A Longitudinal Investigation of Willingness to Pay for Health Insurance in Germany

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Objective. To investigate factors affecting willingness to pay (WTP) for health insurance of older adults in a longitudinal setting in Germany.

Data Sources. Survey data from a cohort study in Saarland, Germany, from 2008–2010 and 2011–2014 ($n_1 = 3,124$; $n_2 = 2,761$) were used.

Study Design. Panel data were taken at two points from an observational, prospective cohort study.

Data Collection. WTP estimates were derived using a contingent valuation method with a payment card. Participants provided data on sociodemographics, lifestyle factors, morbidity, and health care utilization.

Principal Findings. Fixed effects regression models showed higher individual health care costs to increase WTP, which in particular could be found for members of private health insurance. Changes in income and morbidity did not affect WTP among members of social health insurance, whereas these predictors affected WTP among members of private health insurance.

Conclusions. The fact that individual health care costs affected WTP positively might indicate that demanding (expensive) health care services raises the awareness of the benefits of health insurance. Thus, measures to increase WTP in old age should target at improving transparency of the value of health insurances at the moment when individual health care utilization and corresponding costs are still relatively low.

Key Words. Health insurance, willingness to pay, contingent valuation method, older adults, Germany

Germany is facing a substantial demographic aging. While today about 20 percent of the population is older than 65 years, this proportion is estimated to increase to 34 percent by 2060 (Statistisches Bundesamt 2009). This fast-

growing proportion of the elderly poses a great challenge to the German health care system and the financing of health insurance.

In Germany, there is a unique dualistic system of social statutory health insurance (SHI) and private health insurance (PHI). The SHI covers about 90 percent of the population and is financed according to the principle of solidarity (Passon et al. 2009). Contributions are generally income-related and in all cases independent of health status. Most insurees of the SHI are compulsory members and cannot opt for a PHI (Passon et al. 2009). Especially self-employed persons and employees above an income-threshold may opt for a PHI and keep its membership after retirement. Premiums of PHI are related to health status at the time of entering the PHI.

In the period considered in this study, the contribution rate to SHI was generally around 15 percent of gross earned income. As a result, mean contributions per member were €280 per month in 2009 (Bundesministerium für Gesundheit 2015); if a member has a spouse or children (age <26 years) without their own income, they are also covered by this contribution.

Both SHI and PHI offer coverage of health care expenses for inpatient treatment, outpatient physician and nonphysician treatment (e.g., physiotherapy), and prescribed pharmaceuticals. In the SHI, there is, however, a comprehensive system of (mostly small) copayments for these services. For example, patients have to copay €10 per day for hospital stays, and 10 percent of costs of prescribed pharmaceuticals (but no more than €10 per pack). In

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contrast to that, in the PHI, there are varying deductibles depending on the individual contract.

Furthermore, also constituting for the German SHI is the principle of benefits in kind. Patients do not receive invoices from health care providers but present their SHI membership card when utilizing health care services so that the SHI can directly pay the providers. In contrast to that, insurees of a PHI receive invoices from providers, which they have to pay first before receiving reimbursement from the PHI.

The impact of the elderly on the health care system in general and health insurances in particular will increase as their absolute number and their proportion on population grows. Thus, the support for the solidary system of health insurance is needed to maintain it in the long term. Hence, knowing preferences for health insurance in old age and factors affecting them is important for decision making. While most studies about willingness to pay (WTP) for health insurance focused on developing countries without comprehensive systems of health insurance (e.g., Asenso-Okyere et al. 1997; Asgary et al. 2004; Dong et al. 2003; Gustafsson-Wright, Asfaw, and van der Gaag 2009; Mathiyazaghan 1998), only few were conducted in industrialized countries (Bustamante, Ojeda, and Castañeda 2008; Shafie and Hassali 2013; Block et al. 2014). Most of these studies still investigated the situation of uninsured samples.

