Financial decisions			Vocational school	%	16.1
40 000 – 59 999	%	20.0	Alone	%	56.9	University of applied science	%	11.8
60 000 – 79 999	%	11.1	With other household members	%	37.9	University	%	17.0
80 000 – 99 999	%	7.0	Influences decision of others	%	5.2			
≥ 100 000	%	7.0						
<i>Economic savings factors</i>								
Savings motivation (first choice)			Savings motivation (second choice)			Savings motivation (third choice)		
Fulfillment of specific wishes	%	44.4	Fulfillment of specific wishes	%	22.5	Fulfillment of specific wishes	%	13.6
Provision for difficult times	%	14.0	Provision for difficult times	%	24.1	Provision for difficult times	%	18.3
Planning for retirement	%	12.4	Planning for retirement	%	15.7	Planning for retirement	%	19.0
Real estate acquisition	%	9.8	Real estate acquisition	%	7.9	Real estate acquisition	%	4.6
Asset preservation and growth	%	9.4	Asset preservation and growth	%	14.9	Asset preservation and growth	%	15.6
Provision for children	%	7.0	Provision for children	%	11.8	Provision for children	%	12.2
Other	%	3.0	Other	%	3.1	Other	%	16.7
Nb. of individuals		996						

Table 3: Descriptive statistics of the participants’ demographic, social and economic factors.

Demographic, socio-related and economic savings factors In Table 3, we provide descriptive statistics on the respondents’ demographic, socio-related and economic savings factors.

4 Theoretical framework

To perform our CBC analysis, we use a HB model. Such approach has been proven to perform well for conjoint analysis (see, e.g., Arora et al., 1998; Halme and Kallio, 2014; Braun et al., 2016). One of the main advantages of the HB approach is to improve the estimates while reducing the amount of required initial data, i.e. using shorter questionnaires. Indeed, this approach allows providing accurate estimations even when the number of parameters per subject exceeds the number of responses (Lenk et al., 1996). As a consequence, a high number of simulations have to be performed (Fuchs and Schwaiger, 2006). The HB decomposes the estimation in two stages. First, part-worth utilities are drawn from a multivariate normal distribution and individual utilities are estimated by applying a multinomial logit model. In the second stage, the relative importance of the attributes, i.e. their individual contribution to the overall utility, is calculated.

Choice formulation Let us define C_i the choice of the respondent $i \in \{1, 2, \dots, N\}$ and U_{ip} the utility he or she assigns to the product alternative $p \in \{1, 2, \dots, P\}$. In what follows, we use a notation similar to Braun et al. (2016). In our case, the alternatives p correspond to the four cards, i.e. four alternative products, presented in Figure 4 among which the respondent has to choose (see also Table 1, here $P = 4$ and the possible values for p are G, R, A or O). By considering respondents being utility maximizers, an individual i selects alternative p providing

the highest utility level such as

$$C_i = p \quad \text{if} \quad U_{ip} > U_{im} \quad \forall m = 1, \dots, P, m \neq p. \quad (1)$$

In other words, the above equation stipulates that the respondent i chooses alternative p if the related utility U_{ip} exceeds the utility U_{im} from any of the other alternatives. Therefore, U_{ip} can be decomposed into a deterministic and stochastic component (McFadden, 1974, 1986)

$$U_{ip} = \max(U_{i1}, \dots, U_{iP}) = V_{ip} + \epsilon_{ip}, \quad (2)$$

where V_{ip} is the deterministic component identifying general preferences and ϵ_{ip} is the stochastic component highlighting specificity for a respondent i facing the alternative p . Following from Equations (1) and (2), we define $\Pr(C_i = p)$ the probability that the respondent i selects the alternative p as

$$\Pr(C_i = p) = \Pr(U_{ip} > U_{im}) = \Pr(V_{ip} + \epsilon_{ip} > V_{im} + \epsilon_{im}). \quad (3)$$

Multinomial logit model Since the probability expressed in Equation (3) reduces to finding the distribution of the maximum utility, we rely on extreme value theory and assume that the ϵ_{ip} are independent and follow a Gumbel distribution. From these characteristics, we deduce that the utility maximization problem follows a conditional logit model (National Bureau of Economic Research, 2007):

$$\Pr(C_i = p) = \frac{\exp(V_{ip})}{\sum_m \exp(V_{im})}. \quad (4)$$

Assuming the independence from the irrelevant alternatives property (IIA, cf. McFadden, 1986), Equation (4) yields the following multinomial logit model for a given choice scenario:

$$\Pr(C_i = p) = \frac{\sum_l \exp(X_{pl}\beta_{il})}{\sum_{m,l} \exp(X_{ml}\beta_{il})}, \quad (5)$$

where X_{pl} represents the proposed attribute levels $l \in \{1, \dots, L\}$ of the alternative p that appear in the particular scenario and the regression coefficients β_{il} correspond to the i th individual part-worth utility for the attribute level l .

Hierarchical Bayes estimation We estimate the unknown parameters β_{il} in Equation (5) using the HB estimation procedure. Therefore, in a first part, we estimate the distribution of the coefficients' vector $\bar{\beta}$ assumed to be independently and identically distributed and stemming from the multivariate normal distribution $N(\bar{\beta}, \Sigma)$ with mean vector $\bar{\beta}$ and covariance matrix Σ (prior distribution). Then, we use individual respondents' characteristics for determining the coefficients β_{il} (posterior distribution). The HB model likelihood function $\mathcal{L}(\beta_{il}, \bar{\beta}, \Sigma)$ is (Solgaard and Hansen, 2003):

$$\mathcal{L}(\beta_{il}, \bar{\beta}, \Sigma) = \Pr(\mathcal{D} \mid \beta_{il}, \bar{\beta}, \Sigma) = \prod_{i,l} \mathcal{L}_{il}(\beta_{il}) \cdot N(\beta_{il}, \bar{\beta}, \Sigma), \quad (6)$$

where \mathcal{D} stands for the dataset recording all respondents' choices and individual characteristics, \mathcal{L}_{il} is the likelihood for respondent i conditional on the respective coefficients β_{il} . The factor $N(\beta_{il}, \bar{\beta}, \Sigma)$ represents the normal distribution of the coefficients β_i with mean $\bar{\beta}$ and covariance matrix Σ . For estimating the values of β_{il} , we use the Sawtooth's LightHouse CBC/HB 7.0

software.

