Term life insurance in Germany
The consumers’ perspective – a need for preferences-orientated product design?

01 Foreword
02 Executive summary
03 Consumer preferences matter
07 What consumers really want
20 Conclusions & recommendations
22 Appendix: Choice-based conjoint analysis
27 Bibliography
28 Collaboration partners
Foreword

People in many countries are under- or even uninsured against pre-mature death. Germany, where the mortality protection gap is EUR 110 000 per working person with dependents, is no exception. Many Germans choose not to buy life products such as term insurance, despite it being very affordable.

There is no one reason for this. A wide range of factors influence consumer behaviours. The good news is that these can be investigated. Indeed, insurers are well-positioned to extend the reach of their products and services across society at large with better understanding of their consumers.

This study is a joint exercise by Swiss Re and the Institute for Insurance Economics (University of St. Gallen). It demonstrates a means by which insurers can develop greater appreciation of the factors behind buying decisions, such as the product features that create value for consumers, and how much people are willing to pay for term insurance, information that can help instruct the design of effective business strategy.

The methodology used is choice-based conjoint (CBC) analysis. CBC is a state-of-the-art approach to understanding consumer preferences. It is the analysis of consumers’ stated preferences in a hypothetical market or decision-making environment. CBC has been used to good effect in other industries. This study is the first-ever application of CBC in the term life insurance context, the intent being to generate similarly valuable results.

The study is part of the Swiss Re consumer research series. It is the coming together of academics and industry experts with in-depth knowledge of the German insurance sector to help our clients navigate the market. We’re smarter together!

Julien Descombes and Bruce Hodkinson  
Managing Directors  
L&H Continental Europe  
Swiss Re

Professor Hato Schmeiser  
Managing Director  
Institute for Insurance Economics  
University of St. Gallen
Executive summary

The German term insurance market is well developed and competitive. In 2012, the term insurance premium volume was about EUR 3.177 billion (new business reached EUR 355 million) and there were 7.48 million policies in force. Premium income from in-force business has been growing slowly but steadily since 1995. However, new sales peaked in 2006 and have been declining since then, with no signs of recovery. As a result, insurers are increasingly competing on price.

Term insurance has tended to be regarded as lower priority than endowment/annuity business which generates higher volumes and profits. However, with persistently low interest rates and regulatory changes ahead, term insurance has garnered more attention of late. Insurers remain ever-keen to grow their market share. To do so, however, they need to better understand consumer preferences and tailor products to specific consumer segments.

Eliciting information on consumer preferences is challenging. Many surveys are poorly designed or are based on methodologies that are known to provide inferior results that can do more harm than good if introduced into business strategy. This study uses choice-based conjoint (CBC) analysis, which is a state-of-the-art approach for understanding consumer preferences.

The study is a collaborative effort between the Institute of Insurance Economic (University of St. Gallen) and Swiss Re. This is the first time CBC methodology has been applied to the life insurance market, the intent being to generate useful insights. CBC has been shown to provide valid and reliable results when used in other industries.

The report yields interesting new findings, and also confirms some well-established industry wisdoms. For example:

- Life insurers can reach more consumers by moving away from cost- and experience-based pricing and product design to a holistic, consumer preferences-oriented business model.
- Consumer preferences with respect to term insurance and key product features vary significantly. A market that offers a wide range of products best meets consumers’ different needs. As such, insurers should focus on product innovation, product differentiation and pricing.
- Product innovation is a viable strategy to counter competitive pricing pressures.
- Actions to further regulate the term insurance market (e.g., the EU Gender Directive) and to make product offerings and pricing more uniform can reduce insurance uptake. To reduce the protection gap, policymakers and regulators should encourage insurers to offer a wide range of products.

A good understanding of consumer preferences is a strategic competitive advantage. The consumer preferences and profiles collected in this study can be used for improving product design, pricing, consumer segmentation and marketing. The study concludes that insurers who meet the requirements of different consumer segments with appropriate product features will grow their business and market share.

The next chapter explains why consumer preferences matter and outlines the design of the CBC study. The chapter *What consumers really want* presents the results of the study: the importance of product features, marginal willingness to pay for different product features and maximum willingness to pay for four different term insurance products. It also provides a simulation of how people make choices in a competitive market. The final chapter summarises the main insights of the report.

---

1. Source: Versicherungsstatistik 2012, Steria Mummert, based on BaFin.
2. The EU Gender Directive has been in force since December 2012. It bans pricing based on gender. This regulation may have a negative impact on insurance uptake, but it is too early to say.
3. Willingness to pay (WTP) is defined as the maximum amount of money that an individual is prepared to spend on a given good or service. WTP, also known as reservation price, is a central concept in microeconomics. It provides guidance to suppliers with respect to strategy, product design, demand assessment, sales management, and, most notably, pricing decisions.
Consumer preferences matter

Focusing on the consumer

“The consumer is sovereign...through his power to demand (or refrain from demanding).” William Harold Hutt, 1936.

Insurers need to provide an attractive value proposition and price if they are to engage with consumers. They are best-positioned to do so when they have in-depth knowledge and understanding of consumer preferences, behaviours and expectations.

Large proportions of societies are under- or even uninsured against premature death. This is also in Germany, where the mortality protection gap amounts to EUR 110,000 per working person with dependants. Closing this gap would not be big challenge for most consumers. In Germany a term life policy with EUR 100,000 benefit can be bought for as little as EUR 3 to EUR 20 per month (for a 25-55 year old non-smoker).

Yet, many consumers still do not buy life insurance, even though they may be well aware of the benefits that risk protection brings. The list of potential reasons is long, ranging from market failures, rational demand limitations, lack of awareness and literacy to psychological and behavioural biases. Insurers wanting to grow their business and close the protection gap need to pay more attention to one area in particular: the consumer. In the insurance industry, product design and pricing has traditionally been experience-based and cost-side driven. Cost-plus pricing (mark-up pricing) is how homogeneous products are priced in a competitive market. However, insurance is less homogeneous than often assumed. There is scope for product and price differentiation. Even term insurance, a comparatively lean and simple life product, has differing features such as the term of the policy, type of premium payment, and fixed or variable coverage levels. Also, there are often embedded options such as the right to increase coverage at certain life events, to extend policy term without going through a renewed underwriting process, or riders that pay a certain amount after diagnosis of a terminal illness. Insurers who understand which product features and options people like can gain competitive advantage by improving product design and pricing to meet consumer requirements.

Better understanding of consumers’ preferences has become ever more necessary. Primary attackers (non-insurance companies with access to comprehensive information about consumer behaviour) are entering the market. Insurers need to face up to new competitive pressures, and focusing on consumer preferences will best equip them to do so.

Measuring consumer preferences

There are many ways to measure consumer preferences (see box "Concepts for measuring willingness to pay", page 6). This study uses the choice-based conjoint (CBC) methodology. CBC has been applied to different consumer and public goods segments, with reliable and valuable results. This is the first time CBC has been applied to term life insurance.

CBC relies on consumers’ choices in a hypothetical market or decision-making environment. In this CBC study, participants were presented with two products with different attributes and asked to identify which they prefer. After making their choice, respondents were asked if they would in fact be willing to buy the product. This hypothetical buying task was repeated 12 times. Each time the product attributes were altered and combined in a specific way. In making their choices,

---

5 For an overview see sigma 6/2013, Life insurance: focusing on the consumer.
6 Also known as Discrete Choice Experiments (DCE).
7 See the Appendix for a discussion of the CBC methodology.
Consumer preferences matter

This is the first CBC-based study of the life insurance sector.

