DISCUSSION PAPER SERIES

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ABSTRACT

Buying Control?
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We examine the relationship between locus of control (LOC) and the choice of having a supplementary health insurance. Drawing on longitudinal data from Germany, we document the following findings: First, we find robust evidence that an individual's internal LOC is associated with a higher a probability to take up supplementary private health insurance (SUPP). *The effect of a one standard deviation change in an individual's internal LOC on the probability to have a SUPP is equivalent to an estimated 14% change in household income.* Second, we find that the positive association between self-reported health and SUPP becomes small and insignificant when we control for LOC, suggesting that LOC might be an otherwise unobserved individual trait that can explain advantageous selection into SUPP. Third, we find comparable results using data from Australia which enhances the external validity of our results

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1. Introduction

Even in well-established health systems, individuals spend both income and search effort on securing a better access to quality health care. However, not all individuals are naturally sensitive to the future cost and quality of care in the event of need. Among individual psychological traits, locus of control (LOC) refers to an individual belief about the extent to which one is in control of one's own life (Rotter, 1954)[1]. Individuals can be classified on a scale ranging between *external LOC* – who believe that external factors drive their life (e.g., fate and luck) – and *internal LOC* – who believe that they are in control over their own life, and that the main outcomes of their lives are determined by their own actions. Individuals with an internal LOC, are more likely to anticipate their future needs (including the use of private health care, and their desired quality of care), and to invest more effort in securing better access to health care. In settings where there is a mainstream public health insurer, LOC can explain the purchase of supplementary private health insurance (SUPP), over and above other explanations[2].

This paper studies whether that LOC predicts the uptake of SUPP (and other related forms of insurance). More specifically, given that SUPP reduces the financial uncertainty in the event of needing private health care, and allows access to higher health care quality, individuals with internal LOC exhibit a higher ex-ante valuation of additional quality and reduced financial uncertainty (and hence a larger control over disposable income) resulting from insurance purchase. Accordingly, SUPP *'buys control' over future use of private health care*, which is more heavily valued by individuals with an internal LOC[3]. Certainly, the effect

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[1] Personality traits have been identified as important drivers of health care choices (Flynn et al, 2007).

[2] Individuals purchase supplemental insurance for reasons of consumption smoothing to avoid unexpected high spending and for people who cannot self-insure, and people with internal LOC are more likely to engage in such actions.

[3] Consistently, previous studies have already documented that an internal LOC is associated with precautionary measures with regards to natural disasters (Antwi-Boasiako, 2017) and increased resilience against personal shocks (Buddelmeyer and Powdthavee, 2016).

is far from trivial as individuals with an internal LOC are more likely to engage in prevention too (Cobb-Clark et al, 2014)[4]. Yet not even individuals with internal LOC can fully prevent for the use of health care, let alone because health information available is largely incomplete (Murray et al, 2003).

Our second claim is that LOC provides an explanation for previous evidence suggesting advantageous selection into supplementary insurance[5], as individuals with an internal LOC both exhibit a lower-than-average number of claims but are more likely to value SUPP (Buchmueller et al, 2013 and Schmitz, 2011). Hence, LOC appears to be behavioral parameter in the way individuals make ex-ante judgements that can help explain for "advantageous selection" into health insurance (despite standard theoretical models predicting adverse selection). We return to this point in section 5.3.

The empirical analysis is mainly based on survey data from Germany. In this country, statutory public health insurance is available for individuals participating in the labor market as well as their dependents.[6] Individuals benefiting from the statutory health insurance can also purchase additional supplementary insurance. The latter extends health care coverage beyond that of statutory health insurance, and its premium is mainly adjusted based on age and, when observable, chronic conditions. To enhance the external validity of our results, we also replicate

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[4] Cobb-Clark et al (2014) for example show that an internal LOC is associated with preventive health measures such as eating healthy and exercising. This is consistent with findings in the psychology literature showing that self-regulation increases the likelihood of healthy behaviors (Saffer, 2014), and that future orientation and self-efficacy negatively reduce drinking and increase exercising (Chiteji, 2010).