Relative importance Since the regression coefficients β_{il} corresponding to the part-worth utilities of the individual i for an attribute level l have no intuitive economic interpretation, a common usage in CBC analysis is to derive their relative importance. This metric ranges from 0% to 100% and indicates the contribution of an attribute, say k , to the overall utility. In this context, we introduce the notation l_k representing the possible set of levels for the attribute k . In other words, the indicator l_k is a subset of l reporting only the possible levels for an attribute k . The relative importance R_{ik} of attribute k for a respondent i is

$$R_{ik} = \frac{\max_{l_k}(\beta_{il_k}) - \min_{l_k}(\beta_{il_k})}{\sum_k \left(\max_{l_k}(\beta_{il_k}) - \min_{l_k}(\beta_{il_k}) \right)}, \quad (7)$$

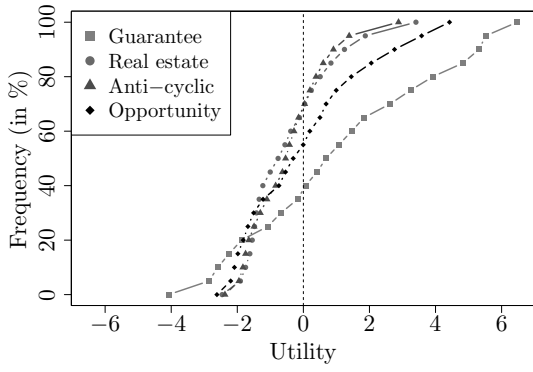
where β_{il_k} represents the regression coefficient corresponding to the part-worth utility for an individual i and the k -th attribute with level l_k .

5 Results and discussion

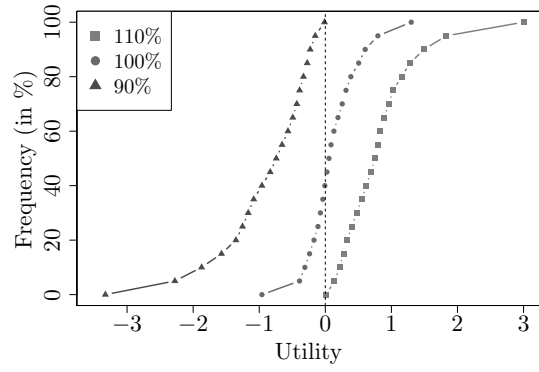
In this section, we present and discuss the numerical results obtained when applying our model on the survey data. First, we report the part-worth utilities and relative attribute importance that are the main ingredients for the further analyses (Section 5.1). Then, we look at both individual and average preferences through product shares as well as product switching behavior to provide input for optimal product design (Section 5.2).

5.1 Part-worth utilities and relative attribute importance

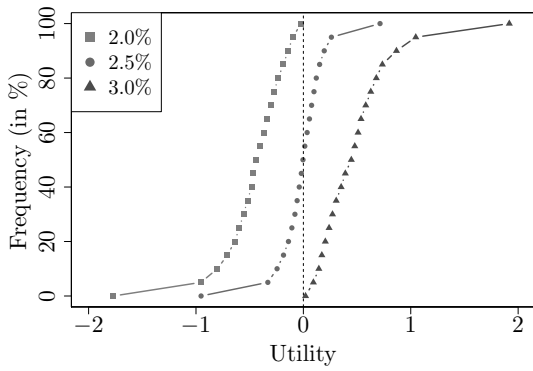
Part-worth utilities As a first model output, we consider the individual part-worth utilities that give an overview of the contribution of each attribute and for all levels in the respondents' choice. Thereby, higher part-worth utilities relate to higher level of utility. In Figure 5, we present the cumulative distribution of part-worth utilities by attributes (graphs a–f) and levels (curves in each graph). Focusing on the type of product attribute (Fig. 5a), we note that for more than 80% of the respondents, the guarantee product provides higher utility than the three other levels corresponding to the real-estate, anti-cyclic and opportunity products. Further, respondents are about 60% to report a positive utility from the guarantee product alternative. This observation yields a first signal for preferences towards guarantee-type products irrespective of the levels of the related attributes, i.e. capital guarantee g and interest rate r_G . Next, the opportunity product shows a positive utility for about 45% of the participants while they are less than 30% to have positive utility with regard to the real estate and anti-cyclic products. We note that both last named options display a very similar pattern in the distribution of part-worth utilities impeding a clear identification of the preferred alternative. For the other five attributes (capital guarantee and interest rates), the part-worth utilities' distributions lead to findings without surprises. Indeed, with numerical measures that can be easily compared, we find that higher levels of guarantees always lead to higher utility levels. For the capital guarantee g , the level of 110% yields the highest utility while the level of 90% displays the lowest (Fig. 5b). For the interest rate r_G , the 3.0% level shows highest utility (Fig. 5c). For both interest rates of the real estate (r_R) and anti-cyclic (r_A) product alternatives the value of 6.0% presents the most important utility level (see Figs. 5d and 5d). Finally, regarding the