Participants made a trade-off based on the product features and so revealed their preferences. The implicit trade-offs were used to estimate willingness to pay (WTP).

A major advantage of the CBC approach is that consumers are not asked directly what they are willing to pay. Rather, they reveal their preferences in the trade-offs they make. The decision making scenario mirrors the real-life buying process. With this more subtle approach, various biases and deficits of direct-stated preference methods can be avoided, yielding results with higher validity and reliability.

Study design

In CBC, products are defined in terms of their specific attributes. This study used the following product attributes for term life insurance:

1. The duration of the life insurance contract for which premium rates were guaranteed. In the survey, each respondent was offered life insurance with 10-, 15- and 20-year terms.

2. Underwriting procedure: life insurance is typically underwritten, meaning that an individual’s risk profile is assessed to determine the premium rate for that person. The most thorough approach is for applicants to undergo a medical examination. However, for low sums assured this is not common and today insurers do underwrite insurance based on answers given in questionnaires. In this CBC study, consumers were offered term insurance products entailing one of the following underwriting procedures:
   - a medical examination; or
   - a 10-question application form; or
   - a three-question application form; or
   - no underwriting, but a 12-month waiting period (later referred to as one-year survival contract).

The last procedure of no underwriting but a 12-month waiting period is not available in Germany. It is offered in markets such as the UK, however. It is included in this study in order to get a more comprehensive sense of consumer underwriting preferences.

3. The brand of the insurance company: in long-term business such as insurance, trust in the supplier is important. A good brand is associated with reliance and creditability. This study used the following brand recognition profiles:
   - a well-known brand (a large and well-known German insurer);
   - a not-well known insurer (small footprint in the German market); and
   - a well-known brand not associated with insurance.

4. Sales channel: life insurance has traditionally been sold face-to-face. In recent years, insurance has also been available online and through direct sales. In this study, participants were given the option to buy insurance either face-to-face or online.

5. Critical illness rider: In Germany, critical illness insurance is available as a standalone product and as a rider embedded in term insurance contracts. In this study, the rider offered a pay out of EUR 50,000 in the event of diagnosis of certain, pre-defined serious illnesses such as a heart attack or cancer.

---


9 The policyholder is entitled to the benefit only if he/she dies one year or later after the contract is in force.

The waiting period serves to limit adverse selection, which basically means that terminally ill individuals or those about to suicide cannot get insurance with certain benefit payment.
6. Monthly premium rate: This was altered throughout the study to gauge the price sensitivity of consumers. The lowest premium was set in a range matching the lowest rates observed in the German market.\(^\text{10}\) The highest premium rate was five times the lowest (four times for smokers). Mortality increases with age and to reflect this, five age-bands were defined and attributed age-specific rates. For smokers, premiums were adjusted to reflect higher mortality rates.\(^\text{11}\)

The different product attributes were presented with about the same frequency (eg, every price level was shown in 20\% of the choice sets, both sales channels were shown in 50\% of the products offered). The sum assured; namely the pay out in the event of death of the policyholder, was fixed at EUR 100 000. However, the participants were informed that they could request a higher sum assured on the same terms at any time.

This CBC was conducted as an online survey of 2 915 participants in Germany.\(^\text{12}\) An example of a decision-making situation presented to the participants each of the 12 times is shown in Figure 1.

Which one of the following two term insurance products would you prefer if the two term insurance products would only differ with regards to the specified characteristics?

<table>
<thead>
<tr>
<th>Term of the contract</th>
<th>15 years</th>
<th>20 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly premium rate</td>
<td>EUR 7.00</td>
<td>EUR 35.00</td>
</tr>
</tbody>
</table>

- **Underwriting**: no underwriting, but a 12-month waiting period
- **Brand**: a not-well known insurer
- **Critical illness rider (pays EUR 50 000 upon diagnosis of a terminal illness)**: not available

Would you actually buy the selected term insurance product if you now could buy a new term insurance product?

- yes
- no

Source: IVW and Swiss Re Economic Research & Consulting

After making their choice, the participants were asked if, in real life, they would buy the product or if they wished to opt out altogether. The option to not buy at all is an important feature of CBC, again to mirror reality. Without an opt-out, it would mean people are forced to buy something they do not want or need, and that is not real life.

Individual preference profiles were estimated based on the 34 980 buying decisions (always between two hypothetical products and the opt-out; ie, 104 940 yes/no decisions). With this information, it was possible to derive a utility function for every individual participant and to calculate WTP for product features and term life insurance products.\(^\text{13}\)

\(^{10}\) The lowest premium was set after interviewing market experts and assessing quotes for a large number of products via the online comparison platform www.check24.de.

\(^{11}\) This resulted in a total of 10 groups of respondents. See Table 3 in the Appendix for an overview of the premium rates used in the CBC experiment.

\(^{12}\) See the Appendix for a description of the survey panel.

\(^{13}\) See the Appendix for a detailed description and discussion of the methodology.
Consumer preferences matter

Concepts for measuring willingness to pay

There are two ways to elicit information on consumer preferences: (1) the revealed preferences, and (2) the stated preferences approaches. In the first, data from real purchases (transaction data) and experiments are used. In the second, participants state their preferences in interviews or questionnaires.

The revealed preferences approach has the advantage that a product being studied has been purchased in a real-life environment and the results can be considered valid. However, real purchase data are often not available and can be very time-consuming to collect. This applies particularly to information at the individual person level. Real purchase data collected at an aggregate level, such as records from insurance agents may be available and less costly but are also less informative. Another drawback of revealed preferences is that the observed price and product feature variations are often small, making WTP estimation difficult. In addition, product features cannot be altered systematically and it’s not possible to estimate WTP for single product features. Noteworthy too is that an estimation of the WTP based on historical data may lead to poor results if the product characteristics or the market environment change over time. In similar vein, it’s not possible to estimate WTP for products that are not yet available on the market.

The stated preferences comprise direct and indirect approaches. In direct approaches, customers are asked to explicitly state their WTP for a particular product. This can result in poor results because the preferences and attitudes consumers reveal in surveys may deviate from real-life behaviour. The way survey questions are framed may influence how people answer, people may respond in a way they think the questioner wants them to answer (response bias), or they may express protest or answer strategically. In the context of infrequently bought goods that are abstract or complex (eg, insurance), this method is known to generate inaccurate estimates because it asks too much of survey participants.

Indirect methods rely on more intricate preference elicitation mechanisms. Typical indirect approaches to estimate WTP belong to the family of conjoint analysis. Here the participant is asked to state which one of a set of product alternatives he/she would buy at a given price. Traditional conjoint analysis relies on ranking or rating procedures.

CBC (sometimes also called Discrete Choice Experiment, given its experimentally-oriented preference elicitation task) is a more advanced variant of the indirect approach. CBC has been shown to be cognitively less challenging for participants than directly assigning a price or establishing a rank order, especially for complex and infrequently bought products. The main disadvantage of CBC is that it is computationally demanding.

Due to the artificial nature of the decision situation in the stated preferences approaches, a hypothetical bias may arise in CBC studies. Becker et al. (1964), proposed an incentive alignment which obliges participants to actually purchase the product under consideration if their inferred WTP is higher than a randomly drawn purchase price. This purchase obligation is very difficult to implement in the context of term life insurance contracts, and is not part of this study.

