Age and choice in health insurance: evidence from a discrete choice experiment

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Abstract: Background: A uniform package of benefits and uniform cost sharing are elements of regulation inherent in most social health insurance systems. Both elements risk burdening the population with a welfare loss if preferences for risk and insurance attributes differ. This suggests the introduction of more choice in social health insurance packages may be advantageous; however, it is widely believed that this would not benefit the elderly. Objective: To examine the relationship between age and willingness to pay (WTP) for additional options in Swiss social health insurance. Methods: A discrete choice experiment was developed using six attributes (deductibles, co-payment, access to alternative medicines, medication choice, access to innovation, and monthly premium) that are currently in debate within the context of Swiss health insurance. These attributes have been shown to be important in the choice of insurance contract. Using statistical design optimization procedures, the number of choice sets was reduced to 27 and randomly split into three groups. One choice was included twice to test for consistency. Two random effects probit models were developed: a simple model where marginal utilities and WTP values were not allowed to vary according to socioeconomic characteristics, and a more complex model where the values were permitted to depend on socioeconomic variables. A representative telephone survey of 1000 people aged >24 years living in the German- and French-speaking parts of Switzerland was conducted. Participants were asked to compare the status quo (i.e. their current insurance contract) with ten hypothetical alternatives. In addition, participants were asked questions concerning utilization of healthcare services; overall satisfaction with the healthcare system, insurer and insurance policy; and a general preference for new elements in the insurance package. Socioeconomic variables surveyed were age, sex, total household income, education (seven categories ranging from primary school to university degree), place of residence, occupation, and marital status. Results: All chosen elements proved relevant for choice in the simple model. Accounting for socioeconomic characteristics in the comprehensive model reveals preference heterogeneity for contract attributes, but also for the propensity to consider deviating from the status quo and choosing an alternative health insurance contract. Conclusion: The findings suggest that while the elderly do exhibit a stronger status quo bias than younger age groups, they require less rather than more specific compensation for selected cutbacks, indicating a potential for contracts that induce self-rationing in return for lower premiums.

DOI: https://doi.org/10.2165/01312067-200801010-00006

Becker, Karolin; Zweifel, Peter (2008). Age and choice in health insurance: evidence from a discrete choice experiment. The Patient: Patient-Centered Outcomes Research, 1(1):27-40.
DOI: https://doi.org/10.2165/01312067-200801010-00006

Age and Choice in Health Insurance: Evidence from Switzerland

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This version
June 8, 2007

Abstract: Elements of regulation inherent in most social health insurance systems are a uniform package of benefits and uniform cost sharing. Both elements risk to burden the population with a welfare loss if preferences differ. This suggests introducing more contracted choice; however, it is widely believed that this would not benefit the aged. This study examines the relationship between age and willingness-to-pay (WTP) for additional options in Swiss social health insurance. Through discrete choice experiments (DCE), a marked diversity of preferences can be established. The findings suggest that while the aged do exhibit more status quo bias, they require less rather than more specific compensation for selected cutbacks considered, pointing to potential for contracts that induce self-rationing in return for lower premiums.

Keywords: willingness-to-pay, health insurance, age, rationing

JEL: C35, C93, D61, I11, I18

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We are indebted to Harry Telser and Rainer Winkelmann (both University of Zurich), seminar participants at the University of Constance, and participants of the Working Party for Health Economics and Policy of the German Economic Association for helpful comments and suggestions.

1 Introduction

Healthcare systems based on mandatory health insurance face a difficult trade-off. On the one hand, they seek to prevent free-riding on society's basic consensus that no-one shall be left suffering from disease for lack of financial means to pay for health care. This calls for a benefit package and a degree of coverage that all insurance policies must offer. On the other hand, if there is diversity of preferences, these minimum requirements cause a welfare loss, which increases as the basic benefit package grows more comprehensive, causing insurance premiums to rise (Cutler and Zeckhauser, 1997 and 2000; Pauly, 1992 and 1994). Policy makers therefore are led to ask the question on whether further additions to the list of benefits are warranted and conversely, on what terms restricting benefits or the degree of coverage would be accepted. However, they often are confronted with the argument that broad segments of the population, in particular the aged, would not benefit from these enlarged choices at all. One general observation with respect to choice behavior – not only in the field of health insurance choice – is that with increasing age, individuals are less likely to change to alternatives, preferring to stay with the status quo that is familiar to them (Schwarze and Andersen, 2002; Royalty and Solomon, 1999). This status quo bias might be especially pronounced for decisions with regard to health insurance, since a future spell of illness may reveal that the alternative contract contains features making it an inferior choice.

The present paper purports to address these issues using evidence on willingness-to-pay (WTP) for proposed changes in Swiss social health insurance. Switzerland is a case of interest because its health insurance combines mandatory with choice elements in a way that is similar to other countries, notably the United States and the Netherlands (OECD, 2004). By the Health Insurance Law (KVG), effective since 1996, all permanent residents are obliged to purchase health insurance policies for basic coverage. The law also defines a uniform basic package of healthcare benefits, whose importance has increased tremendously over the years, mostly driven by technological progress and new treatment methods. Criteria for a therapy or a new pharmaceutical product to be included in the basic package are medical effectiveness, expedience, and economic efficiency (Art. 32 KVG). The Federal Agency for Health is in charge of a regular re-evaluation of the treatments covered in the light of medical, economic, epidemiologic, and demographic developments. These reviews are designed to uncover potential for rationalization by allowing new treatments to replace old, less cost-effective ones. However,

experience has shown that it is difficult to include innovations in the basic benefit package without raising insurance premiums.

At the same time, there are several elements of choice. First, residents can individually select one of some 100 health insurers, with no involvement of the employer at all. In turn, insurers by law must accept any applicant. The fact that premiums are uniform for adults in a given region and hence independent of age facilitates this type of choice for all age groups.

The second element of choice relates to the type of policy. Within the set of conventional policies, the Swiss can choose between different levels of annual deductibles, with a minimum of CHF 300 (CHF 230 until 2004, 1 CHF=0.8 US$ at 2007 exchange rates) and a maximum of CHF 1,500. In addition, there are Managed Care alternatives, offered by some of the major insurers. They include physician networks (similar to Independent Provider Associations in the United States), restricted lists of physicians (Preferred Provider Organizations) and Health Maintenance Organizations (HMO). However, the basic package of benefits remains the same, independent of the deductible and model chosen.

Against this backdrop, this paper is structured as follows. Section 2 presents four hypotheses regarding the demand for health insurance and age that can be derived from different strands of economic theory. One of them indeed predicts a positive relationship; should it be confirmed, any cutback in coverage would be likely to hurt the elderly more than proportionally. Section 3 introduces the method of discrete choice experiments (DCE) as a tool for measuring WTP for a non-existing product, in the present case for additional options in health insurance. In section 4, information on the study population and the setup of the survey conducted in Switzerland is given. Section 5 contains descriptive statistics and estimation results. WTP both for selected variations of the basic benefit package and the degree of coverage are derived and compared across age groups in an attempt to discriminate between the three hypotheses. This calls for accounting for heterogeneity in preferences; indeed, section 6 contains evidence suggesting that the aged do exhibit a stronger status quo bias than the rest of the population. However, once they are compensated for a change of contract in the first place, the aged actually may be won over more easily for accepting cutbacks in the comprehensiveness of health insurance coverage. Section 7 concludes.

2 Age and the Demand for Health Insurance

This section is devoted to developing competing hypotheses regarding the relationship between age and the demand for health insurance.