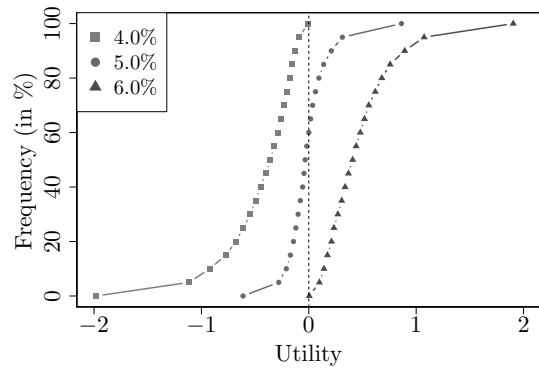
(a) Type of product p



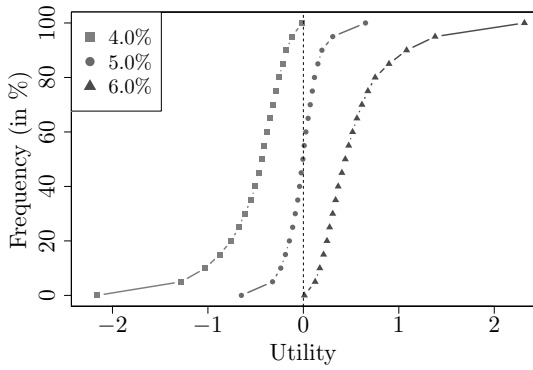
(b) Capital guarantee g



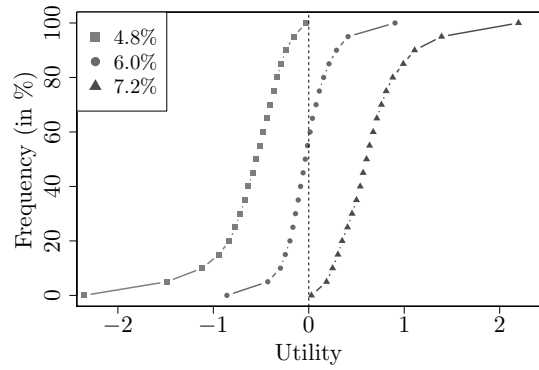
(c) Interest rate r_G



(d) Interest rate r_R



(e) Interest rate r_A



(f) Interest rate r_O

Figure 5: Distribution of the part-worth utilities by attributes and levels.

interest rate r_O for the opportunity product, highest utility values are reached with the value of 7.2% (Fig. 5f). When comparing the range of the utility levels in each graph (x -axis), we observe that the type of product and the capital guarantee in the guarantee product lead to more importantly differentiated values than those implied by the various interest rates.

Relative attribute importance We now deepen our analysis by considering the relative importance R_{ik} metric (cf. Equation 7). The relative importance is the economic measure

of an attribute's contribution to the overall utility, no matter the specific level, i.e. value, of the attribute. We present the distribution of the attributes' importance in Figure 6. In each graph, we lay out the 5% and 95% quantiles ($q_{5\%}$ and $q_{95\%}$) as well as the mean value μ . With a mean of 41.3%, we find that the type of product attribute has the most important effect on respondents' utility (Fig. 6a). The values of the distribution range from 0% to about 70% indicating a contribution of up to 70% for some individuals' overall utility. In terms of quantiles, we find $q_{5\%} = 16.4\%$ and $q_{95\%} = 61.1\%$ reflecting the importance of this attribute on the individual choice. Even though the observations relatively evenly spread between these values, we find higher frequencies for relative importance levels in the range between 50% and 60%. When considering the capital guarantee g , we evaluate the mean relative importance to 16.5% setting this attribute as the second most important in terms of overall utility contribution. Most of the values lie within $q_{5\%} = 2.9\%$ and $q_{95\%} = 33.2\%$ with higher frequencies around the mean. Thereafter, while the mean relative importance for the interest rates r_G and r_R yield an identical value ($\mu = 9.4\%$), the shape the distribution differs with frequency peaks observed above 10% for r_G and below 10% for r_R . A slightly higher impact on the overall utility is observed for the interest rate r_A since we find a mean relative importance of 10.6%. Finally, the interest rate r_O yields $\mu = 12.7\%$ with a 90%-corridor delimited by the values of 4.4% and 24.9%. This classifies the interest rate of the opportunity product as the third most important attribute. Regarding the distribution, the peak frequency is close to the mean value. Finally, let us note that our empirical work does not include any attribute linking to the price or the value of the products. Other studies (see, e.g., Braun et al., 2016) having considered a proxy of products' price as an attribute, unsurprisingly show that such factor significantly influences buyers in a way that clients most often present explicit preferences for the cheaper product.

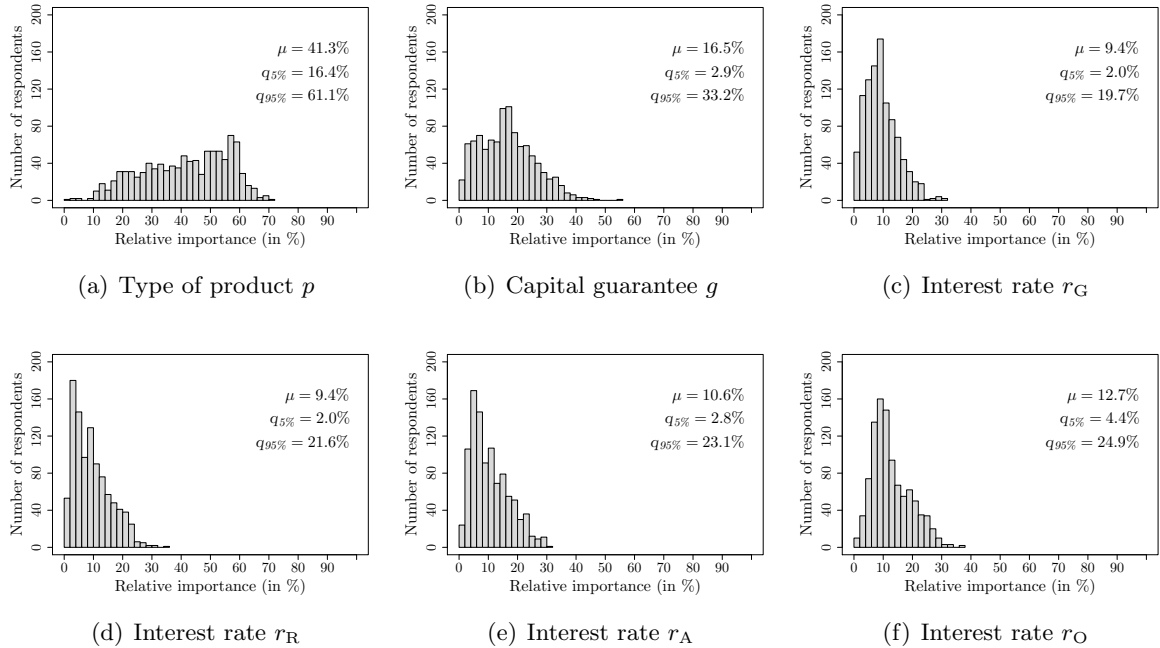


Figure 6: Distribution of the relative importance by attributes.