---

14 See Breidert et al. (2006).
15 See eg Backhaus et al. (2005), Voelckner (2006), or Miller et al. (2011).
16 Miller et al. (2011) discuss and compare four approaches that are frequently applied to measure WTP.
What consumers really want

Many people choose not to buy life insurance

An individual’s demand for term life insurance depends on his/her need to protect dependents. Without dependents, there is no need for life insurance. The same can be true even when there are dependents: social security or workplace insurance plans may provide sufficient financial cover in the event of the death of the family breadwinner. In addition, many people perceive there to be no need for insurance although they may be exposed to significant financial risks.

This CBC study yielded similar findings. Around one third of the survey participants opted out in each of the 12 consecutive decision-making options. In doing so, these consumers declared that they would not be willing to buy the life insurance products presented, even though the premiums were very competitive. Over the duration of the survey, those participants who were unmarried and did not have a house or mortgage were more likely to always opt out.

As part of the study, participants could specify additional reasons why they do not want life insurance. Many said they do not buy life protection because it does not provide a return. They said life insurance is a bad bargain and that they prefer endowment insurance because it provides a certain return.

These statements point to a lack of understanding of the value proposition of term insurance. Like many other types (disability, property and liability), term insurance offers risk protection rather than a financial return. Property insurance also provides no financial return, but the benefits are more tangible. People understand that if their home is destroyed in a fire for example, property insurance would provide a financial safety net to help them get their lives back on track. They pay the premium because they value the risk protection that would kick in in the event of fire. The fate of term insurance, however, is seemingly to be misunderstood, with many choosing more tangible life savings products instead.

Product features: what consumers like

The CBC study showed that on average the premium rate is the most important factor in determining consumer utility in the life insurance sector in Germany. The results showed that the average consumer’s utility increased by 40% when offered the chance to move from the highest premium rate to the lowest (always within each age group and separately for smoker and non-smoker). The other product attributes (brand, the underwriting procedure and the critical illness rider) influenced utility in this way by 14-16%, and term and the sales channel options by 7-8%.

17 The analysis of marginal and maximum WTP was for the whole sample and averages are shown. It is important to stress that all information is available at the individual level, and that the analysis and conclusions can be derived for sub-groups, no matter whether sub-groups are defined by socio-economic factors (income, marital status, education, or profession etc.) or with regards to consumer preferences (ie latent groups that reveal homogeneous preferences).

18 The importance of product attributes was computed according to Equation (6) in the Appendix.
Willingness to pay for product features (marginal willingness to pay)

CBC allows estimation of both marginal willingness to pay (MWTP) for an incremental change in product attributes, and WTP for a specific term insurance product. MWTP can be calculated for all transitions from one to any other product attribute.\(^{19}\)

In Germany, brand is important. Consumers have a strong preference for well-known brand insurers. The CBC study showed that German consumers would be willing to pay on average EUR 18 more for a brand product than for an insurance policy from a not-well-known provider (see Table 1, but see also the box, “Heuristic decision making: relying on brand when making decisions”).

With respect to other product attributes, the average consumer would be willing to pay EUR 11 to buy a critical illness rider. He/she would pay EUR 10 for a simplified underwriting process of 10 questions rather than go through a medical examination, and would pay the same to switch from an online to face-to-face sales scenario. Also, he/she would be willing to pay EUR 6 to change from a policy-buying scenario that involves a medical examination to one with a one-year survival contract but no health assessment. It seems the medical assessment with possibly invasive action (eg, drawing of blood, EKG) and that is time consuming is something the average consumer is keen to avoid.

### Table 1:
Average marginal willingness to pay (rounded EUR)

<table>
<thead>
<tr>
<th>Change from ...</th>
<th>to ...</th>
<th>mean</th>
<th>median</th>
<th>2.5 percentile</th>
<th>97.5 percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown insurer</td>
<td>brand insurer</td>
<td>18</td>
<td>5</td>
<td>-28</td>
<td>99</td>
</tr>
<tr>
<td>No CI rider</td>
<td>with CI rider</td>
<td>11</td>
<td>7</td>
<td>-89</td>
<td>112</td>
</tr>
<tr>
<td>Medical examination</td>
<td>10 questions</td>
<td>10</td>
<td>5</td>
<td>-38</td>
<td>72</td>
</tr>
<tr>
<td>Online</td>
<td>personal sale</td>
<td>10</td>
<td>2</td>
<td>-25</td>
<td>82</td>
</tr>
<tr>
<td>Non-insurance brand company</td>
<td>unknown insurer</td>
<td>7</td>
<td>1</td>
<td>-66</td>
<td>90</td>
</tr>
<tr>
<td>Medical examination</td>
<td>1-year survival</td>
<td>6</td>
<td>3</td>
<td>-74</td>
<td>99</td>
</tr>
<tr>
<td>20-year term</td>
<td>15-year term</td>
<td>5</td>
<td>2</td>
<td>-24</td>
<td>41</td>
</tr>
<tr>
<td>1-year survival</td>
<td>10 questions</td>
<td>4</td>
<td>1</td>
<td>-54</td>
<td>75</td>
</tr>
<tr>
<td>15-year term</td>
<td>10-year term</td>
<td>3</td>
<td>1</td>
<td>-30</td>
<td>40</td>
</tr>
<tr>
<td>10 questions</td>
<td>3 questions</td>
<td>2</td>
<td>1</td>
<td>-29</td>
<td>47</td>
</tr>
</tbody>
</table>

Source: IVW and Swiss Re Economic Research & Consulting

\(^{19}\) MWTP was computed according to Equation (7) in the Appendix.
Heuristic decision making: relying on brand when making decisions

The very high average MWTP to switch to brand insurers warrants closer attention. An in-depth analysis of the CBC data revealed that a substantial sub-group of consumers apparently made their choices mainly in favour of brand insurers.\(^{20}\) If consumers make their decisions based mainly on one product attribute and (partly) neglect the premium rates (price), this means products with very high premium rates will remain popular. This in turn results in low price sensitivity and very high MWTP to switch to brand insurers (technically speaking, MWTP is determined by the ratio between the importance of an attribute and the importance of the price, see Equation (6) and (7) in the Appendix).

While this may simply reflect consumer preferences, it could also be heuristics.\(^{21}\) a simple short-cut rule that facilitates decisions making.

Consumers prefer short-term contracts.

The CBC study showed that the average consumer is also willing to pay for short-term contracts. This illustrates an important dynamic between consumer preferences (demand side) and cost (supply side). From a cost perspective, long-term contracts are more expensive for insurers to supply than short term as mortality rates increase with the term. Moreover, consumers do not seem to value the additional duration of contracts, with insurer attempts to push sales of 15- and 20-year contracts resulting in lower sales. The 10-year contracts proved more popular. These combine both lower production costs and higher WTP, meaning more sustainable profits for insurers.

Older consumers can increase their utility by switching to shorter-term contracts, even more so than younger consumers (see Figure 3). This is because the need for term insurance diminishes at certain life stages, for example when children become adults and leave the parental home, when retirement age approaches and/or when mortgages are paid off.

Very long-term contracts are unpopular.

The MWTP to switch to shorter contracts increases with age.

The CBC analysis revealed that even the younger can increase their utility by switching to 10-year term contracts. Behavioural economics helps shed some light on this aversion against long-term contracts. Consumers are often short-sighted. They prefer lower premiums for the short term over lower premiums far into the future (the benefit of longer term contracts). In addition, longer-term contractual obligations involve more uncertainty. For example, the longer a contract term, the higher the risk that one will not benefit from relatively lower premium rates in later stages (for example, because the policyholder no longer needs insurance).