The question of preferences for health insurance is nonetheless also vital in developed countries with existing systems of social security including well-established systems of health insurances. Therefore, for example, the attitudes toward the system of health insurance have been observed and analyzed for longer times in the United States (Blendon and Benson 2001). In addition, preferences for health insurance have been investigated longitudinally for the American health care context (Lavetti, Simon, and White 2014). Taking into account preferences for health insurance appears to be important also in countries with social health insurance. Thus, for the case of Germany, research has recognized the importance of preferences for social solidarity as a prerequisite of sustaining social health insurance (Hinrichs 1995; Maarse and Paulus 2003). Beyond that, preferences of older Germans for health insurance measured as WTP have been examined, albeit restricted to a cross-sectional design (Bock et al. 2014). This restriction means that there is a gap in knowledge about how factors affect WTP longitudinally in industrialized countries with comprehensive (social) health insurances.

Therefore, this longitudinal study aimed at providing evidence about the factors of WTP for health insurance in Germany. We used panel

econometric techniques to estimate the effects of sociodemographics, lifestyle factors, morbidity, and health care utilization on WTP for health insurance. Consequently, unobserved heterogeneity can be taken into account. Moreover, this technique might also provide insights into the causality between these variables.

METHODS

Sample

The analyses were based on data from the ESTHER (=Epidemiological investigations of the chances of preventing, recognizing early, and optimally treating chronic diseases in an elderly population) cohort study (Lw et al. 2004). ESTHER is a large population-based prospective cohort study, for which 9,949 persons were recruited via their general practitioners during a routine health check-up in Saarland, Germany, between July 2000 and December 2002. Participants had to meet the inclusion criteria of being between 50 and 74 years old and provide sufficient knowledge of the German language. Standardized questionnaires on socioeconomic, lifestyle, and medical factors were collected from participants at baseline as well as at the four subsequent follow-ups 2, 5, 8 (considered as the first wave), and 11 years (considered as the second wave) after enrollment. The 8-year follow-up with $n = 5,057$ participants took place from July 2008 to December 2010, with 3,124 individuals participating in a geriatric assessment at their homes conducted by trained study physicians. Lack of follow-up data (between baseline and first wave) was mainly caused by death ($n = 1,033$) and discontinued participation ($n = 1,210$), including 253 for health reasons.

The 11-year follow-up comprised 2,761 participants taking part in the geriatric assessment, of which 2,257 respondents participated in both waves. These 2,257 individuals were included in regression analysis described below.

Elicitation of Willingness to Pay

Participants' WTP for health insurance was elicited by means of a contingent valuation technique (Klose 1999; Ryan et al. 2000; Olsen and Smith 2001; Smith 2003; Bayoumi 2004), that is, a survey-based, direct, hypothetical method to determine the value of nonmarket commodities. As all Germans were obligated to have health insurance, most of them in the SHI with preset prices, the premiums for health insurance represent such a nonmarket

commodity. We used a payment card, a commonly used instrument in health care (Ryan et al. 2000) introduced by the question: "Imagine, you had no health insurance: in consideration of your monthly household net income, how much would you maximally be willing to pay per month for health insurance, if it provides the same standards as your current health insurance?" The question intended to set participants into a situation without any health insurance and thus—as they all were currently insured—with stopped current premiums or contributions. The payment card offered as answer possibilities two identically constructed columns with different amounts of money. In the first column, participants were asked to state the amount they would definitely be willing to pay. In the second column, they were asked to report the amount of money they would definitely not be willing to pay. Respondents received a payment card with nine values (€50, €100, €200, €300, €400, €500, €750, €1,000, until "more than €1,000").

For further analyses, we used the midpoint technique, that is, we used the mean of the interval defined by the amount of the certain maximum WTP and the minimum someone would certainly not pay in order to calculate the dependent variable. This technique yields under a supposed normal distribution of the true errors accurate results in regression analyses (Cameron 1987). Values of more than "€1,000" were transformed to "€1,250" in order to get definite values for statistical analyses.

Other Variables

We considered age, sex, and marital status, the latter dichotomized for regression analysis into "married" versus "other" ("single," "divorced," or "widowed"). Education was measured as the duration of secondary school education in the categories "up to 9 years," "10 or 11 years," and "more than 11 years." These three categories correspond to the three-tier school-system in Germany. Moreover, participants were asked whether they lived in their own household, and also to indicate their employment status in the categories "full-time," "regular part-time," "marginal," "housewife/house husband," "retired," or "unemployed." Furthermore, income was assessed using the square root equivalence scale that divided the total household net income by the square root of the household's members (individual monthly net income). In this manner, synergy effects of larger households were taken into account.