5.2 Product shares and switching behavior

Individual and average product shares We now consider the distribution of the individual choices predicted by the model. Indeed, the HB estimation procedure allows obtaining an estimate of the individual preferences for any combination of attributes and levels: our setup with five attributes having each one three levels allows for $3^5 = 243$ combinations (cf. Table 1). Based on the 996 respondents, we are able to derive 242 028 ($= 996 \times 243$) share estimates corresponding to the complete set of attribute and level combinations.

In Figure 7, we lay out the distribution of product shares by individuals. The upper left graph presents the set of estimated shares for the guarantee product (Fig.7a). While the mean $\mu = 45.3\%$ indicates that this product is selected in about 45 cases out of 100, the distribution of the individual shares highlights important weights in the tails with highest frequencies of shares below 2.5% and above 97.5%. This “binary” pattern is not present in the other graphs where peaks only appear for shares below 2.5%. In the case of the real estate product, we note an average share of about 15.4% with most results being located within $q_{5\%} = 0.04\%$ and $q_{95\%} = 73.8\%$. In comparison, the average share for the anti-cyclic product is slightly lower (13.4%) and $q_{95\%}$ reaches only 57.1%. At the end, the mean individual share for the opportunity product is of 26.2%, putting it in second position after the guarantee product.

When reconsidering the distributions, we note high frequencies in the lower tail (below 2.5%), however, non-negligible frequencies appear in the upper tail as well. While the guarantee product is clearly the favorite option among the set of alternatives proposed in the survey, we nonetheless observe a significant number of “0%” individual shares for this product. In other

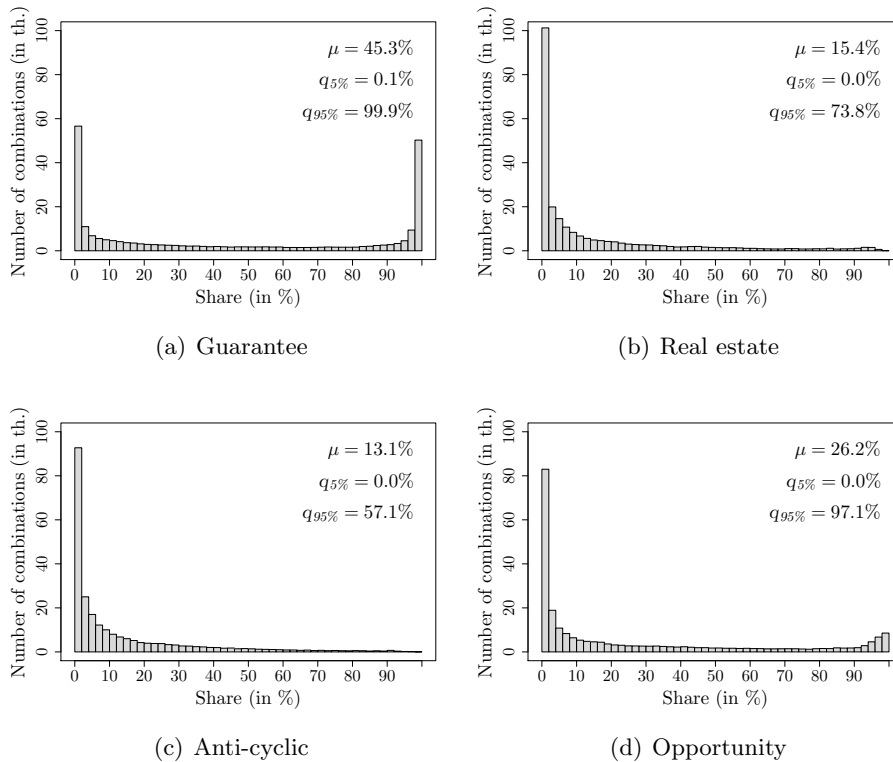


Figure 7: Distribution of the individual shares along the four types of products.

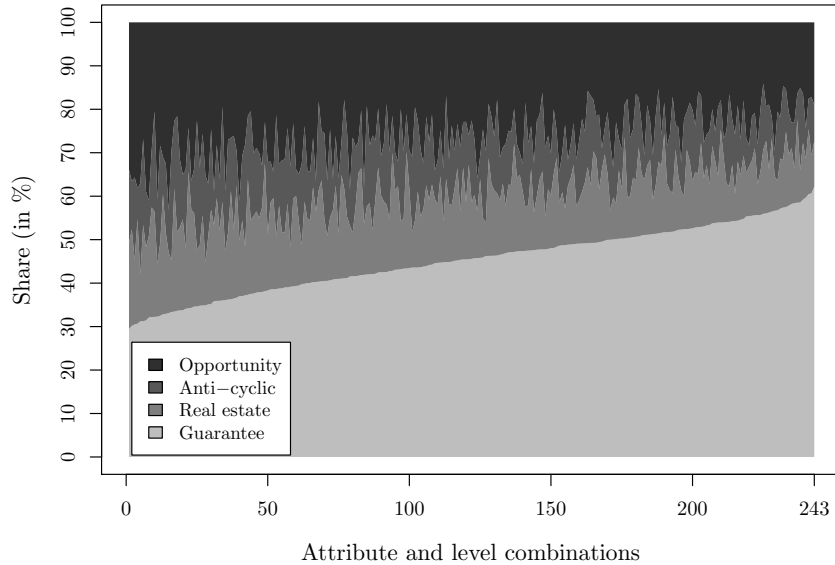


Figure 8: Distribution of the mean shares by product.