\(^{20}\) Those consumers had in fact statistically significantly lower price sensitivity and did also more often choose brand insurer than the other consumers.

\(^{21}\) A heuristic is a decision-making shortcut (rule of thumb) that allows people to solve problems and make judgments quickly and efficiently. Heuristics are helpful in many situations, but they can also lead to inferior outcomes.
Consumer preferences are diverse. A general observation is that preferences vary significantly across individuals. Some consumer segments have a positive MWTP for a certain product feature, while others would be willing to pay to avoid the same feature. Consumer preferences diverge most when it comes to switching from a 15- to a 10-year contract. In the study, 56% demonstrated that they would prefer to switch to a 10-year contract, while 44% preferred 15-year terms (i.e., they had a negative MWTP for the change to a 10-year contract). Preferences with respect to sales channel were also very heterogeneous.

![Preference heterogeneity for product attributes](image)

Some consumers are willing to pay to undergo the full underwriting procedure... … but most prefer a 10-question underwriting survey.

Many consumers also have a positive MWTP for inclusion of a critical illness rider in an insurance contract.

Preferences with respect to critical illness riders are also relatively homogeneous, with only about 23% having a MWTP below zero. A negative MWTP for a rider is surprising given that there was no loading on the premium for products containing a critical illness rider in the CBC. Of course, participants did not know if there was a mark-up or not. It seems they assumed there was a built-in charge, suggesting a “there is no free lunch” line of thinking, which would make those who dislike this rider choose products without. If true, this suggests consumers believe they will have to pay for options, even those which are free.22

22 But this would also demonstrate that the consumers in the CBC-setup revealed very realistic thinking before making a decision.
Who prefers underwriting without any questions/examination?

The aim of underwriting is to attach a risk-based price to each policyholder. Without medical examination and without questionnaires, life insurers have no information about the mortality risk of an applicant. This presents risk of adverse-selection. To offer term insurance policies without underwriting is a bold move. It could mean that people with poor health get life insurance for a price well below that warranted by their risk profile.

The CBC shows that consumer preferences with regards to simplified underwriting are heterogeneous. This raises the question whether those in poorer health tend to seek simplified underwriting as a means to avoid a thorough underwriting assessment, and to secure insurance cover at a price below their true risk costs.

In the CBC, those with poor or impaired self-reported health in fact tended to more often choose the less rigorous underwriting approach. In particular, they more often chose products with no underwriting process involved but a one-year survival contract.

On the other hand, those in self-reported good health had a relatively strong preference to go through a medical examination. This could be a defence strategy. They may have been concerned that they would end up subsidizing those in poorer health if they bought a product that did not involve a rigorous underwriting procedure. Alternatively those in good health might have seen benefit in having a free medical examination to confirm their health status.

A similar analysis revealed that smokers and non-smokers do not choose differently with respect to underwriting procedures, even though they face higher premiums when they partake in a more thorough underwriting procedure.

Figure 5:
Preferred method of underwriting and self-reported health status

Source: IVW and Swiss Re Economic Research & Consulting

---

23 All levels of the product features were shown with about the same frequency to all respondents so that these results can be considered as not influenced by the other product features. Moreover, only product choices that were selected in the first step and were not opted out in the second step were considered.
What consumers really want

Willingness to pay for term life insurance products

An important finding of the CBC study is that consumer preferences are heterogeneous. It follows that insurers should offer a wide range of products and services. In order to best cover the product space as defined in the CBC, four products were defined and analysed with regards to consumer WTP (see Figure 6).

Figure 6: The four products analysed

<table>
<thead>
<tr>
<th>Product A</th>
<th>Product B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand: non-insurance brand</td>
<td>Brand: well-known insurer</td>
</tr>
<tr>
<td>Sales channel: online</td>
<td>Sales channel: human sales person</td>
</tr>
<tr>
<td>CI rider: none</td>
<td>CI rider: none</td>
</tr>
<tr>
<td>Underwriting: 10 questions</td>
<td>Underwriting: medical examination</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product C</th>
<th>Product D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand: unknown insurer</td>
<td>Brand: well-known insurer</td>
</tr>
<tr>
<td>Sales channel: online</td>
<td>Sales channel: human sales person</td>
</tr>
<tr>
<td>CI rider: yes</td>
<td>CI rider: yes</td>
</tr>
<tr>
<td>Underwriting: one-year survival</td>
<td>Underwriting: three questions</td>
</tr>
</tbody>
</table>

Source: IVW and Swiss Re Economic Research & Consulting

Product A presents the scenario of a simple, lean product which is sold online and is provided by a non-insurance brand company. Product B is sold through a well-known brand insurer in a face-to-face setting. Product C contains a critical illness rider. There are no underwriting formalities and the product is sold online. Product D combines all features that the CBC study has identified as representing the highest utility for the average consumer.24

In the CBC, Product D elicited the highest average consumer WTP, at EUR 33 per month. The WTP for the three other products (see Table 2) was significantly lower; EUR 16 for Product A, EUR 20 for Product B, and EUR 23 for Product C.

The average WTP is highest for the product that combines the most preferred features.

The 25% of consumers with the highest utility from the four products had an average WTP of between EUR 12 for Product A and EUR 35 for Product D. There were also consumer segments with very high WTP. At the high end, 2.5% of consumers would have been be willing to pay between about EUR 83 and 140 for these products.

Most consumers have a low WTP, but there are also consumers with high WTP.

On the other hand, between 44% and 61% of consumers had a WTP of zero. This again evidences that many people do not need – or think they do not need - term life insurance or see no value in having term insurance.

Large groups don’t need or want term life insurance and have a WTP of zero.

24 More products could be defined and analysed. However, these would only be slight modifications of one of the four products analysed here. There would be little additional value in doing more analysis in the current context.
The decision to buy a product or not depends on WTP and the price. Consumers will only buy if their WTP exceeds the market price. While Product D best meets average consumer preferences (it has the highest average WTP according to the CBC), it is not necessarily the most attractive from the supplier perspective. That’s because Product D includes a critical illness rider and is therefore more expensive to provide, something that has to taken into account in pricing. Likewise, the simplified underwriting procedure may attract buyers who want life insurance but who are not in good health. Such consumers perhaps want to avoid a medical examination, knowing that the poor outcomes would result in higher premiums (see box "Who prefers underwriting without any questions/examination?"). For the supplier, if adverse selection were to occur in this settings, the expected pay-out to policyholders would increase and hence so too the cost of providing the insurance. The high average WTP for Product D is hence (partially) offset by a higher price, which both reduces demand and margins.

Who buys what?

In the real world, consumers can choose between various products and may choose not to buy insurance at all. Using the data on consumer preferences collected in the CBC, the impact of pricing and product design on market shares can be analysed.\(^{25}\)

To simulate the market, each of the four previously-defined products A, B, C and D (see Figure 6 for a description of the products) are available at the following assumed prices:\(^{26}\)

- Product A: lowest premium rate\(^27\)
- Products B and C: second lowest premium rate
- Product D: medium premium rate

In this setting, according to preferences revealed in the CBC study, 59% of consumers opted out. For those consumers, the perceived value of the products on offer was less than the market price they would have been required to pay. Of the 41% who did buy, Product A was most popular, with a 15% market share.\(^{28}\) Product A is relatively cheap and appeals to those who do not care much about brand or having a critical illness rider, and who prefer simple 10 question underwriting and online transaction. The second favourite was Product D (market share: 12%).