Morbidity status was assessed using the Cumulative Illness Rating Scale for Geriatrics (CIRS-G) (Linn, Linn, and Gurel 1968). The CIRS-G is a generic instrument consisting of a sum score of 13 somatic illness categories and

one psychiatric category. In each category, general practitioners assessed patients' illness level according to a scale ranging from 0 ("no problems") to 4 ("severe problems"). Thus, the CIRS-G could range from 0 points to 56 points with a higher score indicating an increased illness level.

In addition, we considered smoking and drinking as lifestyle factors. For smoking, we asked participants to report whether they were smoker, former smoker, or nonsmoker. The total consumption of alcohol was assessed in days per week of regular consumption of beer, wine, and spirits, separately.

Individual health care costs were calculated from a societal perspective. The calculation of costs contained three steps (Luce et al. 1996). First, relevant cost categories were identified. Second, corresponding units of resource consumption in these cost categories were collected. And third, these units were multiplied by unit costs in order to gain monetary values. For the first two steps, we used an interviewer-administered questionnaire (Roick et al. 2001; König et al. 2009), collecting the resource consumption for inpatient treatment, outpatient care, pharmaceuticals, medical supplies (such as wheel chair or hearing aid), dental prostheses, and nursing care with both formal and informal care. Resource consumption units (e.g., a contact with a general practitioner or days in a hospital) were recorded retrospectively for a 3-month period. Further details concerning collection of resource consumption and its valuation in the ESTHER study have been reported elsewhere (Heider et al. 2014). Total costs were calculated as the sum of sectoral costs and were used for the following analyses.

Participants also reported their individual amount of money they had to pay out-of-pocket (OOP) for the above-mentioned resource consumption. Individual OOP payments were assessed subsequent to the resource consumption, for inpatient treatment, outpatient treatment, pharmaceuticals, medical supplies, dental prostheses, and nursing care. The sum of these sectoral OOP payments was calculated and used as covariate for the following analyses.

Statistical Analyses

First, we provide descriptive statistics for individuals at both waves. Second, we examine factors potentially affecting WTP by exploiting the longitudinal data through panel regressions. Regression models specific for members of a SHI and PHI are performed in addition to regressions with all observations.

Furthermore, please note that the Stata command for fixed effects (FE) regression analysis includes individuals with only one observation in calculating the number of observations as they provide information about the constant and the variance components and so forth. However, it does not affect the standard errors and the beta-coefficients.

In order to estimate effects of time-dependent variables on WTP, we use FE regressions. It is assumed that individual unobservable characteristics that are constant over time, such as risk attitude, optimism, or personality are correlated with the regressors x_{it} . Thus, we cannot use random effects regression, as this model is inconsistent in such a case (Cameron and Trivedi 2005) (indicated by Sargan-Hansen statistic; Schaffer and Stillman 2011, with $p < .001$). Using FE regressions, we can control for unobserved heterogeneity. This also means that we only exploit variations within individuals over time. Therefore, the findings can be interpreted causally (average treatment effect on the treated; Cameron and Trivedi 2005). However, internal validity is not necessarily warranted as the subjects were not randomly assigned to treatment or control groups. Yet, for reasons of linguistic simplicity, we describe estimations of FE regressions using causal terminology. To deal with heteroskedasticity and autocorrelation, we compute cluster-robust standard errors, which is a conservative choice (Horwitz and Nichols 2011).

Interpreting the age effect can be ambiguous (Johnson 2005). Is it an effect of aging or a period effect (2008–2010 vs. 2011–2014)? As we have a case of an identification problem (Mason and Fienberg 1985), this effect must be interpreted with caution. For linguistic reasons, we refer to it as an age effect in the results section.