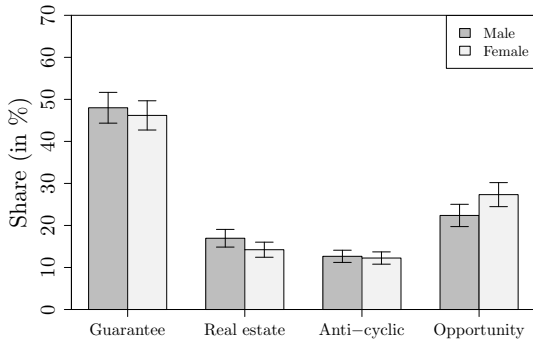
words, for a given set of attribute and level combinations in the other product types, individual preferences do not report any share for the guarantee product. However, due to the heterogeneity in preferences in life and health insurance (see, e.g., Cutler et al., 2008, Polyakova, 2016, Braun et al., 2016) an obvious sequence of level combinations leading to recurrent individual preferences cannot be identified. For example, among the about 56 thousand (out of 242 thousand) individuals' shares for the guarantee product that appear below 2%, about one thousand are obtained by setting the levels of the guarantee product attributes, i.e. the capital guarantee g and the interest rate r_G , to the lowest values while setting the levels of the attributes in the products, i.e. the interest rates r_G , r_A and r_O , to their highest values. Furthermore and for comparison, a mere number of about 400 individual shares below 2% are obtained when setting the guarantee product's attributes to the highest levels and the alternative products' attributes to the lowest levels. In the subsequent paragraphs, we remain with the metric of the average of individual shares along products. By considering this single measure, we are still able to highlight general patterns in overall preferences while keeping the discussion rather simple.

In Figure 8, we present the average individual shares for the four products along the attribute and level combinations. The combinations are ordered with respect to the average share choosing the guarantee product, i.e. on the left-hand side of the graph we find the lowest average shares while on the right-hand side we have the highest shares for the guarantee product. The minimum average share in the guarantee product starts at 29% and is complemented by shares of 20%, 17% and 34% in the real-estate, anti-cyclic and opportunity products, respectively. While for the aforementioned individual shares it is difficult to identify a clear pattern, we note that the lowest average share in guarantee product is obtained when setting the product attributes to the lowest levels, i.e. capital guarantee $g = 90\%$ and interest rate $r_G = 2.4\%$, while considering the other products' attributes at their highest levels ($r_G = 6.0\%$, $r_A = 6.0\%$

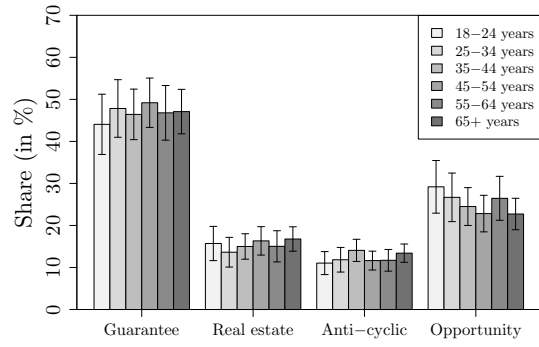
and $r_O = 7.2\%$). This observation underlines two main ideas. On the one hand, in that specific setting, the average share of the opportunity product exceeds the one of the guarantee product indicating that there exist cases where customers prefer the opportunity product. Indeed, plausible product design in a given market setting can affect customer preferences and deviate their choice from the guarantee product. Further, the opportunity product lets potential customers design their own investment strategy by selecting the funds in which to invest. The associated strategy is medium-term and allows clients to reallocate assets in secure investments. Therefore, investments in risky assets can provide higher utility. On the other hand, one can also see that, even within the most unfavorable combination of attribute levels in the guarantee product, a non-negligible amount of respondents still show preferences for this product. This lets us hypothesize either that individuals might have non-rational preferences toward guarantees (Allais, 1953; Diecidue et al., 2004; Andreoni and Sprenger, 2012) or that other benefits not considered in this study, e.g. tax-privileges, influence customer decisions (Chen et al., 2019). As an example, since 2008, the German State sponsors subsidizes the Riester-Rente product with 175 Euro per saver and 300 Euro per child. In addition, contributions of up to 2100 Euro can be deducted from the income as “special expenses”, hence reducing income tax.⁴ The maximum average share for the guarantee product is obtained when its attributes are set to their highest levels, i.e. capital guaranteed $g = 110\%$ and interest rate $r_G = 2.4\%$ and when the attribute levels of the other products are at their lowest levels ($r_G = 4.0\%$, $r_A = 4.0\%$ and $r_O = 4.8\%$). In this particular case, we find an average share of 62% for the guarantee product and mean shares of 11%, 8% and 19% for the real estate, anti-cyclic and opportunity products. Comparing these results with the combination of attributes reporting the lowest average share for the guarantee product, we note that the mean shares of the real estate and the anti-cyclic products have been reduced by a factor of about 2 (from 20% to 11% respectively from 17% to 8%). The average share in the opportunity product is slightly less reduced from 34% to 19.0%.

Finally, we consider the distribution of the shares of preferences along selected demographic, socio-related and economic savings factors. In Figure 9, we show the shares of preferences by products for the gender, age, yearly gross income and savings motivation factors. For the four products, we only report the preferences for a “baseline” scenario with the following attributes levels’ values: capital guarantee $g = 100\%$ and interest rates of $r_G = 2.0\%$, $r_G = 4.0\%$, $r_A = 4.0\%$ and $r_O = 4.8\%$. This scenario refers to the product configurations one often found in practice at the time of running the survey. Although the prevailing interest rates have now decreased to 0% or even to negative rates in the financial market, the issue of guarantees is still very relevant. In each graph, we lay out the 95% confidence interval. When considering the results, we do not observe significant differences along covariates. In fact, for a given product alternative, confidence corridors from different covariates’ values overlap with each other. Nonetheless, we can comment on observed trends. Among the surveyed, males present slightly higher preferences than female for the guarantee product while women, when compared to men, show higher a share of preferences for the opportunity product. The share of preferences toward the opportunity product decrease with age. Respondents in the 18–24 years age class present the greater preference while the lowest shares appear for the oldest. In graphs (c) and (d) of Figure 9 we have chosen to report the results along the yearly gross income and the savings motivation as examples for the social and economic factors. In both selected cases as with the other factors (see Figure 10 in the Appendix) we do not observe a clear pattern. Thus, no clear

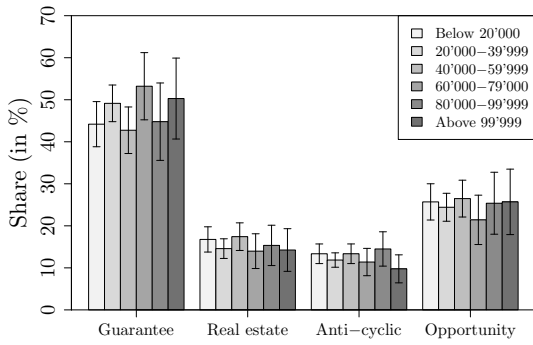
⁴See the website of BMF at www.bundesfinanzministerium.de.