The first hypothesis concerns preference for the status quo. Collecting the information for a choice constitutes an investment. With increasing age, the expected utility payoff from having found a preferred alternative necessarily decreases (unless the investment has the effect of increasing remaining life expectancy, a complication that is neglected here). Therefore, one has

> *H1*: *Due to a reduced expected payoff period to the investment incurred for evaluating an alternative to the status quo, status quo bias is predicted to increase with age.*

A standard result in insurance theory is that WTP for insurance depends on the product of asset variance and the coefficient of absolute risk aversion (Arrow, 1971). Now with increasing age, not only average healthcare expenditure (HCE) may increase but its variance as well. There is evidence of increased variance from studies on the so-called costs of dying (Lubitz and Riley, 1993; Zweifel et al., 1999; Felder et al., 2000; Seshamani and Gray, 2004). They find that HCEincurred during the last year of life is at least seven times higher than for individuals who continue to live. However, the likelihood of being in one's last year of life increases with age, and with it the variance of HCE and of assets prior to insurance, and hence WTP for health insurance. With regard to absolute risk aversion, there is no compelling theoretical argument suggesting a systematic relationship with age, and the empirical evidence is inconclusive (Bellante and Green, 2004; Halek and Eisenhower, 2001; Riley and Chow, 1992). This component can thus be disregarded, leading to a second hypothesis,

> *H2: Due to increased asset variance caused by health problems, demand for health insurance is predicted to increase with age, ceteris paribus*.

A third hypothesis can be derived by noting that the demand for insurance may also depend positively on the value of the asset at risk, especially if the size of the possible loss increases with the value of the asset (Arrow, 1971; Mossin, 1968). Considering health (rather than wealth) to be the asset at risk, the fact that this asset can be lost entirely because of death makes a positive relationship between the asset and the size of the loss credible. Now health insurance can be seen as indirectly insuring health to the extent that it grants access to effective medical care. WTP for it should therefore follow the value of life over the life cycle.

The value of life depends on discounted future labor earnings and on discounted future gross consumer surplus of being alive with a certain rate of consumption (Shepard and Zeckhauser, 1984; Felder, 1997). After the completion of education, labor earnings increase, causing the value of life to rise. Setting the earnings peak somewhere between age 40 and retirement seems intuitive. After the earnings peak, WTP for extending life decreases since the impact of a shrinking residual life expectancy becomes dominant. According to the argument expounded in the previous paragraph, WTP for health insurance should follow a similar pattern. Beyond age 40-62 (say), it is predicted to decrease with age, contrary to the second hypothesis.

H3: In view of the declining value of health itself, demand for health insurance is predicted to decline beyond age 40 or higher.

A fourth hypothesis combines the arguments of hypotheses H2 and H3 , focusing on retirement status. There are reasons to believe that the price elasticity of the demand for medical care decreases with age (Schut et al., 2003; Strombom et al., 2002). This parameter depends on the elasticity of substitution between medical inputs and own effort in the production of health. Given that the relative productivity of an individual's own effort is likely to decrease with age, the elasticity of substitution decreases as well. However, it should locally increase after retirement because the reduction of working time serves to relax the time constraint. Facing a less restrictive time constraint, retirees can lower the variance in their health asset by undertaking preventive measures like exercising and improved nutrition. Therefore, a temporary decrease of the variance in the health asset is predicted. At the same time, its value decreases according to H3 because expected future labor income falls. Both effects induce the demand for health insurance to decrease with retirement.

H4: Transition to retirement leads to a temporary reduction both in the variance and value of the health asset. This causes the demand for coverage for health insurance to decrease.

The objective of the present work is to test these four hypotheses.

Now a change of health insurance by assumption occurs only if this promises an increase in utility at least on expectation. In the present context however, most alternatives presented are not available (yet), and actual choices thus cannot be observed. This means that in order to predict choices, the utility associated with alternatives must be estimated. When it comes to replacing revealed preference by stated preference, two main approaches are available. The traditional one is contingent valuation (for a survey, see Mitchell and Carson (1989)) . In an experiment, all the

attributes of the alternative are held constant across scenarios except price, and participants are asked to state the maximum price that still keeps the alternative preferable. Among the stated preference approaches, so called discrete choice experiments (DCE) constitute a very powerful instrument to quantify the willingness-to-pay (WTP) indirectly by choice experiments, rather than asking directly for an acceptable price. The flexible way of designing a realistic contract choice scenario with various influencing attributes allows making predictions as to how WTP for more comprehensive health insurance (or conversely, compensation required for accepting contracts with cutbacks) vary with age. Depending on the confirmed hypothesis, compensation required for cutbacks increases (H2) or decreases (H3, H4) with age, implying that a widened contractual choice may be of little or no value (H2) or substantial value (H3, H4) to the older population.

3 Discrete Choice Experiments

Based on random utility theory (Luce, 1959; Manski, 1977; McFadden, 1974, 1981 and 2001), discrete choice experiments (DCE) are designed to allow individuals to express their preferences for non-marketed goods or goods which do not yet exist. Applications of DCE to the valuation of healthcare programs have become more numerous over the past years (see Ryan and Gerard, 2003 for an overview; Scanlon et al., 1997). In a DCE individuals are given a hypothetical choice between many or just two (binary choice) commodities. From the trade-offs respondents implicitly make between the different attributes of the product, the researcher can infer the utility associated with product attributes. The inclusion of a cost or price attribute permits estimating the value of the remaining product attributes in money terms. Biases that might occur when individuals are asked about their WTP directly (as in Contingent Valuation) are less likely to be observed (Ryan, 2004).

The first step of a DCE involves the definition of the attributes of the commodity and the levels assigned to them (Louvière et al., 2000; Ryan and Gerard, 2003). In the present case of Swiss health insurance, attributes that currently are in the political debate were chosen to describe the different benefit packages (for more details see Table 1). These attributes had been checked in a pretest for their relevance, occasioning some adjustments to the deductible attribute, whose range had to be decreased to avoid protest responses for lack of realism.[1] The retained attributes are

[1] For potential difficulties with the inclusion of cost variables see Slothuus-Skjoldborg and Gyrd-Hansen (2003).

- variation in the annual deductible;
- variation in the levels of copayment;
- variation in coverage of treatment methods in alternative medicine;
- variation in the drug benefit;
- variation in the speed of access to innovative treatments;
- variation in the premium as a result of these extensions or limitations of benefits (this constitutes the price attribute).

Table 1

Product attributes and levels in the main survey

Attribute	**Label**	**Levels**
Deductible	deduct	- Status quo: CHF 230, 400, 600, 1'200, 1'500per year - CHF 0, 2'400, 4'800 per year
Copayment	copay	- Status quo: 10% (=0) with a maximum of CHF 600 - 20% (=1) with a maximum of CHF 1'200
Alternative medicine	altmed	- Status quo: some treatment methods are covered (=0) - More alternative treatment methods are covered (=1)
Medication	generics	- Status quo: all drugs on the list are reimbursed (=0) - The cheapest product on the market is reimbursed (=1)
Access to innovation	innovation	- Status quo: all treatment methods are covered as soon as they get approval (=0) - Innovative treatment methods are covered only three years after introduction (=1)
Premium	premium	- Increase of the monthly premium by CHF 50, 25 or 10 - Decrease of the monthly premium by CHF 50, 25 or 10

Coding of dummy variables in parentheses.

These six attributes and their levels including the status quo levels combine for a very large number of choice sets. Using statistical design optimization procedures (Kuhfeld et al., 1994; Hardin and Sloane, 1993 and 1994), their number was reduced to 27 and randomly split in three groups. One choice was included twice in each choice set for consistency checking (Ryan and Bate, 2001), resulting in 10 choices per person. Each of the 10 alternatives had to be evaluated against the status quo insurance contract.

As a rational subject, a respondent is predicted to always choose the alternative with the higher level of utility. The decision making process within a DCE can thus be seen as a comparison of utility values V_{ij},

$$V_{ij} = v_i(a_j, p_j, y_i, s_{i,}\varepsilon_{ij}) \quad (1)$$

where v_{ij} represents the indirect utility function of individual i for an insurance contract with a vector of attributes a_j and a price denoted by p_j. The income of individual i is y_i, the sociodemographic characteristics are denoted by s_i, and the error term by ε_{ij}.