For individual health care costs and individual OOP payments, we use the natural logarithm of these variables, as they are highly skewed to the right. Health care costs and OOP payments are calculated plus one Euro before transformation, as the value “zero” occurs whose logarithm is not defined. The variable “smoking” is dichotomized into “current” smoker and the other statuses “never” and “former smoker.” It is worth mentioning that time-invariant independent variables (sex, education) are omitted in our FE models.

The level of significance is set at $\alpha = .05$. All analyses are performed using *Stata 13.1* (Stata Corp., College Station, TX, USA). First, our baseline models include “individual health care costs” as covariate. Second, we also run models with OOP payments as covariate instead of health care costs. OOP payments are a share of “individual health care costs”;

therefore, they should not be entered into the regression model simultaneously. Third, we run regression models without health care costs and OOP payments, as these may be correlated with age (and morbidity) and might bias its effect on WTP. Solely in additional analyses, we address missing values using the multiple imputation approach. It is implemented via *ICE* procedure (White, Royston, and Wood 2011) with a cycle length of $c = 200$ and $m = 100$ imputations, following recent recommendations (Van Buuren et al. 2006; Van Buuren 2007).

RESULTS

Sample Characteristics

At both stages, sample characteristics are depicted in Table 1. In the first wave ($n = 3,124$), mean age was 69.6 years with a standard deviation (SD) of 6.3 years. The majority of participants was female (52.6 percent), married (71.8 percent), retired (71.2 percent), had the lowest educational level (67.0 percent), and lived in own household (98.6 percent). The mean individual monthly net equivalence income was €1,433 (SD €684.6). The mean morbidity score was 6.9 (SD 5.4). On average, participants consumed alcohol on 2.4 (SD 2.3) days per week. About 7.8 percent of the participants were smokers. On average, individual health care costs (3 months) amounted to €865.7 (SD €2,176.0). The mean individual OOP payments (3 months) were €119.4 (SD €381.1). Moreover, the mean WTP per month was equal to €260.6 (SD €171.2).

In the second wave ($n = 2,761$), mean age increased up to 71.9 years (SD 6.1 years). Consequently, the proportion of individuals in full-time employment decreased markedly, whereas the proportion of retired respondents increased substantially. The proportion of married individuals slightly decreased (70.3 percent). Furthermore, the proportion of current smokers decreased (7.8 percent vs. 7.1 percent). Individual health care costs (€962.0, SD €2,322.1) as well as individual OOP payments (€135.5, SD €434.9) increased. WTP went down to €220.6 (SD €138.3). Moreover, individuals had a higher mean morbidity score (7.8, SD 5.8). Other variables remained almost constant.

Willingness to pay decreased by about €40, which corresponds to a reduction of about 15 percent. The maximum decrease within a person over time was €950, whereas the maximum increase within a person over time amounted to €675. For about 60 percent of the individuals, the intraindividual change ranged from €−100 to €100. Moreover, the mean reduction in WTP occurred consistently in both groups, members of SHI and PHI.

Table 1: Descriptive Statistics over Time

	Wave 1 (n = 3,124)	Wave 2 (n = 2,761)	Number (%) of transitions between waves for categorical time-dependent variables
Age in years: Mean (SD)	69.6 (6.3)	71.9 (6.1)	
Female: N(%)	1,643 (52.6%)	1,180 (52.3%)	
Married: N(%)	2,217 (71.8%)	1,859 (70.3%)	90 (4.2%)
Education: N(%)			
9 school years	2,393 (67.0%)	1,779 (65.5%)	
10–11 school years	631 (17.7%)	493 (18.1%)	
≥12 school years	548 (15.3%)	446 (16.4%)	
Living in own household: N(%)	3,049 (98.6%)	2,624 (98.9%)	31 (1.4%)
Employment status: N(%)			424 (20.0%)
Full-time employed	218 (7.1%)	83 (3.1%)	
Marginally employed	88 (2.9%)	47 (1.8%)	
Regular part-time employed	48 (1.6%)	28 (1.1%)	
Housewife/house husband	486 (15.9%)	439 (16.6%)	
Retired	2,182 (71.2%)	2,033 (76.9%)	
Unemployed	44 (1.4%)	15 (0.6%)	
Individual monthly net equivalence income*: Mean (SD)	€1,433.0 (€684.6)	€1,471.4 (€694.8)	
Morbidity (CIRS-G) [†] : Mean (SD)	6.9 (5.4)	7.8 (5.8)	
Number of days with alcohol consumption per week [‡] : Mean (SD)	2.4 (2.3)	2.2 (2.3)	854 (46.6%)
Currently smoking: N(%)	240 (7.8%)	186 (7.1%)	123 (5.7%)
Individual health care costs (3 months): Mean (SD)	€865.7 (€2176.0)	€962.0 (€2322.1)	
Individual out-of-pocket payments (3 months): Mean (SD)	€119.4 (€381.1)	€135.5 (€434.9)	
Statutory health insurance: N(%)	2,859 (92.2%)	2,482 (91.2%)	
WTP for health insurance per capita (1 month) [§] : Mean (SD)	€260.6 (€171.2)	€220.6 (€138.3)	