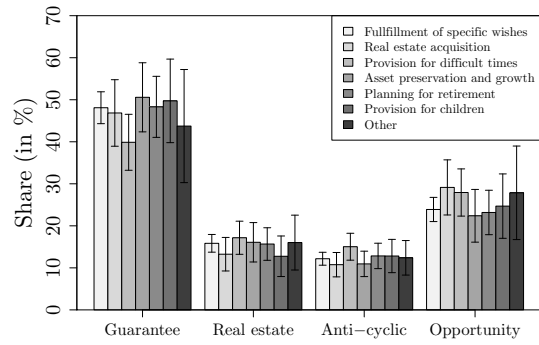
(a) Gender



(b) Age



(c) Yearly gross income



(d) Savings motivation (first choice)

Note: Confidence intervals are given at the 95% level.

Figure 9: Shares of preferences by products for selected covariates.

segmentation of customers can be derived from these results. While a multivariate analysis by combining several explanatory factors would be of great interest, the limited number of records and large number of covariates (and category levels within each factor) hinders us to obtain further reliable results.

Product switching behavior To understand how preferences are affected by different values of the attributes, we adopt a scenario-based *ceteris paribus* analysis by observing the share of preferences when modifying one attribute level value while keeping the other levels fixed at their “base” level. In our approach, base attribute levels correspond to the levels taken for the aforementioned baseline scenario, i.e. a capital guarantee $g = 100\%$ and interest rates $r_G = 2.0\%$, $r_R = 4.0\%$, $r_A = 4.0\%$ and $r_O = 4.8\%$. We define 11 profiles denoted from A to K that deviate from the baseline profile. For each characteristics’ profile, we report the share of preferences for the guarantee s_G , real estate s_R , anti-cyclic s_A and opportunity s_O products. Alongside and in brackets, we give the percentage point variation in product shares Δ_G , Δ_R , Δ_A and Δ_O when preferences are compared to the baseline share. The results are presented in Table 4.

In the base scenario (cf. row “Base” in Table 4), we note that $s_G = 47.0\%$ of the participants

would decide for the guarantee product, although the other products offer at least double as high expected returns when compared to the guaranteed interest. In this set-up, among the alternative products without guarantees, the opportunity product promising a higher expected return is most popular ($s_O = 25.0\%$). While pledging the same expected rate of return, more customers would head towards the real estate ($s_R = 15.6\%$) when compared to the anti-cyclic product ($s_A = 12.4\%$). This indicates that the product description and the underlying investment concept makes a difference. Alternative characteristics are considered in profiles A and B where the capital guarantee g and guaranteed interest rate r_G attributes are changed while keeping all other levels constant. In these profiles we modify both attribute levels because the capital guarantee and guaranteed interest are linked to each other (Section 3.1). While adapting g , we set the guaranteed returns r_G to their lowest level (cf. Table 1). In profile A, we observe that the share for the guarantee product decreases by 9.2 percentage points. This important decrease highlights the importance of the capital guarantee for participants in their product selection. The result can also be derived from profile B since the average share of preferences for the guarantee product increase by 7.2 percentage points linked to the higher g . These results are in line with customer surveys on investments and retirement products indicating that for almost 80% of German consumers, having a guarantee on the paid-in capital is the main investing criteria (Bundesverband Deutscher Banken, 2011; INSA, 2018). Only 13% of them would accept a lower safety level on their savings capital if a higher return can be expected. In the profiles C and D, we observe variations in the preferences when only changing the promised interest rate. By setting the return guarantee to $r_G = 2.5\%$ and $r_G = 3.0\%$, we report absolute increases in the guarantee product of 4.0 and 8.5 percentage points, respectively. In these scenarios, the other products experience decrease of about 1 to 3 percentage points.

The following profiles showcase the results for selected variations of the product landscape in the products without formal guarantees. Profiles E and K consider higher expected returns for

Profile	Characteristics					Guarantee		Real estate		Anti-cyclic		Opportunity	
	g	r_G	r_R	r_A	r_O	s_G	(Δ_G)	s_R	(Δ_R)	s_A	(Δ_A)	s_O	(Δ_O)
Base	100	2.0	4.0	4.0	4.8	47.0	–	15.6	–	12.4	–	25.0	–
A	90	2.4	4.0	4.0	4.8	37.8	(–9.2)	18.7	(+3.1)	14.6	(+2.2)	28.9	(+3.9)
B	110	1.6	4.0	4.0	4.8	54.2	(+7.2)	13.0	(–2.6)	10.5	(–1.9)	22.2	(–2.8)
C	100	2.5	4.0	4.0	4.8	51.0	(+4.0)	14.2	(–1.4)	11.4	(–1.0)	23.4	(–1.6)
D	100	3.0	4.0	4.0	4.8	55.5	(+8.5)	12.8	(–2.8)	10.2	(–2.2)	21.5	(–3.5)
E	100	2.0	5.0	4.0	4.8	45.4	(–1.6)	21.3	(+5.7)	10.4	(–2.0)	23.0	(–2.0)
F	100	2.0	6.0	4.0	4.8	43.3	(–3.7)	26.9	(+11.3)	8.7	(–3.7)	21.1	(–3.9)
G	100	2.0	4.0	5.0	4.8	45.5	(–1.5)	13.1	(–2.5)	18.8	(+6.4)	22.6	(–2.4)
H	100	2.0	4.0	6.0	4.8	43.5	(–3.5)	10.9	(–4.7)	26.0	(+13.6)	19.6	(–5.4)
I	100	2.0	4.0	4.0	6.0	44.8	(–2.2)	13.4	(–2.2)	10.1	(–2.3)	31.7	(+6.7)
J	100	2.0	4.0	4.0	7.2	41.8	(–5.2)	11.7	(–3.9)	8.3	(–4.1)	38.2	(+13.2)
K	100	2.0	6.0	6.0	7.2	37.8	(–9.2)	17.1	(+1.5)	14.8	(+2.4)	30.2	(+5.2)