Product D is expensive relative to the other products (medium premium rate). It is bought by those who value brand recognition and who also want a critical illness rider.

---

**Table 2:**

<table>
<thead>
<tr>
<th></th>
<th>Product A</th>
<th>Product B</th>
<th>Product C</th>
<th>Product D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>16</td>
<td>20</td>
<td>23</td>
<td>33</td>
</tr>
<tr>
<td>Median</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>75% percentile</td>
<td>12</td>
<td>16</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>97.5% percentile</td>
<td>83</td>
<td>89</td>
<td>106</td>
<td>140</td>
</tr>
<tr>
<td>Percentage WTP &lt; 0</td>
<td>61%</td>
<td>56%</td>
<td>53%</td>
<td>44%</td>
</tr>
</tbody>
</table>

Source: IVW and Swiss Re Economic Research &Consulting

---

\(^{25}\) Consumer decision making follows the first-choice method: consumers choose and buy the product that contributes most to their utility (if there is no net utility from buying, consumers are assumed not to buy).

\(^{26}\) Hence the number of insurers in the market is equal to the products offered in the market. If more insurers offer the same product this would not alter the aggregate market share of that specific product.

\(^{27}\) See Table 3 in the Appendix for the age-band and smoker/non-smoker specific premium rates.

\(^{28}\) This metric is called share of preferences in the marketing research literature. However, intuitively it refers to market share, which we – for ease of reading – prefer in this report.
What consumers really want

Products B and C are priced mid-market and cater to the requirements of a small subset of consumers. In the simulation, the two products took just 5% and 9% market shares, respectively.

Price competition

The German insurance market is competitive. The number of comparison sites which consumers use to research products and prices is growing, and insurers are under pressure to reduce prices to defend their market share and meet their growth targets.

CBC methodology can simulate such market realities. Changes in prices changed the market shares of the products A, B, C and D, as expressed by corresponding consumer choices. For example, Product A at the outset had a market share of 15%. As Figure 8 shows, a one-step increase (“+1”) in the price of Product A from “very low”, with the prices of the other products remaining unchanged, led to a fall in market share to about 7.5%. The main beneficiary of the +1 price rise in Product A price rise was Product C. As the turquoise bars of the chart shows, Product C’s market share widened from 9% to about 12%.

The right hand panel of Figure 8 shows the degree of change of market share in percentage points (pp) for each product in response to price increases for Product A. Staying with the +1 price rise from “very low”, the chart shows that 3.5 pp of consumers who had previously bought Product A would opt out following the one-step price increase. This can be seen from the widening of the light grey bars in Figure 8. As evident from Figure 8, as the price of Product A is raised further, its market share continues to decline and is close to zero at the very high (“+8”) price level.
Market share sensitivities to changes in the price of Product A

Figure 8:

Source: IVW and Swiss Re Economic Research & Consulting

Even with a large drop in price ...

... Product B cannot compete with the low-end or high-end products.

Market share sensitivities to changes in the price of Product B

Figure 9:

Source: IVW and Swiss Re Economic Research & Consulting

A similar price change exercise was applied to Product B. From a starting “low” price and a market share of 5%, the price of Product B was reduced by two levels (“-2”). The prices of the other products remain fixed. Figure 9 shows that with price change, Product B’s market share grew to 12%. Of the increase, 1.6pp were previously uninsured consumers. The price change also prompted 2.1pp consumers to switch from Product A to Product B. However, despite the changes, in terms of market share Product B was still behind Product A (low price, simple product) and Product D (high price, high-end product).
What consumers really want

Product C is price sensitive, it competes with Product A.

Figure 10 shows that Product C's market share grew to 27% from 9% when its price was cut by two steps from "low", and while the price of other products remains unchanged. With this price decrease, almost 4pp of consumers previously uninsured came into the market to buy Product C, and more than 5pp switched into C from Product A. Conversely, when Product C's price was increased, its market share fell dramatically, with consumers switching to A.

Product B and C are weak substitutes for each other.

Product D sells at higher prices.

To sell Product D at lower prices would likely quickly become unviable.

A price reduction can greatly increase market share. However, given the high cost of providing Product D given its specific attributes (critical illness rider, face-to-face sales), the provider of Product D would unlikely be able to take the price too low.

Source: IVW and Swiss Re Economic Research & Consulting
Competition through product innovation: a win-win approach

As an alternative to price competition, insurers can improve product design to better respond to consumer preferences and increase market share. Again, market share can be increased by taking customers from competitors or by attracting the previously uninsured into the market.

To simulate, the features of a product were changed from the originally defined attributes (as defined in Figure 6) and WTP was calculated for the new product. Then the prices were adjusted until the starting market share was reached again. The price increase (decrease) is an indicator of the added (lost) value for consumers.

- A critical illness rider was added to Product B, making the new Product B+ similar to Product D with the exception of the underwriting. Buying Product B+ means having to undergo a medical examination as part of the underwriting process, while Product D involves a three-question application form.

  With the additional feature, the results showed that Product B+ could be sold with an almost 60% price increase and still maintain a 5% market share. However, this additional revenue may or may not increase profits since the critical illness rider would also increase the expected claims.

- The design of Product C was changed to include a three-question underwriting application form and a reduced term of 10 years. Based on consumer responses to the changes, the new Product C+ could be sold at around a 13% higher premium. As the 10-year contract is less costly than the 15-year policy, and because the insurer faces less risk of being victim of adverse selection, offering this product seems to be a promising move.

- If the providers of Products B and C both changed their products simultaneously, the price increase would have been slightly lower (again with the restriction that market shares are maintained at their original level). Overall insurance coverage would increase slightly. However, these product innovations would also impact the market shares of Products D and A. Product D would lose market share (some customers would buy the improved Product B+ or C+), and Product A would gain share. This is the result of higher prices of the two new products and because Product B+ customers who dislike the new critical illness rider in their policy would switch to Product A.

Product innovation is also a tool to grow the market and increase market share.
Product innovation and product differentiation can help increase sales.

Insurers can influence market share and reach more consumers with product innovation and differentiation. However, if all insurers start to offer similar products with only more favourable product features, the overall market offering would be more homogeneous. Those consumers with specific preferences would likely not be satisfied with products designed for the average consumers, and overall insurance sales would fall because there would be less choice.

Source: IVW and Swiss Re Economic Research & Consulting

For example, in the extreme case where all insurers were to offer Product D that combines all features that create the highest utility to an average consumer, only 27% of consumers would buy insurance (compared to 41% if four products were available). The market shares for the four products - assuming that only one product is available, or equally that all products converge into the same - are shown in Figure 12. Such product convergence is best avoided and not only because of lower sales. With convergence, price differentials more strongly impact sales, leading to increased price pressure.

Product-launch analysis: diversity is a win-win for consumers and insurers

Market entry of one or several products can also be analysed based on the consumer profiles obtained from the CBC. Let’s assume only Product B (branded, face-to-face sales, no critical illness rider, underwriting requires medical examination) is available. In this case, only 20% of all consumers would buy insurance.