With an additive error term, the individual will choose contract j rather than contract l if

$$w_i(a_j, p_j, y_i, s_i) + \varepsilon_{ij} \geq w_i(a_l, p_l, y_i s_i) + \varepsilon_{il} \quad (2)$$

Here, $w_i(\cdot)$ is the deterministic component of the utility that can be estimated, while the error terms reflect unobservable factors that vary with the individual and the alternatives. The utility function $w_i(\cdot)$ can be inferred from observed choices by assuming that the probability P_{ij} of choosing alternative j rather than l, given the vector of attributes, equals the probability of the difference in utilities given in (2) occurring. Therefore,

$$P_{ij} = \Pr[w_i(a_j, p_j, y_i, s_i) + \varepsilon_{ij} \geq w_i(a_l, p_l, y_i s_i) + \varepsilon_{il}] \quad (3)$$

Rearranging this inequality into a stochastic and a deterministic part leads to the following expression,

$$P_{ij} = Pr[(\varepsilon_{ij} - \varepsilon_{il}) \geq w_i(a_l,...) - w_i(a_j,...)] \quad (4)$$

This condition makes intuitive sense because it states that the noise on the left-hand side must be dominated by the systematic utility difference on the right-hand side for inference with regard to the determinants of choice to be possible. Moreover the utility function is usually assumed to be linear[2],

$$v_i = c_i + \beta_1 a_1 + \beta_2 a_2 + ... + \varepsilon_{ij} \quad (5)$$

where c_i is a constant, $\beta_1,...\beta_K$ are the parameters to be estimated, and $a_1,...a_K$ (K = 6 in the present case) are the different attributes of the commodity. The parameters $\beta_1,...\beta_K$ can be interpreted as the marginal utilities of the attributes; they are constant in the case of a linear utility function. This rather strong assumption might not be satisfied for attributes covering a wide range such as the deductible or the premium. To test for nonlinearity, quadratic terms of regressors

[2] There is empirical evidence that a linear specification leads to good predictions in the middle ranges of the utility function (Hensher et al., 1999).

exhibiting a good deal of variation (*deductible*, *premium*) are included in the empirical specification. In particular, $premium^2$ is used to indicate whether the marginal utility of income is constant or decreasing (see below), while a negative coefficient of $deductible^2$ points to risk aversion. The marginal rate of substitution between two attributes k and m is given by

$$MRS_{k,m} = -\frac{\partial v_i / \partial a_k}{\partial v_i / \partial a_m}, \quad (6)$$

with the marginal utilities taken from the estimated utility function.

The WTP for a specific attribute can be calculated by dividing the respective slope parameter of the indirect utility function by the parameter pertaining to the price variable (in the present case the monthly premium, reflecting the marginal utility of income[3]). This ratio then indicates how much income respondents are willing to forego in order to obtain an increased amount of the other attribute.

The dependent variable being either 0 (opt for status quo) or 1 (opt for alternative), logit or probit techniques are appropriate, depending on the assumption being made on the distribution of the error terms. Since respondents have to make several choices, the underlying data has a panel structure, suggesting a random-effects specification (for a more detailed explanation of DCE, see Louvière et al., 2000 and Ben-Akiva and Lerman, 1985). Limiting the specification to the product attributes, one obtains the following expression representing the difference in utility between status quo and alternative insurance contract,

$$\Delta V_{ij} = c_0 + \beta_1 deduct + \beta_2 deduct^2 + \beta_3 copayment + \beta_4 altmed + \beta_5 generics + \beta_6 innovation + \beta_7 premium + \quad (7)$$

3 This can be shown by Roy's Identity. Quantity demanded equals the negative ratio of partial derivatives of the indirect utility function with respect to price and income, $x_j(\cdot) = -\frac{\partial v_j(\cdot)/\partial p_j}{\partial v_j(\cdot)/\partial y_i}$ Since the quantity demanded can be set to one $(x_j = 1)$ for the one alternative to be chosen, the expression simplifies to $\frac{\partial v_j}{\partial y_i} = -\frac{\partial v_j}{\partial p_j}$. Thus the marginal utility of income is equals the negative derivative of the indirect utility function with respect to price.

where $\varphi_{ij} = \varepsilon_{ij} - \varepsilon_{il}$ and $c_0 = c_{oj} - c_{ol}$. At this point, squared premium ($premium^2$) is already excluded because of lack of statistical significance, pointing to constancy of the marginal utility of income.

According to the random utility model, individuals thus evaluate the difference between the status quo and the alternative presented. For the dummy variables representing copayment, alternative medicine, generics, and innovation, this does not require any adjustments of the variables entering the estimation function. The premium variable is defined as the absolute change in Swiss Francs (CHF) from the actual contract; it takes on six discrete values (see Table 1 again). For the deductible, the difference between the level proposed in the alternative contract and the one in the status quo contract needs to be taken.

The φ_{ij} are assumed to be normally distributed and to have a random component structure[4] such that

$$\varphi_{ij} = \mu_i + \eta_{ij} \quad (8)$$

where μ_i is a stochastic component, varying only with the individual but not across choices. The μ_i and η_{ij} are uncorrelated with the vector of attributes $(a_{i1},...,a_{iK})$. In the probit model, μ_i and η_{ij} are assumed to be $iid \sim N(0,\sigma)$, with $\sigma_\eta = 1$ as the standard assumption so that

$$Var[\varphi_{ij}] = \sigma_\eta^2 + \sigma_\mu^2 = 1 + \sigma_\mu^2 \quad (9)$$

and

$$Corr[\varphi_{ij}, \varphi_{il}] = \rho = \frac{\sigma_\mu^2}{1 + \sigma_\mu^2} \quad (10).$$

Evidently, ρ indicates how strongly the different choices j and l of a given individual are correlated over the course of the experiment (Greene, 2000, Ch. 19.5). A high and significant value of ρ indicates that the random-effects specification is justified. Another advantage of the

[4] The alternative would be to estimate a fixed-effects model. This would necessitate the estimation of individual-specific constants, increasing the number of dummy variables tremendously and thus causing multicollinearity problems. This would preclude estimation of age and other socioeconomic effects, which are at the focus of this study.

probit model is that it relaxes the strong IIA (independence of irrelevant alternatives) assumption of the logit model (Train, 2003; Ben-Akiva and Lerman, 1985).

Marginal utilities and WTP values can be made to depend on socioeconomic characteristics by extending the model of equation (7). Since the age-related effects are the main focus of this work, the three variables for age groups (*a2539, a40-62, a63+*) serve as an example. They are interacted with the product attributes as well as the constant (which gives rise to their direct inclusion, permitting status quo bias to vary between groups),

$$\Delta V_{ij} = c_0 + \beta_1 deduct + .. + \beta_7 premium + .. + \beta_{15} a2539 * deduct + \beta_{15} a2539 * deduct^2 \quad (11)$$
$$+ ... + \beta_{22} a63^+ * deduct + ... + \beta_{72} a2539 + \beta_{73} a63^+ + ... + \varphi_{ij}$$

where as before $\varphi_{ij} = \varepsilon_{ij} - \varepsilon_{il}$ and $c_0 = c_{oj} - c_{ol}$. The comprehensive specification shown in the appendix includes additional interaction terms involving socioeconomic characteristics such as sex, income, household size, language (French, German), and subjective health status. Moreover, current premium paid serves as an indicator of the basic tendency to change in search of a less costly alternative.

4 Sample and Setup of the Study

To find out about the preferences of the Swiss residential population concerning their health insurance, a representative telephone survey with 1,000 persons aged over 25 living in the German- and French-speaking parts of Switzerland was conducted. The survey, fielded in September 2003, was in two steps. In a first telephone contact, individuals who agreed to participate were asked to look up their personal monthly premium and annual deductible for the compulsory part of their insurance policy. Knowledge about the status quo is essential for respondents to be able to make an informed choice between their current contract and a proposed alternative. They also were sent a package of information material to make sure that all had the same information concerning services covered by the uniform compulsory part of their policy, enabling them to assess the variations considered in the experiment.[5]

The second telephone contact was by appointment and consisted of the questionnaire itself. It started with questions concerning utilization of healthcare services, overall satisfaction with the healthcare system, insurer and insurance policy, and a general preference for new elements in the

[5] See San Miguel et al. (2005) for the importance of a priori information for choice consistency in a DCE.

insurance package. Socioeconomic variables surveyed were age, sex, education, total household income, education (seven categories ranging from primary school to university degree), place of residence, occupation, and marital status.