Notes. Missing values for metric variables (if occurred): *409 missing values in the first wave and 395 missing values in the second wave; [†]526 missing values in the first wave and 544 missing values in the second wave; [‡]316 missing values in the first wave and 383 missing values in the second wave; [§]91 missing values in the first wave and 84 in the second wave.

CIRS-G, Cumulative Illness Rating Scale for Geriatrics; WTP, willingness to pay.

Longitudinal Findings

Table 2 shows the results of FE regression models with WTP for health insurance as dependent variable for all participants (1–3) as well as by type of health insurance (4–9). In the main model, individual health care costs are included as independent variable. In the second specification, OOP payments are used instead as OOP payments are a subset of individual health care costs and therefore should not be included as regressors simultaneously. In the third specification, both individual health care costs and OOP payments are omitted, as they might be correlated with other independent variables, such as morbidity and age.

The models show a negative impact of age on WTP that existed consistently in all calculated models. Becoming widowed or divorced significantly increased WTP by €80.0. Changes in individual monthly net income did not affect WTP for health insurance in either model. Furthermore, becoming a smoker decreased WTP by €72.2 (without controlling for health care costs or OOP payments). Changes in alcohol consumption did not affect the WTP for health insurance.

A change in the illness level—measured by the CIRS-G—did not affect WTP significantly as far as all participants were considered. For members of a PHI, a higher illness level increased WTP (+€13.1) significantly. The analyses for members of SHI, members of a PHI, as well as the model for the entire sample, show an increasing effect of higher individual health care costs on WTP. Utilizing 1 percent more expensive health care services led to increased WTP rates of about €8.9 for the entire sample.

Analyses with OOP payments as covariate instead of “health care costs” show higher OOP payments to significantly increase the WTP among members of a SHI, whereas this result could not be found for the total sample and the PHI. However, there was no significant interaction between OOP payments and the status of health insurance.

Additional Analyses

The robustness (in terms of significance and effect sizes) of our variables of interest is checked by comparing the main models (Table 2) with three additional models (results of model specifications are not shown but are available upon request from the authors). In a first additional model, income is categorized into income quartiles to capture nonlinear aspects of the relationship between WTP and income. While the transition to a higher income quartile

Table 2: Factors Affecting Monthly WTP for Health Insurance per Capita: Results of Fixed Effects Regression Analysis

Variables	WTP- All		WTP—Statutory Health Insurance		WTP—Private Health Insurance	
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Age	-16.86*** (1.93)	-16.19*** (1.91)	-16.27*** (1.92)	-16.18*** (1.91)	-15.71*** (1.92)	-29.54*** (9.17)
Not married (Ref.: Married)	79.97** (29.63)	79.40** (29.81)	81.61** (29.51)	75.26** (28.10)	74.78** (28.36)	138.89 (9.17)
Not living in own household	-36.78 (30.31)	-34.22 (30.97)	-32.75 (31.29)	-34.34 (29.55)	-31.11 (30.34)	137.39 (133.57)
(Ref.: Living in own household)						(129.32)
Marginally/ Irregularly employed	-61.99† (32.61)	-62.28* (32.13)	-62.10† (32.04)	-46.34 (31.78)	-46.73 (31.22)	
(Ref.: Full-time employed)						
Regular part-time employed	-3.51 (41.76)	-9.18 (42.23)	-6.60 (42.24)	15.16 (46.17)	12.96 (46.76)	-240.36* (111.15)
Housewife/house husband	-19.28 (26.31)	-22.76 (26.67)	-21.82 (26.63)	3.99 (23.49)	0.28 (23.61)	-177.62* (85.60)
Retired	-40.75† (23.53)	-43.34* (24.00)	-42.52† (23.92)	-24.74 (20.36)	-26.98 (20.56)	-65.82 (84.22)
Unemployed	-67.10 (42.26)	-67.59 (42.24)	-67.66 (42.98)	-53.28 (42.57)	-54.52 (43.13)	-54.94 (96.59)
Individual monthly net income in Euro	0.02 (0.01)	0.02 (0.01)	0.02 (0.01)	0.01 (0.01)	0.01 (0.01)	42.66 (137.77)
						41.31 (132.51)
						0.05 (0.03)