Then, a well-known and respected furniture company decides to diversify its activities into insurance and spots an opportunity to bring a product such as Product A (sold online, without a critical illness rider and underwriting assessment entailing a 10-question application form) to market to target consumers with low WTP. As Figure 13 shows, now 33% of all consumers buy insurance, an increase by 13 pp. Product B loses 10pp in market share to Product A.
Next, after extensive consumer research and based on the findings of a thorough CBC study, another brand insurer decides to bring Product D, which bundles many features that consumers like (face-to-face sales, critical illness rider and very simple underwriting procedure of three questions), to market. Product D takes significant share mainly from Product B, and it too attracts previously uninsured persons into the market (plus 6pp).

Finally, a little-known insurance company brings Product C, which is sold online, has a critical illness rider and a one-year waiting period, to market. As Figure 13 shows, Product C attracts new consumers into the market.

With four products to choose from, 41% of all consumers purchased insurance. With only one product only 20% bought insurance.

With more product offerings, insurance uptake increases as additional consumers come into the market.

A wide range of term products should be offered to grow the market and reach more consumers.

Policymakers and regulators should encourage a rich product offering.

Consumer heterogeneity can only be met with a wide range of term insurance products. To a certain degree insurers can chose a niche segment to avoid pure price competition. From a business stand point this requires and justifies further efforts to understand consumer preferences.

Also from a societal point of view: if policymakers aim to reduce the protection gap, they should encourage insurers to offer a wide range of products. They should not encourage unification of product offerings and pricing.

Figure 13:
Market shares, market penetration and product differentiation

With four products now available to choose from, 41% of all consumers buy insurance. That’s up from the just 20% who took cover when Product B was the only product around. In this model, heterogeneous preferences have been successfully met with a heterogeneous product landscape.

(Note: the order of the market entrance has no impact on the final market shares)
Conclusions & recommendations

This CBC study provides the following insights into the term life insurance market in Germany:

- Only some consumers need term life insurance, for example those with dependents (spouses, children or business partner etc). In addition, many people perceive there not to be a need for term life insurance. This is reflected in the results of the CBC study: one third of all respondents opted out from every one of the 12 decision-making options presented to them.

- According to the CBC, only 20-30% had a WTP that exceeded the price observed in the German life insurance market. Moreover, when asked if they would actually make a purchase, just 16% said they would. This is a close portrayal of real-life and underpins the validity of the current CBC. In Germany, about 17% of those aged 20-59 have term insurance. 29

- Preferences differ significantly across consumer groups. While some consumers like specific features such as a simple underwriting procedure, others have strong aversion against it. Preference heterogeneity is not as definite for other product features, but it is always there.

- Preference heterogeneity can be addressed with diverse products. In general, the range of products available should be as wide as possible. This also implies that there is a market for niche players.

- By designing consumer-group specific products (ie by eliminating product features with insufficient WTP and by including product features that create high utility), consumers’ cost-benefit can be improved, resulting in higher sales. People who currently do not buy term insurance can be attracted into the market and become consumers, reducing underinsurance.

- Product differentiation can also help insurers avoid competing on price alone with similar products. The focus can be on the benefits of product features which are attractive to consumers.

- Product pricing goes hand-in-hand with product design. By understanding consumers' WTP, prices can be adjusted after comparing WTP for and manufacturing costs of different product features. For example many consumer segments prefer short-term contracts which are less costly to provide. In this case, both insurers and policyholders stand to benefit from a greater degree of short-term product offerings.

- Products marketing can also be made more effective. Once consumer segments are identified, product offerings can be tailor-made and marketed. However, this requires identification of consumer segments with relatively homogeneous preferences.

- To reduce the protection gap, policymakers and regulators should encourage insurers to offer a wide range of products. This broadens the reach of insurance to more consumers and help to reduce the mortality protection gap. 30 Actions to further regulate the term insurance market (eg, the EU Gender Directive) and to make product offerings and pricing more uniform could reduce term insurance uptake.

---

29 There were 7.48 million term insurance policies in force in Germany in 2012 (Source: Versicherungsstatistik 2012, Steria Mummert). The population aged 20-59 (the age range represented in the study and the most likely benefit from term insurance) was about 44 million in 2011 (Source: Statista).

All this requires life insurers to move away from cost- and experience-based pricing and product design, to a holistic consumer preferences-oriented business model. This will yield greater consumer satisfaction and lower underinsurance and thus produce more business with sustainable profits.

Recommendations and cautionary statements

- The results are based on an experiment. The consumers (i.e., the survey participants) were acting in a hypothetical situation. Reliability and validity checks are needed to further prove business relevance of the results. Ideally results of the experiment would be compared with real-world sales of term life insurance in Germany.

- The results shown here are intentionally confined to the whole sample. However, all information is available for every single consumer, and MWTP and WTP analysis can be done for sub-groups. For example, MWTP and WTP vary substantially with age (and other socio-economic factors and personal traits etc). This is particularly relevant in matching consumer segments and products.

- Many of the findings could be relevant and valid for other countries, but the characteristics of life insurance markets do differ. For example in countries with well-developed stand-alone critical illness products, the WTP for critical illness riders could be very different from that observed through the CBC in Germany.
Appendix: Choice-based conjoint analysis

The following appendix has been extracted from the 2014 working paper “On Consumer Preferences and the Willingness to Pay for Term Life Insurance” by Alexander Braun, Florian Schreiber and Hato Schmeiser, which is forthcoming at www.ivw.unisg.ch.

Theoretical foundations

CBC analysis is theoretically underpinned by Random Utility Theory (RUT, see Thurstone, 1927; Von Neumann and Morgenstern, 1944). Let C denote the set of all relevant alternatives, y the i-th observed value of a discrete choice variable for individual j, and M the total number of alternatives shown in a given choice task c ∈ C. Each individual j associates alternative a with a latent utility U_{ij}. Under the assumption that all individuals maximize utility, alternative a is chosen (ie y_{ij} = a), if and only if its utility exceeds that of all other available alternatives: U_{ja} = \max(U_{j1}, U_{j2}, ..., U_{ja}). To account for the probabilistic nature of choice, RUT describes utilities by means of a deterministic component (V_{ja}) and a stochastic term (\epsilon_{aj}) that captures unobserved aspects as well as measurement error (see, eg, Train, 2003):

(1) \quad U_{ja} = V_{ja} + \epsilon_{aj}

The condition under which a is selected can then be expressed as follows:

(2) \quad U_{ja} > U_{jm}

\[ \begin{align*}
V_{ja} + \epsilon_{ja} &> V_{jm} + \epsilon_{jm} \\
\epsilon_{ja} - \epsilon_{jm} &> V_{jm} - V_{ja}
\end{align*} \quad Vm \neq a
\]

Therefore, the probability of individual j choosing alternative a equals:

(3) \quad Pr(y_{ij}=a) = Pr(U_{ja}>U_{jm}) = Pr(\epsilon_{ja} - \epsilon_{jm} > V_{jm} - V_{ja}) = 1 - Pr(\epsilon_{ja} - \epsilon_{jm} \leq V_{jm} - V_{ja})

By assuming the \epsilon are independent and adhere to a Gumbel (type-I extreme value) distribution, it is possible to derive the Lucean choice model (see, eg, McFadden, 1974):

(4) \quad Pr(y_{ij}=a) = \frac{\exp(V_{ja})}{\sum_{m=1}^{K} \exp(V_{jm})} \quad Vm.

which is characterized by the independence from irrelevant alternatives (IIA) property.\(^{31}\) It is now possible to condition on the choice task c and explicitly specify V_{ja} and the V_{jm} in terms of attributes of the alternative under consideration to derive the multinomial logit (MNL) model that lies at the center of the CBC approach:

(5) \quad Pr(y_{ij}=a|c) = \frac{\exp(X_{ja} \beta_j)}{\sum_{m=1}^{K} \exp(X_{jm} \beta_j)} \quad Vm.

where the X = (x_{1}, ..., x_{Q}) are N×Q matrices whose column vectors include values for the Q predictors (attribute levels) as shown in N choice tasks and \beta_j = (\beta_{j1}, ..., \beta_{jQ}) represents the Q×1 vector of unknown parameters (part-worth utilities).\(^{32}\)

\(^{31}\) IIA implies “that the odds of choosing alternative a in relation to alternative b must be constant, regardless of what other alternatives are present” (Louviere and Woodworth, 1983).