The DCE was implemented in the second part of the survey. Participants were asked to compare the status quo, i.e. their current insurance contract, with 10 hypothetical alternatives defined by the six attributes named in section 3. To mitigate learning or fatigue effects, the order of the choice alternatives was randomly changed (Merino-Castellò, 2003; Kjaer et al, 2006).

5 Descriptive Results

5.1 Socioeconomic characteristics

The sample consists of 780 respondents from the German-speaking part of Switzerland and 220 of the French-speaking population. Half the sample are women, the other half, men. The sample was weighted by language regions, resulting in an average age of 49 years. No less than 46 percent of the persons interviewed stated very high interest in health-related issues, with a still higher share among those aged over 65 years. This might reflect a selection effect because people interested in health issues were more likely to participate.

Some 80 percent of the respondents stated that they currently were in very good or good health. This corresponds rather closely to the results of the survey Healthmonitor 2001 (Longchamps, 2001). As to medical services, 28 percent of the sample had not used any medical care during the past 6 months, 12 percent had been in hospital, 50 percent had received outpatient care, 21 percent had seen a dentist, 10 percent had consulted a healer, and 39 percent had taken medications. Again, these frequencies accord with the results of the survey Healthmonitor 2001. Other key variables are in line with official statistics, too.

On average, the interviewed paid a monthly premium of CHF 240 (US$ 192) for their mandatory health insurance. This average is lower than the CHF 270 (US$ 216) computed for the whole of Switzerland by the Federal Agency for Social Insurance (2003). This difference can be explained by three factors. First, the official figure includes only the (expensive) contracts with the lowest deductible, whereas the sample also includes (less expensive) contracts with higher deductibles and Managed Care alternatives. Second, the canton Tessin (Ticino, Italian-speaking), a canton with traditionally high HCEand high premiums, was not sampled for this study. Third, the official figure includes the contributions to accident insurance, which were excluded here.

The frequencies of the different annual deductibles are shown in Table 2. With 24.8 percent, the highest deductible of CHF 1,500 (US$ 1,200) is over-represented. According to official statistics for 2001, only 9 percent chose the highest level. However, this share was still lower in 1999 (5.4 percent; Federal Agency for Health, 2006). Therefore, there is a tendency towards higher deductibles, which may go some way towards bridging the gap between the sample and the general population as of 2003. The gap may still reflect the possibility that people who are willing to take part in a health-related survey are more informed about the different options that result in premium reductions. However, the over-representation of the maximum deductible may also be the result of risk selection. Indeed, the sample has a modal age of 35, an age group with a rather good health status.

Table 2

Frequencies of deductible levels in Swiss health insurance (in percent)

Annual deductible in CHF	**1999**[a)]	**2003**	**Survey (2003) (N=1000)**	**2005**[b)]	
				Deductible	In percent
230	47.6	41.8	**36.1**	300	43
400	30.8	22.1	**22.4**	500	24.1
600	7.6	10.2	**14.3**	1'000	2.8
1'200	3.2	2.6	**2.4**	1'500	15.0
1'500	3.9	15.0	**24.8**	2'000	0.8
Other [c)]	7.0	8.3	**0.8**	2'500	4.4

[a)] Second year after introduction of the new Health Insurance Law with a minimum deductible of CHF 230.

[b)] New deductibles effective from 2005.

[c)] Insured in Managed-Care or Bonus-Option contracts.

1 CHF = 0.8 US$ at 2007 exchange rates; Source: Federal Agency for Health (2006).

For a preliminary investigation into the relationship between age and the demand for more flexibility in health insurance, the data set is split into the age groups 25 to 39 years, 40 to 62, and 63+, respectively. The first two groupings are in accordance with the development of the value of life (see H3 in section 2). As to the retirement effect of H4, the official retirement age in Switzerland is 65 for men and 64 (63 if born before 1942) for women. However, the information

about professional status (marker "retiree") suggests that some individuals have retired earlier. By letting the highest age group start at 63, one has almost all retirees in that group.[6]

5.2 Analysis of choice behavior

A first indicator of the importance of choice is the *change of insurer* over the past five years. Of the entire sample, 77 percent did not change their insurer, 20 percent changed once, and 2 percent changed more than once. Among those 63 years and older, only 13 percent (rather than the average of 20 percent) stated one change of insurer. This observation leads to the presumption that older people benefit less from choice concerning health insurance, although they state a higher interest in health-related issues.

A second indicator is the change of the *type of insurance* that occurred over the past five years. Overall, 66 percent stayed with their old insurance contract. Among respondents younger than 40, this figure drops to 58 percent. For the age group of 63 years and older, it rises to 78 percent. The elderly who decided to change opted for an individually chosen deductible (8 percent), followed by the preferred provider model (6 percent), or they changed back to a conventional contract (5 percent).

A third indicator of flexibility can be derived from the global results of the DCE. A total of 10,000 decisions could be made by the 1,000 individuals in the sample. 18 percent of these decisions were made in favor of the alternative, giving up the status quo contract. This figure, while low at the first sight, is around the expected percentage of a DCE with such a high degree of complexity (Telser et al., 2004). The question arises of whether these changes are concentrated among few individuals only. As can be seen from Table 3, around 40 percent of the respondents never chose the alternative insurance contract. Therefore, some 60 percent were flexible in that they deviated from their status quo at least once. This figure should not be taken as a predictor of actual choice behavior of the Swiss population, however. It is known that actual decision making is subject to considerable status quo bias (Samuelson and Zeckhauser, 1988). In the context of health insurance, this bias has been found to be especially marked among older persons (Schut et al., 2003; Buchmueller and Feldstein, 1997; Schwarze and Andersen, 2001).

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[6] Including a dummy variable for "retiree" in the estimation caused a multicollinearity problem. Therefore, the age segment 63+ was used as a proxy for retirement status.

As to the consistency within the 10 choices of each individual, the alternative considered twice was "correctly" chosen by nearly all respondents, with the exception of 13 individuals out of 1,000. While these choices remained included in the sample in order not to impose excessive consistency, inconsistency of choices does not seem to be an issue in this study.. The choices made were also plausible. Individuals were in general more likely to opt for the objectively "good" alternatives within the 10 choices and remain at their status quo for obviously "bad" alternatives. Individuals showing dominant preferences were not excluded from the estimation to avoid embellishing the sample.

Table 3

Choices of the alternative over the status quo

Number of choices (of a total of 10)	Frequency	In percent
0	387	38.7
1	142	14.3
2	142	14.3
3	124	12.4
4	112	11.2
5	43	4.3
6	21	2.1
7	6	0.6
8	3	0.3
9	1	0.1
10	3	0.3
Total	**985**	**98.5**
Missing	15	1.5
Full sample	n=1000	100

6 Estimation Results

6.1 Empirical relevance of the product attributes

Equation (7) is the simple core model traditionally used for DCE in which marginal utilities and hence WTP values do not depend on socioeconomic characteristics. The random-effects probit estimation results in highly significant coefficients with the expected signs (Table 4). Therefore,

it can be said that the six product attributes distinguished proved relevant for choice. However, the highly significant and large value of the constant points to marked status quo bias.

Table 4

Random-effects probit estimation results (simple model)

	expected sign	coefficient	std.error	z-value	marg. effect
constant	0	-0.76362**	0.05893	-12.96	
deductible	-	-0.00057**	0.00003	-18.64	-0.00007
deductible2	+/-	3.80e-08**	7.88e-09	4.82	4.45e-09
copayment	-	-0.27058**	0.04282	-6.32	-0.03201
altmed [a)]	+	0.35371**	0.04198	8.43	0.04265
generics	-	-0.19710**	0.04211	-4.68	-0.02334
innovation	-	-0.54942**	0.04807	-11.43	-0.06479
premium	-	-0.01431**	0.00061	-23.63	-0.00171

σ=0.90224, ρ=0.44875

Log likelihood: -3134.5289

n=9569

[a)] expanded coverage of alternative medicine (status quo= no inclusion)

** (*) significant at the 1 (5) percent level

A comparison is possible between *constant*, *altmed, generics, innovation,* and *copayment* since they are all (0,1)-variables. Among the contract attributes, having access to the latest innovations has the greatest effect on choice of contract (the negative of -0.549); however, it is not by itself sufficient to overcome status quo bias. For this, one would have to add an expanded catalogue of alternative treatment methods. The smallest (negative) effect on choice is associated with a contract that restricts the drug formulary to generics or the cheapest drug on the market.