Note: All values are expressed in %. The columns “ s_G ”, “ s_R ”, “ s_A ” and “ s_O ” report the share of preferences for the guarantee, real estate, anti-cyclic and opportunity products, respectively. We denote by “ (Δ_G) ”, “ (Δ_R) ”, “ (Δ_A) ” and “ (Δ_O) ” the columns laying out the percentage point variation when compared to the base scenario for the guarantee, real estate, anti-cyclic and opportunity products, respectively.

Table 4: Evolution of the average share of preferences when varying attribute level values.

the real estate product, namely $r_R = 5.0\%$ and $r_R = 6.0\%$. Under such conditions, the shares for the real estate product increase by 5.7 respectively 11.3 percentage points. It is important to note that only few people would switch from the guarantee product to the real estate product (cf. the small Δ_G). Potential switching behavior becomes even more obvious for profiles G and H when higher returns for the anti-cyclic product are expected, namely $r_A = 5.0\%$ and $r_A = 6.0\%$. While the increase in shares of preferences for the anti-cyclic product is higher than in the previous profiles for real estate, our outcomes show that the share of people willing to switch over from the guarantee product is lower. This supports our earlier finding, that besides the expected return, the product description matters to customers. Profiles I and J show the results when increasing the expected returns for the opportunity product to the levels $r_O = 6.0\%$ and $r_O = 7.2\%$. From the product description, this product offers the highest flexibility to the insureds. Customers can pick an investment strategy out of a selection of funds. Apparently customers who are not used to managing assets themselves are put off by the higher individual responsibility. When the expected return r_O is 6.0%, the average shares of preferences for the guarantee, real estate and anti-cyclic products are reduced by about 2.2%. By setting the expected return r_O to 7.2%, we observe an impact that is more than two times higher on the guarantee product share ($\Delta_G = -5.2$) than in profile I.

Finally, in profile K, we set the expected returns of the real-estate, anti-cyclic and opportunity products to their highest levels while keeping the base attribute levels for the guarantee product. Although the guaranteed return in the guarantee product is three times smaller than the expected return in the alternative products, the guarantee product remains the most popular product with a share of 37.8%. Participants that move away from the guarantee product rather switch to the opportunity product ($\Delta_O = +5.2\%$), which proposes the highest expected return. Consequently, insurance companies have to carefully develop alternative schemes without formal guarantees that target well-defined groups of customers with adequately fitting product features. Simply showcasing higher expected returns will not convince customers that put the focus on the capital guarantee. We also observe that the product description and the underlying investment concepts matter to the participants – even when the same level of return is expected. For products with a high level of flexibility and individual decision-making in the investment schemes, the customer only switches when the remuneration is higher than for managed products.

6 Conclusion

This paper contributes to the research on consumer preferences for participating life insurance contracts, taking into account demographic, socio-related and economic savings factors. The data used in this study stems from a unique private survey conducted among individuals in Germany. We use the framework of a CBC analysis as well as the HB model to understand customer preferences toward life insurance products including guarantees. Within this survey, individuals have to choose their preferred option among four participating life insurance schemes. During the study, individuals always face the same product alternatives however with varying expected returns and with or without capital guarantee. Based on the respondents' answers, we compute part-worth utilities and relative importance by attribute levels as well as shares of preferences towards the four participating life insurance contracts. This allows us to highlight product features that most affect customer decisions. Finally, we analyze the overall respondent preferences for products including guarantees and study the potential switching be-

havior when making the preferred product less attractive. We find that individuals have strong preferences for life insurance products offering guarantees even when higher expected rates are possible in alternative products without guarantees. In this context, the product structure as well as the amount of guaranteed capital are the most important attributes in terms of customer preferences. In particular, participants prefer the combination “high capital guarantee with low interest rate guarantee” over a combination with “low capital guarantee and high guaranteed interest rate”.

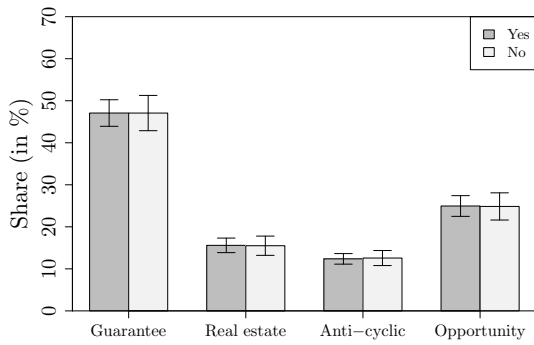
Considering individual preferences, we note that they are heterogeneous and that no clear pattern can be derived when considering the participants’ demographics, socio-related and economic savings factors. However, when reporting the average share of preferences among all individuals, we are able to identify groups and, in particular, potential switching behavior from contracts with guarantees. We find that the favorite alternative product is the opportunity product, i.e. a product letting individuals design their own investment strategy with the possibility to reallocate assets in secure investments during unfavorable market development periods. Nevertheless, no matter the attribute level combination, the average share of preferences for this product always remains below the share of preferences for the guarantee product. In fact, our results show that the guarantee product with the lowest interest rate guarantee level and a 100% capital guarantee is still preferred by more participants than any alternative product even when the expected returns are up to three times higher. To attract customers towards products without guarantees, insurers have to develop alternatives targeting well-defined customer groups. In such context, accounting for socio-demographic factors and savings motivations may lead to adequate solutions along customer profiles. However, further research is necessary since we cannot clearly identify such patterns from our data. Product characteristics seem to be relevant factors that shape customer decisions and in particular we find that the product scheme and underlying investment concept matters to customers. Respondents show clear preferences for real estate investments when compared to anti-cyclic products, although they are quasi identical.