\(^{32}\) Note the special form of this MNL model, resembling the conditional logit approach (see, eg, McFadden, 1986). In contrast to the CBC analysis, MNL predictors are usually individual characteristics instead of product attributes, whereas the parameters are allowed to vary across alternatives.
Product attributes and levels

There is no generally accepted procedure for determining the appropriate product attributes and levels to be used in a CBC research design. For this study, focus group discussions with industry professionals resulted in the six attributes: (1) insurance premium; (2) term assured; (3) sales channel; (4) medical underwriting; (5) brand, and (6) critical illness (CI) rider. The sum insured for all policies was held fixed at EUR 100 000. For the specification of the levels, the guidelines suggested by Orme (2002) were taken into account, in particular concise labelling, independence and mutual exclusivity.

The selection of levels for the monthly insurance premium was a challenging task. Firstly, the aim was to avoid distortions due to the “range and number-of-levels effects” (see Verlegh et al., 2002). Thus, as suggested in the extant literature, a realistic range bounded by the minimum and maximum price of comparable policies offered in Germany was determined (see, eg, Miller et al., 2011). This was achieved by interviewing market experts and evaluating quotes for a large number of products through the online comparison platform www.check24.de. Secondly, term life insurance differs from most consumer goods in that there is a direct link between an individual’s age and physical condition and the price of the policy. More specifically, premiums for older policyholders with impaired health will be much higher than for the young and healthy. Accordingly, the study design needed to ensure that each individual was offered a price range that matched his/her risk characteristics. For this reason, the survey participants were allocated into 10 different groups, defined by five age brackets and smoker status. Throughout the 12 choice experiments, each group was offered product profiles based on the corresponding price levels (“very low” to “very high”).

Table 3: Premium rates used in the experiment

<table>
<thead>
<tr>
<th>Non-smoker</th>
<th>Age</th>
<th>Very low</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very high</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–29</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>30–39</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>40–44</td>
<td>7</td>
<td>14</td>
<td>21</td>
<td>28</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>45–49</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>50–55</td>
<td>20</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Smoker</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20–29</td>
<td>5</td>
<td>8.75</td>
<td>12.5</td>
<td>16.25</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>30–39</td>
<td>10</td>
<td>17.5</td>
<td>25</td>
<td>32.5</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>40–44</td>
<td>20</td>
<td>35</td>
<td>50</td>
<td>65</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>45–49</td>
<td>30</td>
<td>52.5</td>
<td>75</td>
<td>97.5</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>50–55</td>
<td>60</td>
<td>105</td>
<td>150</td>
<td>195</td>
<td>240</td>
<td></td>
</tr>
</tbody>
</table>

Sample and choice-based conjoint analysis

Data was collected from a population-representative sample of 2 955 people in Germany, of which 2 017 rated themselves as insurance decision makers. All survey participants were aged between 20 and 54 years. To ensure a roughly equal distribution of respondents across the 10 groups, a 10% quota was targeted. A well-respected market research firm was chosen for the experiment in order to

---

33 It is common for insurers to differentiate price for smokers with smokers’ higher mortality risk.
34 In the context of this study, the term “insurance decision maker” is defined as a person who either purchases insurance policies him/herself or participates in the decision to do so.
maximize response rates and minimize the risk of missing data. Participation in the study was incentivized by bonus points that can be spent for real consumption purposes.

The online survey relied on the latest CBC system of Sawtooth Software, Inc. and underwent a technical pre-test before the two-week field phase. At the outset, participants were asked about their age, sex, health status, education, profession, smoking habits etc. This was followed by discrete choice experiments that began with a neutral explanation of the hypothetical buying situation, the purpose of term life insurance and the product attributes. Finally, participants were presented with 12 choice tasks, each comprising two complete term insurance contracts and the possibility to opt out. The attribute order within each conjoint stimulus remained fixed, but the pairwise comparisons were generated according to the balanced overlap method, a randomized experimental design that accounts for the principles of minimal overlap, level balance and orthogonality. This approach helps curtail psychological context and order effects (see Sawtooth Software, 2013). At the end of the survey, additional questions to capture participants’ attitude towards insurance and why they did or not did buy term insurance were posed.

Estimation of individual-level part-worth utility profiles

Individual-level part-worth utilities were estimated from the observed choices using the Hierarchical Bayes (HB) routine which is included in Sawtooth CBC/HB 5.0 (see Sawtooth Software, 2009). The corresponding set-up comprises two levels. On the lower level, the choice data is explained by the MNL model in Equation (5). In addition, there is an aggregate or upper level comprising the prior for the individual part-worth utilities. More specifically, the \( \beta_j \) in Equation (5) are assumed to stem from a multivariate normal distribution with mean vector \( \alpha \) and covariance matrix \( D \), which describes the heterogeneity across individuals. For computational ease, the HB approach relies on an additional multivariate normal and the inverse Wishart distribution as conjugate hyperpriors for \( \alpha \) and \( D \).

A robust iterative process with initial values of zero serves to estimate the unknown parameters. The Metropolis-Hastings Algorithm is employed to draw the \( \beta_j \), while \( \alpha \) and \( D \) are determined through Gibbs sampling. An important property of the HB model is the incorporation of shrinkage, which implies that the individual-level estimates become more efficient because they inform each other via the higher level distributions. 20,000 burn-in iterations of the Markov chain and 50,000 post-convergence iterations for the subsequent sampling of the posterior distributions were run. Once the Bayesian updating of the prior probabilities with the choice data was completed, monotonicity constraints were imposed on the posterior part-worth utilities for the attribute premium using the tying-after-estimation procedure. This was done because monotonically falling price-utility curves are a necessary condition for the computation of maximum WTP.

---

35 The introductory and explanatory statements were carefully phrased to rule out framing effects.
36 The reader is referred to Huber and Zwerina (1996) for a more detailed description of these conjoint design principles. As recommended by Orme (2002), so as to avoid estimation problems and confounded utilities, no attribute level combinations were prohibited.
37 The suitability of HB models for conjoint studies has been documented in several pieces of high-class research (see, eg, Arora et al., 1995; Lenk et al., 1996; Atora et al., 1998; Huber, 1998; Arora and Huber, 2001, Train, 2009).
38 Technical details on these Markov Chain Monte Carlo (MCMC) methods can be found in Chib and Greenberg (1995).
39 This method implies running the HB estimation without constraints and then recursively tying the values for each offending pair of part-worths until all violations have been eliminated. It has been shown to perform very well in terms of hit rate and share predictions (see Johnson, 2000).
Relative importances, willingness to pay, and shares of preference

By itself, the MNL model in Equation (5) is unidentified. It is therefore impossible to find a unique set of estimates without imposing some form of restriction on the parameters. CBC analysis commonly relies on a normalizing constraint for identification such that the sum of part-worth utilities equals zero. This is achieved through effects coding of the product attributes. Conjoint utilities are interval scaled, i.e., they exhibit an arbitrary intercept for each attribute (see, e.g., Orme, 2010). Therefore, it is possible to add any constant to the part-worth profiles of the product attributes without affecting the predicted choice probabilities. On the other hand, utility values are not comparable across attributes and ratios must not be formed.