Mean marginal WTP values for the attributes can be derived from equations (6) and (7). Estimates are shown in Table 5, with standard errors calculated using the Delta method (STATA, 2004).

As could be expected, the mean individual of the survey needs to be compensated to overcome his or her status quo bias, i.e. to consider a change in the insurance contract in the first place. For this, a premium reduction of about 53 CHF per month (22 percent of average premium) would be necessary. An issue of great interest in the ongoing reform debate in Switzerland and Germany is the willingness to accept deductibles and copayments and the selection effects resulting from choosing different levels of deductibles (Schellhorn, 2001; Werblow and Felder, 2003). Ex-ante

rational individuals would want to limit theirex-post moral hazard by opting for a positive rate of coinsurance (Zweifel and Breyer, 1997, Ch. 6).

First, for a median individual with CHF 400 deductible at present, an increase in the annual deductible by CHF 1 has to be compensated with a monthly premium reduction of 3.47 cents (s.e. 0.204 or smaller). An individual who has the highest deductible of CHF 1,500 today only needs to be compensated with 3.27 cents (s.e. 0.147 or smaller). This decrease is not compatible with the assumption of constant absolute risk aversion, pointing to the possibility that individuals with low risk aversion choose the contract with the highest deductible. Neglecting such variation in risk aversion, one can infer that the transition from a deductible of CHF 400 (compensation 3.47 cents) to CHF 1,500 would have to be compensated by a reduction of roughly CHF 38 in the monthly premium. This compares favorably with the actual premium reduction, which amounts to CHF 65 as of 2003.[7]

Second, there is an estimated WTP for avoiding a 20 percent rate of coinsurance (compared to 10 percent at present) of CHF 19 (s.e. 3.3 or smaller). This figure cannot be juxtaposed directly to variations in actual premiums because the present rate is set uniformly at 10 percent. However, it amounts to about 8 percent of the sample average premium of CHF 240. Since a 10 percentage point increase in the rate of coinsurance necessarily reduces insurance payments by at least 10 percent (HCE borne by the insured plus mitigation of moral hazard effects), health insurers on average should be able to offer premium reductions that overcome consumers' resistance against cost sharing.

[7] In spite of this favorable comparison, only 25 percent of respondents have the maximum deductible (see Table 3).

Table 5

Mean marginal WTP for attributes (in CHF per month) – derived from the simple model

	WTP		**std. error** *(Delta-Method)*
constant (status quo bias)	-53.36	**	4.63
deduct [a)]	-0.04	**	0.008
copayment	-18.91	**	2.988
altmed	24.71	**	3.10
generics	-13.77	**	3.06
innovation	-38.39	**	3.32

[a)] compensation in CHF required for a 1 CHF increase in the annual deductible for the median individual.
** WTP significant at the 1 percent level.
1 CHF=0.8 US$ at 2007 exchange rates

Concerning the list of benefits, the inclusion of the existing and some new treatments from alternative medicine commands a WTP of some CHF 25 (s.e. 3.10 or smaller). With CHF 14 (s.e. 3.15 or smaller), WTP to avoid a drug benefit limited to generics is even lower. Put the other way around, WTP to have access to the latest pharmaceutical innovation is not very marked. This stands in stark contrast with the finding that for giving up immediate access to medical innovations, individuals would have to be compensated by CHF 38 (s.e. 3.36 or smaller) per month in terms of reduced premiums (see Table 6).

6.2 Accounting for socioeconomic differences

This section is devoted to the discussion of a comprehensive formulation of the probit equation that allows marginal utilities and WTP values to depend on socioeconomic characteristics, as introduced in section 3. Explanatory variables included in the model were age (in three categories), gender, language (German, French), monthly per capita income (in three categories), household size, the actual premium paid to control for premium differences in the different cantons, and a proxy for health status. Stated subjective health status proved to be insignificant, due to the high share of individuals stating a very good or good health condition (80 percent); therefore, a proxy using information on doctor and/or hospital visits in the past six months was constructed. No data was available on the expected utilization of medical services in the

upcoming year.[8] Variables for education and professional status proved also insignificant; however, 88 percent of the sample stated high or rather high interest in health system related issues. Thus the sample, being homogenous under this aspect, can be considered as 'educated' in issues related to health. The high number of individuals having chosen a deductible in excess of the legal minimum further testifies to respondents' familiarity with existing choice options in health insurance.

Estimation results for the comprehensive model [equation (11) in section 3] are given in the appendix table (Table A1). They give rise to the following observations.

Stability of attribute effects: While the signs of the constant and the six product attributes continue to accord with theoretical expectations, *copayment*, *altmed*, *generics*, and *innovation* lose statistical significance. However, they retain (or come very close to) 5 percent significance in at least one interaction term, with the only exception of generics. This attribute had the lowest WTP estimate in Table 5 already; therefore, this result is not so surprising. Status quo bias and all the other attributes can be said to be empirically relevant also according to this generalized specification.

Preference heterogeneity: In the introductory section, it was argued that preference heterogeneity may be an important reason for a uniform benefit list to cause utility losses. If indeed marginal utilities depend on socioeconomic characteristics, this should be reflected in the coefficients pertaining to the respective interaction terms of equation (11). In Table A1, seven explanatory variables reflect such characteristics, viz. *sexm*, *a2539*, *a63+*, *langf* (french language), *rich*, *poor*, and *hhsize*. Each one is significant by itself (indicating heterogeneity with regard to status quo bias) or in at least one interaction term; *a3539*, *rich*, and *poor* even in two (out of seven). For example, poor people suffer greater utility loss from higher deductibles than middle income ones, a theoretically expected difference. In all, there is considerable evidence of preference heterogeneity.

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[8] As suggested and tested for Switzerland by Holly et al. (1998), supplementary insurance also seems to influence health care utilization. This aspect, however, is not part of the present analysis, which revolves around the mandatory part of insurance. Therefore, formation on the presence of supplementary coveragewas collected.

6.3 Age-specific results

The descriptive results of section 5.2 show that both the propensity to change the type of contract and health insurer decreases with age. Here, the issue is whether this translates into an age gradient of the status quo bias and of compensations asked to accept restrictions in coverage.

- According to hypothesis H1 (see section 2), status quo bias is predicted to increase with age.
- According to H2, WTP for more ample coverage (for avoiding restrictions, respectively) is predicted to increase with age.
- According to hypothesis H3, WTP for more ample coverage (for avoiding restrictions, respectively) is predicted to decrease beyond age 40 or higher.
- According to hypothesis H4, WTP for a more ample coverage and for avoiding restrictions decreases temporarily after retirement.

To discriminate between H3 and H4, age-specific effects should ideally be tested for, using a continuous age variable along with a dummy variable for retirement to discriminate between H 3 and H4. However, this specification resulted in severe multicollinearity. This still leaves scope for a partial test of H4. In the event that H4 was false, the age gradient predicted by H3 could be reversed after retirement age. To allow for this possibility, age groups 40-62 and 63 and above (*a63+*) were formed. Without a reversal of the age gradient, however, it will prove impossible to discriminate between H3 and H4.

The age-specific WTP values shown in Table 6 are calculated by using the estimated coefficients from the Table A1 and multiplying them with the median values of the explanatory variables for the respective age-specific subsample. Median rather than mean values were used to mitigate the effect of outliers, whose impact may become considerable in the age subsamples. The estimated standard errors are computed using the Delta method.