Beyond the current study, several streams of research require further investigation. First, the survey on which we base our study focuses on pure preferences of customers without considering monetary aspects. While we derive results that are of high relevance for insurance companies, we also think that adding information on the willingness to pay for each participating life insurance scheme could bring an alternative measure of preferences (Gatzert et al., 2011; Braun et al., 2016). Second, accounting for life events affecting customers, e.g., their first job, child birth, and retirement could remove part of the heterogeneity observed in individual shares of preferences since those events might trigger insurance purchases. Third, although our study has not shown evidence of some particular socio-economic factors, we believe that future studies should still be carried out with regard to covariates. Indeed, when including the price or value of the products, different behaviors might appear. Further the limited number of observations does not allow to combine covariates to find proper customer segmentations. In future research, it could be interesting to see how our results link to work done on risk aversion behavior.

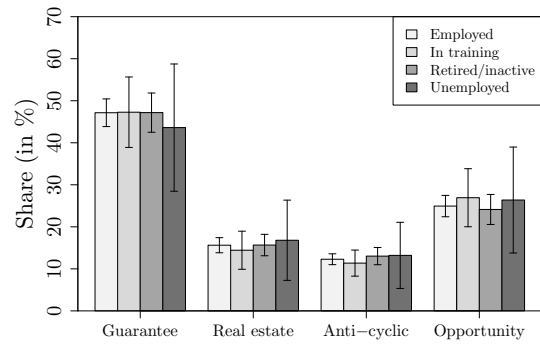
Life insurance business has become more difficult in the last years. While solvency requirements and financial market conditions hinder insurers to propose long-term guaranteed interest rates and capital guarantees in many countries, customers are still seeking for security and returns. Given that guaranteed products always appear as favorites, our study confirms that from a business perspective it does not seem reasonable to eliminate all guarantees. For the

insurance sector, this implies that the transition to alternative products should be done by fostering hybrid products. In fact, current trends in Germany show that the fastest growing segment within the annuities and pension products are not classic with-profit products or pure unit-linked insurance but hybrid forms with guarantees, reaching almost 30% of new business in life insurance by type of product (GDV, 2019). Further, the life insurance business is often affected by policies towards tax-deductible amounts and taxes applied to returns. Therefore, the magnitude of the capital guarantee can be fiscally more advantageous than the other interest rates since a more favorable taxation may relate. Hereby, the State and regulators play an important role since they define the playing field. Our study does not provide information on the creation of customer segments (see the discussion above). Further customer studies are needed to enable insurers to tailor their product offerings and target customer groups with appropriate hybrid products. Despite the mentioned limitations, our analysis provides insights for insurers in an area where consumer studies are scarce. We extend the literature on preferences for capital and interest rate guarantees within participating life insurance contracts, i.e. in an area where the life insurance industry in German-speaking countries faces major challenges nowadays.

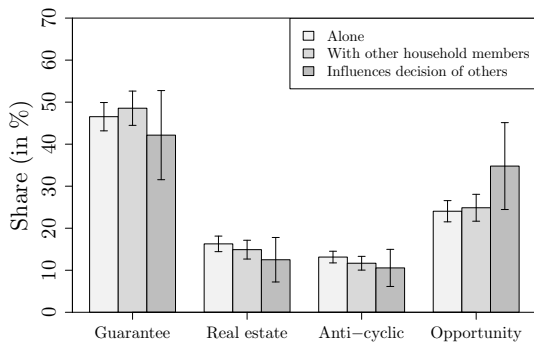
Appendix



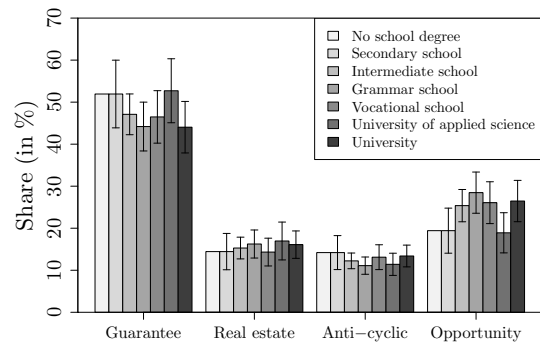
(a) Children



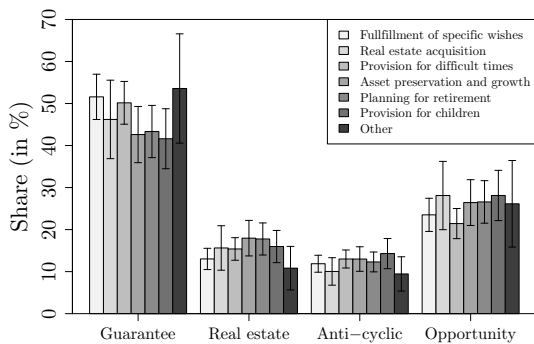
(b) Employment



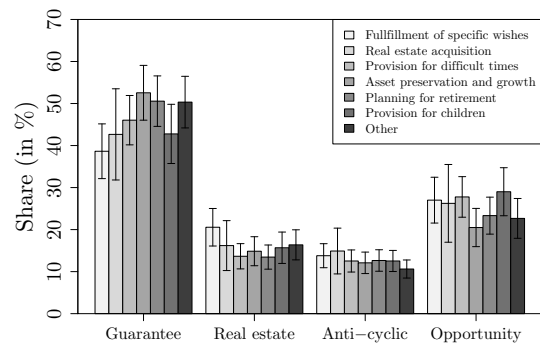
(c) Financial decisions



(d) Education



(e) Savings motivation (second choice)



(f) Savings motivation (third choice)

Note: Confidence intervals are given at the 95% level. In the graph (d), the confidence interval for the “No school degree” group is not available due to insufficient data (cf. Table 3).

Figure 10: Shares of preferences by products for additional covariates.

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