continued

Table 2: Continued

Variables	WTP - All		WTP - Statutory Health Insurance		WTP - Private Health Insurance	
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Morbidity (CIRS-G)	-0.53 (0.89)	-0.49 (0.89)	-0.86 (0.88)	-0.80 (0.88)	13.09* (5.96)	13.82* (6.41)
Number of days with alcohol consumption per week	5.49 (4.12)	5.47 (4.16)	3.61 (3.50)	3.55 (3.54)	18.91 (28.82)	21.28 (30.25)
Smoking (Ref.: Currently not smoking)	-72.19* (30.67)	-79.00** (29.98)	-72.74* (31.57)	-77.89* (31.42)	-139.10 (123.85)	-314.68** (113.04)
(Log) Individual health care costs in Euro	8.88** (3.24)		6.75* (3.34)		36.16* (14.28)	
(Log) Individual out-of-pocket payments in Euro		3.58* (1.96)		4.22* (1.87)		-0.51 (8.61)
Constant	1,372.70*** (130.31)	1,366.93*** (129.93)	1,322.58*** (128.35)	1,313.38*** (127.93)	2,035.67*** (633.61)	2,232.69*** (636.43)
Observations	3,672	3,672	2,595	2,595	263	263
Number of individuals	2,615	2,615	1,662	1,662	161	161
R ²	0.101	0.0966	0.101	0.100	0.205	0.157

Notes. *** $p < .001$, ** $p < .01$, * $p < .05$, $^{\dagger}p < .10$. Cluster-robust standard errors in parentheses. Observations with missing values were dropped (listwise deletion). More specifically, listwise deletion means that observations with missing data were deleted and only the reduced sample of complete observations (complete case analysis) is analyzed. β , beta-coefficients; CIRS-G, Cumulative Illness Rating Scale for Geriatrics; SE, standard error; WTP, willingness to pay.

did not affect WTP for the entire sample and among members of SHI, these transitions increased WTP among members of PHI. In a second additional model, we additionally control for squared age in order to detect potential nonlinear relationships. In a third additional model, we also control for squared comorbidity, again to test for potential nonlinear relationships. However, we do not find nonlinear relationships between age and WTP, or between comorbidity and WTP.

Finally, our regression models with multiple imputed values reveal similar results. For example, individual health care costs still statistically significantly influenced WTP for the total sample. Main differences to our above shown results were that, for the total sample, the variables “smoking” and “OOP payments” did not achieve statistical significance anymore (results are not shown but are available upon request from the authors).

DISCUSSION

Main Findings

The aim of this study was to investigate factors of WTP for health insurance among older adults in Germany longitudinally. Mean monthly WTP per capita decreased from €260 in the first wave to €220 in the second wave. The regression models show higher individual health care costs to increase the WTP, which can in particular be found for members of PHI. Changes in income and morbidity did not affect WTP among members of social health insurance, whereas these predictors affected WTP among members of PHI.

Previous Research

A previously published longitudinal study on WTP for health insurance has focused on other predictors, including changes in political opinions (Lavetti, Simon, and White 2014). Therefore, it is difficult to compare our findings with this study. However, as already found by Lavetti, Simon, and White (2014), changes in household income did not affect WTP for health insurance, which is in contrast to cross-sectional findings with data from the first wave of the ESTHER study (Bock et al. 2014), where individual monthly net income was positively associated with WTP. Moreover, contrary to the cross-sectional analyses (Bock et al. 2014), where individual health care costs were not associated with WTP, individual health care costs affected WTP positively in our longitudinal setting.