Table 6

Mean marginal WTP for attributes for different age groups (in CHF per month) – derived from the full model evaluated at the age group's median individual

	WTP 25-39	std.err	WTP 40-62	std.err.	WTP 63+	std.err.
constant	62.64	28.07	57.97	19.55	65.22	16.61
deductible [a)]	-0.06	0.04	-0.05	0.02	-0.03	0.01
copayment	-16.64	16.00	-30.36	12.31	-8.24	6.96
altmed	67.51	44.88	19.95	10.60	0.77	6.38
generics	-31.77	22.00	-13.81	9.57	-8.91	6.90
innovation	-54.12	35.41	-25.50	11.57	-14.10	8.34

[a)] compensation in Swiss Francs required for a CHF 1 increase in the annual deductible for the median individual

1 CHF=0.8 US$ at 2007 exchange rates

First, one notes that the compensation asked to depart from the status quo is highest for those individuals over 63 years of age, providing some weak support to hypothesis H1 because the differences are non-significant. As to the valuation of specific attributes, the differences again lack statistical significance in view of large estimated standard errors. (see the large area of overlap between the density functions shown in Figure 1).

It is still interesting to note that the compensation needed for an increase in the deductible, while increasing with age, does not do so progressively (Table 7). Specifically, an increase from CHF 230 (the minimum deductible in 2003), to CHF 1,500 would have to be compensated by CHF 38 per month for the youngest age group, 50 CHF for those aged 40 to 62, and 60 CHF among the 63+ group. This supports H2 and contradicts H3 and H4. In combination with the general preference for the status quo, which is highest among those aged 63+, total compensation for changing the deductible from CHF 230 to CHF 1,500.would amount to a maximum of CHF 125 per month or CHF 1,500. While this is a substantial amount, internal data of a major Swiss health insurer show that contracts of this type do achieve savings of this magnitude. Therefore, it is conceivable that absent premium regulation, even older consumers could be won over to policies with rather stingy copayments.

Table 7

Compensation for an alternative contract with deductible of CHF 1'500 (in CHF per month)[a)]

Age	Considering change of contract	Compensation for higher deductible	Total
25-39	62	38	100
40-62	57	50	107
63+	65	60	125

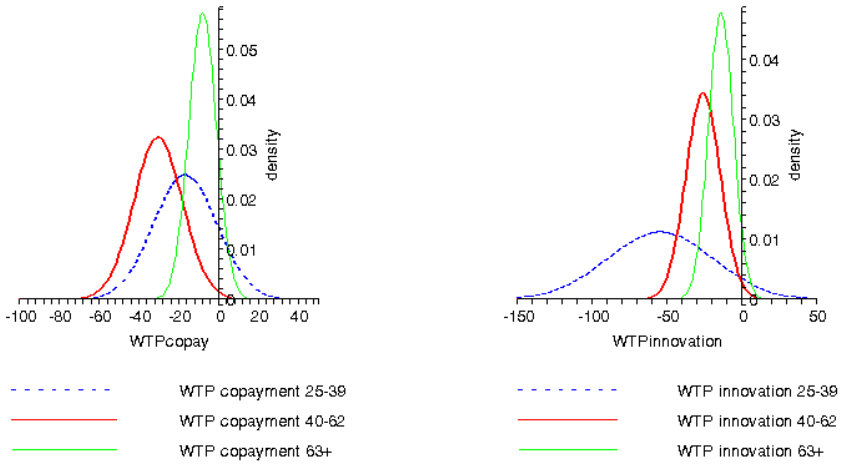
[a)] Status quo: 230 CHF
1 CHF=0.8 US$ at 2007 exchange rates

Turning to the comprehensiveness of benefits, WTP for having additional treatment methods from alternative medicine covered drops consistently with age. High interest in alternative medicine among the youngest age group is also found in several studies on the demand and utilization of alternative medicine (Sommer et al., 2002; Kelner and Welman, 1997; McGregor and Peay, 1996).

The results for generics and innovation also point in the same direction, indicating that older people are willing to accept restrictions in exchange for a smaller amount of compensation than younger age groups. These findings again contradict H2 but support H3 and H4. Finally, Figure 1 provides some evidence suggesting that these orderings are not caused by outliers (this holds true for the other attributes as well, not shown). In panel A, the distribution of negative WTP for higher copayment shifts systematically towards zero with increasing age. In panel B, the same shift can be observed for delayed access to innovation; in addition, the distribution also becomes less dispersed with increasing age.

Figure 1

Estimated WTP densities according to age



(A) Copayment 20 rather than 10 percent (B) Delayed access to innovation

Summing up, the results clearly are in accordance with H1. Status quo bias is more marked among the elderly, and for good economic reasons (see section 2). They only provide limited support for H 2, however. On the one hand, higher deductibles must be compensated more highly among the top age group, likely reflecting their higher risk of incurring HCE. On the other hand, a higher rate of copayment seems to result in smaller utility losses among the elderly. Due to high standard errors for the compensation demanded (see Table 6) the differences are not statistically significant. However, the popular belief that demand for a more ample coverage in health insurance generally increases with age is not confirmed. At least with respect to a more comprehensive benefit catalogue and an immediate access to innovations, WTP values turn out to be smaller for the older than for the younger age groups.

7 Summary and Conclusion

Social health insurance is heavily regulated even in countries that basically have opted for choice and competition. Typically, uniformity is imposed with regard to both benefits covered and cost-sharing parameters. This may cause welfare losses to the extent that preferences differ. The present study seeks to establish whether such differences in preference are likely to exist in the

case of Switzerland. Still, older consumers might fails to benefit if social health insurers were permitted to write contracts with less comprehensive benefits in return for lower premiums.
. In order to test for this possibility, this paper attempts to measure willingness-to-pay (WTP) to avoid curtailments in benefits and increases in cost sharing. It reports on a Discrete Choice Experiment (DCE) conducted in the fall of 2003 that covers several attributes of health insurance contracts whose variation could contribute to added flexibility in Swiss social health insurance.
Economic theory suggests several reasons why demand for health insurance should be related to age. First, any change away from the status quo amounts to an investment, the payoff to which decreases with reduced remaining life expectancy. Therefore, status quo bias is predicted to increase with age (H1). Next, demand for coverage (and hence WTP for extended benefits or avoiding cost sharing) may increase with age because worsening health induces variance in assets (H2). However, the value of the asset 'health' itself decreases as an individual ages, resulting in an opposite effect (H3). Finally, retirement status might weaken the effect considered in H2 by decreasing the variance of the asset 'health' because more time for investment in health becomes available, with the elasticity of substitution between medical care and own effort going to zero. Entering retirement status also accentuates the decrease in value of life due to a smaller future income. Both effects should cause e demand for comprehensive health insurance to decrease (H 4).
Historical choices show limited interest in alternatives to existing contracts. No less than 77 percent of respondents did not change their insurer during five years, while 66 percent never changed their type of insurance contract. Among those aged 63+, both changes occur even less frequently. From this evidence, it is tempting to conclude that permitting choice in social health insurance is a non-issue to the aged.
Indeed, WTP estimates derived from the DCE point to a marked status quo bias. On average, one would have to offer a premium reduction amounting to 22 percent of the national 2003 value to induce Swiss consumers to consider an alternative to the status quo. Moreover, annual deductibles exceeding CHF 600 (US$ 480) as well as a 20 percent (rather than the current 10 percent) rate of coinsurance would have to be compensated by additional premium reductions. Access to alternative medicine, avoiding a drug benefit limited to generics, and access to latest medical innovations all command positive WTP. With the exception of generics, these findings are confirmed when the model is extended to let WTP depend on seven socioeconomic

characteristics. Such a dependence is found in all cases, suggesting that preferences for health insurance are indeed heterogeneous.

Concerning age in particular, compensation asked to overcome status quo bias does increase, although not progressively, providing evidence supporting H1. Deductibles in excess of the legal minimum and an increase of the rate of coinsurance from 10 to 20 percent also would have to be compensated more highly as a function of age. This speaks in favor of H2 and against H3 and H4 (the two cannot be distinguished due to multicollinearity). However, WTP for attributes that reflect comprehensiveness of the benefit catalogue consistently tend to decrease with age, providing evidence against H2 and in favor of H3 and H4.