For these reasons, part-worth utilities cannot be directly interpreted. However, part-worth utility profiles can be used to derive metrics with a more intuitive economic meaning. One such option is the relative importance, which measures the percentage contribution of a single attribute to the overall utility of a product (see Orme, 2010). Formally, the relative importance $RI_{jk}$ of attribute $k \in \{1, \ldots, K\}$ with levels $l \in \{1, \ldots, L_k\}$ as perceived by individual $j$ can be expressed as follows:

$$ RI_{jk} = \frac{\max_l (\beta_{jk}) - \min_l (\beta_{jk})}{\sum_{k=1}^K \left( \max_l (\beta_{jk}) - \min_l (\beta_{jk}) \right)} $$

The $RI_{jk}$ follow a ratio scale, add up to 100% for each respondent $j$, and are readily comprehensible: the larger the utility range of an attribute, the more important it is to the individual and the higher its potential to raise or lower the choice probability for a product. Based on the $RI_{jk}$, it is possible to identify key product features for a given market.

Beyond the relative importance, one may draw on measures for the WTP to conduct interpersonal comparisons. In this context, it is important to differentiate between the marginal WTP for changes in product attribute levels and the maximum WTP for whole products. A common approach to estimate individual $j$’s marginal WTP (MWTP) for the step from level $l$ to level $h$ of product attribute $k$ is based on an exchange-rate between utility and price (e.g., see Jedidi and Jagpal, 2009):

$$ MWTP_{jk}(h, l) = \left( \frac{\max_l (p_j) - \min_l (p_j)}{\max_l (\beta_{jhl}) - \min_l (\beta_{jhl})} \right) \cdot (\beta_{jkh} - \beta_{jhl}) $$

where $p_j$ denotes the levels of the attribute price ($k = 1$) in EUR associated with age and smoking status of individual $j$ (see Table 3) and the $\beta_{jhl}$ represent the corresponding part-worth utilities. MWTP is equivalent to the marginal rate of

40 More specifically, the last level of every attribute is estimated as the negative of the sum of the other levels. Although dummy coding would also introduce an identification constraint by selecting one attribute level as the baseline category and setting it to zero, effects coding emerged as the standard in the early 1990s (see Sawtooth Software, 2009).

41 Data may exhibit various properties. E.g., nominal data cannot be ranked, i.e., blue is not higher/better than red. Ordinal data can be ranked, but does not support mathematical operations. E.g., a type 3 hurricane is stronger than a type 2 hurricane, but the difference is not the same as between a type 2 and type 1 hurricane. Interval data differences reveal valid information, i.e., the difference between 20 degrees Celsius and 10 degrees is the same as the difference between 10 and 0 degrees. For ratio data all mathematical operations are allowed.

42 Note that due to statistical noise, conjoint part-worth profiles will almost never be flat. Therefore the $RI_{jk}$ values for attributes with little relevance may be upwardly biased because the measure exclusively focuses on extreme utility values (see Orme, 2010).

43 The reason for this property of the WTP lies in the fact that the intercept disappears in monotonic transformations. For a formal discussion see Jedidi and Zhang (2002).
substitution between non-price and price attribute and expresses the utility increases or decreases induced by product adjustments in monetary terms. The resulting figures, however, should be interpreted with care because this concept assumes a strictly linear part-worth curve across the whole price range, does not consider a specific product context and fails to take into account the option not to buy or the impact of competition in the market.44

With regard to maximum WTP for whole products, the approach of Kohli and Mahajan (1991) was adopted, who suggest a definition based on the following relationship:

\[
\begin{align*}
(8) \quad & u_{j-\text{p}} + v_j(p_j) \geq u_j^* + \xi .
\end{align*}
\]

where \( u_{j-\text{p}} \) equals the sum of utilities for all product attributes except price as perceived by individual \( j \), \( v_j(p_j) \) is the utility associated with price level \( p_j \), \( u_j^* \) represents a threshold utility, and \( \xi \) stands for an infinitesimally small positive number. Following Jedidi and Zhang (2002), in this study \( u \) was treated as the utility of the none option, implying that individual \( j \) would only choose the product if the associated total utility was at least as high as the utility of not buying. The maximum WTP could then be derived by finding the highest price for which Equation (8) still holds (indifference condition):

\[
(9) \quad \text{WTP}_j = v_j^{-1} (u_j^* - u_{j-\text{p}}) .
\]

with \( v_j^{-1} \) denoting the inverse of the price-utility curve. A piecewise-linear approach was applied to calculate the maximum WTP (see, eg, Miller et al., 2011). Since the part-worth profiles for the insurance premium were captured at discrete points only, they needed to be interpolated with linear slopes. Similarly, in case the utility values fell outside the range covered by our estimates, the nearest segment of the curve was extrapolated.

The next step was to simulate consumer behaviour in a competitive setting. Individual-level part-worth utility profiles were converted into “shares of preference” (shares of choice) that allow to measure market expansion, market contraction and product switching effects.45 Product demand was predicted by the first-choice method (maximum utility rule), which assumes that each individual buys the policy with the highest overall utility (see Orme, 2010).

44 In addition to these theoretical limitations, it is known to yield heavy-tailed posterior distributions, see, eg, Sonnier et al., (2007).
45 Shares of preference may track actual long-term equilibrium market shares quite well. Yet, as conjoint part-worth profiles do not incorporate many important real-world determinants such as advertising, promotions, and sales force effects, the two concepts should not be confounded (see Orme, 2010).
Bibliography


Collaboration partners

Swiss Re

The Swiss Re Group is a leading wholesale provider of reinsurance, insurance and other insurance-based forms of risk transfer. Dealing both direct and through brokers, its global client base consists of insurance companies, mid-to-large-sized corporations and public sector clients. From standard products to tailor-made coverage across all lines of business, Swiss Re deploys its capital strength, expertise and innovation power to enable the risk taking upon which enterprise and progress in society depend.

Swiss Re was represented by Markus Unterkofler, John Turner and Lukas Steinmann.

Institute of Insurance Economics – as part of the University St. Gallen – was founded in 1949 as an independent centre of competence for research, education and consulting in the field of insurance economics and risk management. Its focus lies on the engagement in fundamental and applied research. The institute continuously works on the latest topics in the field of insurance economics and risk management and provides its clients with practical studies, market analyses and expert opinions. In addition, and very importantly, it teaches students in its field of expertise and thereby secures new generations of qualified employees and scientists.

The Institute of Insurance Economics was represented by Prof. Hato Schmeiser, Prof. Alexander Braun and Florian Schreiber.

Swiss Re Centre for Global Dialogue

The Swiss Re Centre for Global Dialogue is a platform for the exploration of key global issues and trends from a risk transfer and financial services perspective. Founded by Swiss Re, one of the world’s largest and most diversified reinsurers, in 2000, this state-of-the-art conference facility positions Swiss Re as a global leader at the forefront of industry thinking, innovation and worldwide risk research. The Centre facilitates dialogue between Swiss Re, its clients and others from the areas of business, science, academia, and politics.

The Swiss Re Centre for Global Dialogue was represented by Stephan Schreckenberg.