These findings underline the complex nature of WTP in old age. The differences between predictors in cross-sectional and longitudinal setting can be explained by omitted variable bias in cross-sectional regressions (Greene 2008). For instance, concerning the variable “income,” high-ability individuals select themselves into higher income classes. Because of their abilities, the respective persons might be able to regard the value of health insurance better than people with fewer abilities and therefore report higher WTP rates.

In total sample and in SHI, findings regarding morbidity are in line with cross-sectional data (Bock et al. 2014). In contrast to our study, Bock et al. (2014) found no association between morbidity and WTP in PHI.

Strengths and Limitations

This is the first study analyzing factors affecting WTP for health insurance in a longitudinal setting in old age. This is important as the use of panel data allows controlling for individual unobserved heterogeneity. However, for reasons of data availability, our study is restricted to two waves with rather long intervals between waves. Thus, short-term changes might be covered due to adaptation processes.

Elicitation of WTP required participants to reveal their preferences for health insurance, whereby the health insurance covers expenditures for health care services. Health care services are, in general, free of charge for insurees of a SHI. Members of a SHI only have to pay a rather small copayment and do not receive invoices, so that they usually do not know prices of health care services. This fact might have made it difficult for participants to assess their financial risk resulting from potential health care use, which is necessary to derive WTP for health insurance. Yet, for example, costs of frequently prescribed dental prostheses are reimbursed only by up to 50 percent, so that insurees of a SHI know prices of them; besides, there are so-called individual health services (e.g., screening for glaucoma), which are optional health services provided by physicians and not paid for by the SHI. They are frequently offered to patients (Zok 2010) and paid for completely OOP. In sum, there is a relatively low general transparency of cost for health care; nevertheless, a limited number of services are paid for directly by patients, so that they have some indication they can refer to when assessing their financial risk associated with health care use.

At baseline, our large sample was almost representative of the elderly general population in the federal state of Saarland, Germany (Löw et al. 2004; Raum et al. 2007). Regarding age and sex distribution, the federal state of

Saarland is comparable to the elderly population in Germany (Statistisches Bundesamt 2014). The level of detail regarding health care utilization, morbidity, and socioeconomic variables should be emphasized.

However, our estimates might have been biased downwards for reasons of panel attrition (endogenous selection bias; Elwert and Winship 2014). Individuals with high WTP and, for instance, high morbidity might have a higher probability to drop out. Moreover, individuals with higher educational levels and income tend to live longer as compared to those with less education and income. Therefore, it is assumed that individuals with complete data are healthier than individuals who drop out. The contingent valuation instrument used for this study has been discussed critically (Bock et al. 2014), especially due to the possibility of influencing people's decisions and thus receiving biased results (Klose 1999). This refers both to selected money categories in the payment card and the fact that participants could see right from the beginning all answer possibilities. The latter fact could be avoided by a bidding game; however, in large sample sizes, such bidding game techniques would be much more time-consuming and expensive. Other variables also depended on survey data and thus recall bias for health care costs and OOP payments cannot be entirely excluded. On the other hand, this bias should be small, as the recall period was rather short. Moreover, even if we cannot rule out the possibility of a reverse causality (e.g., WTP causing individual health care costs), we believe that it is highly unlikely.

Conclusion and Future Research

The aging of society as well as the medical progress will probably require higher premiums for health insurance in the next decades. Consequently, a high WTP for health insurance is important to preserve social health insurance. Individual health care costs affected WTP positively. This might indicate that demanding (expensive) health care services raises the awareness of the benefits of health insurance. Thus, measures to increase WTP in old age should target at improving transparency of the value of health insurances at the moment when individual health care utilization and corresponding costs are still relatively low. To cross-validate our findings, future research is required with regard to other validated measures of WTP. Furthermore, more research is desirable regarding countries with other health care systems and younger age brackets.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.