These results should not be interpreted to mean that enlarged choice in health insurance would cause a majority of consumers to actually exercise it. Both past experience and a status quo bias evident in the DCE that is especially marked among the aged speak against such a conclusion. Still, the contractual cutbacks analyzed here do not require compensations by the aged that necessarily exceed the premium reductions that could be granted thanks to their dampening effects on moral hazard. In combination with status quo bias, however, some of them do exceed what can be offered by health insurers at present, at least for the median member of the top age group. This still leaves scope of addressing those among the aged who exhibit low compensation values. At a time when the policy debate revolves about a rationing of medical services to be imposed on the elderly, the finding that self-rationing through contractual choice has a chance is of considerable relevance. If this self-rationing takes on the form of less comprehensive benefits, it has appeal even among the median member of the top age group in Switzerland. If it takes on the form of increased cost sharing, the cost savings may still result in premium reductions that are sufficient to win over at least to some even of the top age group.

8 References

Arrow, K. (1971). Alternative approaches to the theory of choice in risk-taking situations, in: Arrow, K. (Ed.), *Essays in the Theory of Risk-bearing*, North-Holland, Amsterdam, 1-44.

Becker, K. (2006), Flexibilisierungsmöglichkeiten in der Krankenversicherung (Options for flexibility in health insurance), PhD-Thesis, Verlag Dr. Kovač, Hamburg.

Bellante, D. ,Green, C. (2004). Relative risk aversion among the elderly. *Review of Financial Economics* 13,

Ben-Akiva, M., Lerman, S. R. (1985). *Discrete Choice Analysis.* The MIT Press, Cambridge, Mass.

Buchmueller, T.C. and P. J. Feldstein (1997), The effect of price on switching among health plans, *Journal of Health Economics* 16, 231-47.

Cutler, D. M. and R. J. Zeckhauser (1997), *Adverse selection in health insurance*, NBER Working Paper no. 6107, Cambridge.

Cutler, D. M. and R. J. Zeckhauser (2000), The anatomy of health insurance, in: Culyer, A. J. and J. P. Newhouse (eds.), *Handbook of Health Economics*, Volume 1A, Amsterdam: Elsevier, 563-643.

Federal Agency for Social Insurance (2003), Statistics of the Social Health Insurance 2004, Bern.

Federal Agency for Health (2006), Statistics of the Social Health Insurance 2005, Bern.

Felder, S. (1997), Costs of dying: alternatives to rationing, *Health Policy* 39, 167-176.

Felder, S., M. Meier, and H. Schmidt (2000), Health care expenditures in the last months of life, *Journal of Health Economics* 19, 679-695.

Greene, W. H. (2000), *Econometric Analysis*, Upper Saddle River, NJ: Prentice Hall International.

Hanemann, M. W. (1883), Mariginal welfare measures for discrete choice models, *Economics Letters* 13, 129-136.

Hardin and N. J. A. Sloane (1993), A new approach to the construction of optimal designs, *Journal of Statistical Planning and Inference* 37, 339-369.

Hardin and N. J. A. Sloane (1994), Operating Manual for Gosset: a general purpose program for constructing experimental designs, 2nd edition.http://www.research.att.com/ njas/gosset/.

Halek, M. and J. G. Eisenhauer (2001), Demography of risk aversion, *The Journal of Risk and Insuranc*e 68(1), 1-24.

Hedayat, A. S., N. J. A. Sloane, and J. Stufken (1999), *Orthogonal Arrays. Theory and Applications*, New York, Berlin, Heidelberg: Springer.

Hensher, D. A. and Louviere, J. J. and Swait, J. D. (1999), Combining sources of preference data, *Journal of Econometrics* 89, 197-221.

Holly, A., L. Gardiol, G. Domenighetti, and B. Bisig (1998), An econometric model of health care utilization and health insurance in Switzerland *European Economic Review*, 42, 513-22.

Kelner, M. and B. Wellman (1997), Health care and consumer choice: medical and alternative therapies, *Social Science & Medicine* 45(2), 203-212.

Kjaer, T., Beck, M et al. (2006), Ordering effects an price sensitivity in discrete-choice experiments: Need we worry*?, Health Economics* 15, 1217-1228.

Kuhfeld, W. F., R. D. Tobias, et al, (1994). Efficient experimental design with marketing research applications, *Journal of Marketing Research* 31, 545-557.

Longchamp, C. (2001), *Qualitäts- und Kostenorientierung. Trendstudie zum Gesundheitsmonitor 2001* (Assessments of quality and cost. Trend study complementing Healthmonitor 2001), Basel.

Louviere, J. L. and D. A. Hensher, et al. (2000), *Stated Choice Methods. Analysis and Applications*, Cambridge: University Press.

Lubitz, J. D. and G. F. Riley (1993), Trends in Medicare payments in the last year of life, *New England Journal of Medicine* 328(15), 1092-2096.

Luce, D. R. (1959), *Individual Choice Behavior*, New York: Wiley and Sons.

Manski, C. and S. R. Lerman (1977), The estimation of choice probabilities from choice based samples, *Econometrica* 45(8), 1977-88.

McFadden, D. (1974), Conditional logit analysis of qualitative choice behavior, in: Zarembka, P. (ed.), *Frontiers in Econometrics*, New York: Academia Press, 105-142.

McFadden, D. (1981), Econometric models of probabilistic choice, in: C. F. Manski and D.

McFadden (eds.), *Structural Analysis of Discrete Data with Econometric Applications*, Cambridge, Mass.: The MIT Press, 198-272.

McFadden, D. (2001), Economic choices, *The American Economic Review* 91(3), 351-378.

McGregor, K. J. and E. R. Peay (1996), The choice of alternative therapy for health care: testing some propositions, *Social Science & Medicine* 43(9), 1317-1327.

Merino-Castellò, A. (2003), *Demand for pharmaceutical drugs: a choice modelling experiment*, Working Paper, University of Barcelona.

Mitchell, R.C. and R.T. Carson (1989), *Using Surveys to Value Public Goods – the Contingent Valuation Method*, Washington DC: Resources for the Future.

Mossin, J. (1968), Aspects of rational insurance purchasing, *Journal of Political Economy* 46(4), 553-568.

OECD (2004), *The OECD Health Project:Toward sHigh-performing Health Systems*, Paris.

Pauly, M. V. (1992), `The normative and positive economics of minimum health benefits, in: Zweifel, P. and H. E. Frech (eds.), *Health Economics Worldwide*, Dordrecht: Kluwer, 63-78.

Pauly, M. V. (1994), Avoiding the mistreatment of bad risks in a democracy: universal health insurance from a constitutional perspective, *Constitutional Political Economy* 5(3), 397-318.

Riley, W. B. and K. V. Chow (1992), Asset allocation and individual risk aversion, Financial Analysts' Journal 48(6), 32-37.

Royalty, A. B. and Solomon, N. (1999), Health plan choice: Price elasticities in managed competition setting, *Journal of Human Resources* 34(1), 1-41.

Ryan, M. (2004), A comparison of stated preference methods for estimating monetary values, *Health Economics* 13(3), 291-296.

Ryan, M. and A. Bate (2001), Testing the assumptions of rationality, continuity and symmetry when applying discrete choice experiments in health care, *Applied Economic Letters* 8, 59-63.

Ryan, M. and K. Gerard (2003), Using discrete choice experiments to value health care programmes: current practice and future reflections, *Applied Health Economics and Health Policy* 2(1), 55-64.

Samuelson, W. and R. J. Zeckhauser (1988), Status quo bias in decision making, *Journal of Risk*

and Uncertainty 1, 7-59.

San Miguel, F., M. Ryan, and M. Amaya-Amaya (2005), Irrational stated preferences: a quantitative and qualitative investigation, *Health Economics* 14(3), 307-322.

Scanlon, D. P., M. E. Chernew, and J. R. Lave (1997), Consumer health plan choice, *Annual Review of Public Health* 18, 507-28.

Schellhorn, M. (2001), The effect of variable health insurance deductibles on the demand for physician visits, *Health Economics*, 10, 441-56.

Schut, F. T., S. Gress, and J. Wasem (2003), Consumer price sensitivity and social health insurer choice in Germany and the Netherlands, *International Journal of Health Care Finance and Economics* 3, 117-28.

Schwarze, J. and H. H. Anderson (2002), *Kassenwechsel in der Gesetzlichen Krankenversicherung: Welche Rolle spielt der Beitragssatz?* (Change of insurer in statutory health insurance: What is the influence of the contribution rate?), *Schmollers Jahrbuch: Zeitschrift für Wirtschafts- und Sozialwissenschaften (Journal of Applied Social Science Studies)* 121, 581-601, Berlin.

Seshamani, M. and A. Gray (2004), A longitudial study of the effects of age and time to death on hospital costs, *Journal of Health Economics* 23, 217-35.

Shepard, D. S. and R. J. Zeckhauser (1984), Survival and consumption, *Management Science* 30(4), 423-439.

Slothuus-Skoldborg, U. and D. Gyrd-Hansen (2003), Conjoint analysis. The cost variable: an Achilles' heel?, *Health Economics* 12(6), 479-97.

Sommer, J., M. Bürgi, and R. Theiss (2002), *Komplementärmedizin in der Krankenversicherung* (Complementary medicine in health insurance), Bern: Schweizerischer Ärzteverlag.

STATACorp (2004), STATA Statistical Software: Release 8.0 - Reference Volumes, College Station, Texas: Stata Cooperation.

Strombom, B. A., T. C. Buchmueller, and P. J. Feldstein (2002), Switching costs, price sensitivity and health plan choice, *Journal of Health Economics* 21, 89-116.

Telser, H. (2002), *Nutzenmessung im Gesundheitswesen – Die Methode der Discrete-Choice-Experimente* (Measuring benefits in the health care sector – discrete-choice experiments), PhD-Thesis, Verlag Dr. Kovač, Hamburg.

Telser, H., S. Vaterlaus. P. Zweifel und P. Eugster (2004), *Was leistet unser Gesundheitswesen*? (What Performance Our Healthcare System?), Verlag Ruegger, Zürich.

Train, K. T. (2003), *Discrete Choice Models with Simulation*, Cambridge: University Press.

Werblow, A. and S. Felder (2003), Der Einfluss von freiwilligen Selbstbehalten in der gesetzlichen Krankenversicherung: Evidenz aus der Schweiz (The effects of voluntary deductibles in mandatory health insurance: Evidence from Switzerland), *Schmollers Jahrbuch: Zeitschrift für Wirtschafts- und Sozialwissenschaften (Journal of Applied Social Science Studies)*, 123(2), 235-64.

Zweifel, P. and F. Breyer (1997), *Health Economics*, Oxford: University Press.

Zweifel, P., S. Felder, and M. Meier (1999), Ageing of population and health care expenditure: a red herring?, *Health Economics* 8, 485-496.

Appendix

Table A1

Random-effects probit estimation results (full model)

	exp. sign	coefficient	std.err.		z-value
constant	0	-0.87395	0.23906	***	-3.66
deductible	-	-0.00085	0.00012	***	-6.87
deductible2	+/-	1.12e-07	0.00000	***	3.53
copayment	-	-0.33744	0.18286	*	-1.85
altmed [a)]	+	0.28399	0.18338		1.55
generics	-	-0.07629	0.17453		-0.44
innovation	-	-0.00488	0.21739		-0.02
premium	-	-0.01508	0.00273	***	-5.53
a2539*deduct		6.75e-05	6.81e-05		0.99
a2539*deduct2		-1.15e-08	1.83e-08		-0.63
a2539*copay		-0.03366	0.09941		-0.34
a2539*altmed		0.12122	0.09702		1.25
a2539*generics		-0.01993	0.09753		-0.20
a2539*innov.		-0.23113	0.11262	**	-2.05
a2539*premium		-0.00322	0.00141	**	-2.29
a63+*deduct		0.00020	0.00010	**	1.93
a63+*deduct2		-1.44e-08	2.55e-08		-0.56
a63+*copay		0.26306	0.13380	**	1.97
a63+*altmed		-0.23687	0.13096	*	-1.81
a63+*generics		0.03280	0.13152		0.25
a63+*innov.		0.10810	0.14908		0.73
a63+*premium		0.00543	0.00183	**	2.97
sexm*deduct		0.00015	6.41e-05	***	2.34
sexm*deduct		-2.88e-08	1.69e-08	*	-1.71
sexm*copay		0.08336	0.09139		0.91
sexm*altmed		-0.16156	0.08891	*	-1.82
sexm*generics		-0.08908	0.08939		-1.00
sexm*innov.		0.04951	0.10253		0.48
sexm*premium		0.00187	0.00128		1.46
langf*deduct		2.89e-05	7.07e-05		0.41
langf*deduct2		-1.38e-08	1.91e-08		-0.72
langf*copay		0.13053	0.10135		1.29

Table A1 continued…

…Table A1 continued					
langf*altmed		-0.06019	0.09856		-0.61
langf*generics		-0.07649	0.09841		-0.78
langf*innov.		0.24711	0.11308	**	2.19
langf*premium		0.00215	0.00141		1.53
rich*deduct	+	0.00028	9.01e-05	***	3.07
rich*deduct2	+/-	-7.42e-08	2.65e-08	***	-2.79
rich*copay	+	-0.02325	0.09885		-0.24
rich*altmed	+	0.18744	0.10506	*	1.78
rich*generics	+	0.09924	0.10221		0.97
rich*innov.	+	0.21166	0.11320	*	1.87
rich*premium	+	0.00131	0.00148		0.88
poor*deduct	-	-0.00027	0.00011	***	-2.54
poor*deduct2	+/-	6.45e-08	2.76e-08	**	2.34
poor*copay	-	-0.18372	0.14008		-1.31
poor*altmed	-	0.00578	0.13762		0.04
poor*generics	-	-0.06435	0.13977		-0.46
poor*innov.	-	0.06104	0.16089		0.38
poor*premium	-	0.00319	0.00198		1.62
hh*deduct	-	4.55e-05	2.84e-05		1.60
hh*deduct2	+/-	-1.63e-08	7.51e-09	**	-2.16
hh*copay	-	-0.01334	0.04310		-0.31
hh*altmed		0.06510	0.04235		1.54
hh*generics		-0.00556	0.04229		-0.13
hh*innov.		-0.06685	0.04830		-1.38
hh*premium	-	-0.00035	0.00061		-0.58
notreat*deduct	+	8.46e-05	6.50e-05		1.30
notreat*deduct2	+/-	-7.73e-09	1.71e-08		-0.45
notreat*copay	+	0.29779	0.09277	***	3.21
notreat*altmed		0.16860	0.09023	*	1.87
notreat*generics		-0.09656	0.09067		-1.06
notreat*innov.		0.11189	0.10367		1.08
notreat*premium		-0.00080	0.00130		-0.62
prem_pd*deduct	-	-3.12e-07	2.81e-07		-1.11
prem_pd *deduct2	-/+	1.39e-11	7.59e-11		0.18
prem_pd *copay	-	-0.00022	0.00039		-0.56
Table A1 continued…					

…Table A1 continued					
prem_pd *altmed	-	-0.00065	0.00039	*	-1.65
prem_pd *generics	-	-0.00046	0.00033		-1.37
prem_pd *innov.	-	-0.00094	0.00052	*	-1.80
prem_pd *premium	-	-3.61e-06	6.29e-06		-0.57
a2539	0	0.13103	0.13352		0.98
a63+	0	-0.46353	0.17655	***	-2.63
sexm	0	-0.05830	0.13744		-0.42
languagef	0	-0.11770	0.15083		-0.78
rich	0	-0.10998	0.13653		-0.81
poor	0	0.05966	0.20956		0.28
hhsize	0	0.00957	0.05781		0.17
notreatment	0	-0.18403	0.12322		-1.49
prem_pd	0	0.00068	0.00043		1.57
constant	0	-0.87395	0.23906	***	-3.66
σ=0.91029, ρ=0.45314					
Log likelihood: -2964.4978					
n=9334					

[a)] expanded coverage of alternative medicine (status quo=no inclusion)

*** (**,*) significant at the 1 (5, 10) percent level

0: predicted to be insignificant in the random utility model

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