[5] Against the backdrop of the hypothesis of individuals self-selecting into insurance based on their objective risk (Rothschild and Stiglitz, 1976), several studies document puzzling evidence of either 'no evidence of selection' (Chiappori and Salanié, 2000), or in some cases, the presence of 'advantageous selection' into insurance (de Meza and Webb, 2001, Einav and Finkelstein, 2011)

[6] Individuals can also opt out of the statutory public health insurance scheme and take up substitutive health insurance if they qualify for it based on an income threshold of 56,000€ in 2017. More specifically, employees and pensioners earning less than €57,600, and their non-earning dependents have mandatory statutory health insurance (and individuals with a gross income above the threshold or self-employed can purchase substitutive private health insurance). A significant share of the population purchases supplementary private insurance (SUPP) to ensure access to private health care in the event of need.

our analysis with Australian data, where a universal health insurance scheme, *Medicare,* provides health care to the entire population, but individuals can have access to SUPP in exchange of a community premium [8]. One could argue that the reason LOC influences SUPP in Germany is because of insurance underwriting. That is, preexisting health conditions (to an extent more preventable for higher internal LOC individuals) can influence the premium and condition of access to insurance. To address this point, we examine evidence from Australia where premiums are community rated, hence no underwriting is possible. If we observe results similar to those observed in Germany, it strengthens the hypothesis that LOC is the main driver of insurance choices, rather than insurance underwriting.

We extend the literature in three ways. First, we contribute to the analysis of the demand of SUPP by focusing on LOC, an important behavioral trait unobserved by the insurer[9]. Second, we add to the existing literature on the influence of LOC on important life outcomes such as education (Coleman and Deleire, 2003), earnings (Cebi, 2007), preventive health behaviors (Cobb-Clark et al, 2014) and savings (Cobb-Clark et al, 2016). Third, we examine whether LOC can play a role as a potential unobservable explaining previous evidence of positive health selection into SUPP. Finally, to enhance our external validity, we report evidence from two large countries with large SUPP markets which complement the coverage of a mainstream insurer: Germany and Australia.

We show evidence that *an internal LOC predicts the uptake of SUPP*[10]. This finding is robust to controlling for measures of risk attitudes, wealth, and income alongside several other personality traits as well as other potential observed confounders and fixed unobserved

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[8] Community rating means that a given health insurance policy must be offered to all consumers at the same price thereby prohibiting insurers charging premiums on observable risks.

[9] Furthermore, in the context of Handel and Kolstad (2015) it is a welfare relevant preference factor, that is a parameter of the utility function that it affects how individuals make evaluations.

[10] An advantage of examining data from Australia is that insurance pricing is community rated, and hence differences in risks are unlikely to result in difference in insurance premiums.

heterogeneity. Finally, we show that *the inclusion of LOC eliminates the positive health selectio*n into SUPP both in Germany (Lange et al, 2017) and Australia (Buchmueller et al, 2013)[11].

The following section describes the institutional settings in Germany. Section 3 provides a conceptual background on SUPP decisions, and the role of LOC. Section 4 describes the data and our empirical strategy. Section 5 displays the results and section 6 shows a comparable analysis using Australian data to strengthen the validity of our finding. Section 7 contains our concluding remarks.

2. The German supplementary health insurance

The German market for SUPP offers additional insurance to those covered by social or statutory health insurance (SHI), which provides coverage for 90% of the German population and is funded from employment-based pay roll contributions. Individuals in the statutory system have the option of purchasing supplementary insurance (SUPP), that is in addition to the coverage provided by the SHI. SUPP provides access to additional health care services excluded from the SHI and can improve upon some quality dimensions the case delivered by SHI. However, it entails paying an insurance premium. SUPP is subject to risk-based premiums, which in practice is mainly based on age and disability status of the individual.

The main reason for individuals to purchase SUPP lies in attaining better health care quality service than delivered by the social health insurance (Lungen *et al*, 2008) and better access to rationed care by the social health insurance, which individuals expect to consume out of pocket

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[11] Obviously, these results are not the result of an exogenous source of variation so we interpret the estimates as assoications.

otherwise (Gruber and Kiesel, 2010, Hullegie et al, 2010; Grunow and Nusheler, 2013). Hence, it provides better quality and reduces out-of-pocket expenses. Lange et al (2017) estimate that whilst 8.24% of individuals received SUPP in 1999, its uptake increased to 22.68% in 2008. For individuals younger than 66, they find evidence that heathier individuals are more likely to choose to have private insurance (so called, "positive selection" into insurance). However, so far, a behavioral explanation for a 'selective' choice of private health insurance is lacking, and we propose in the following that LOC provides a potential explanation for this.

Finally, a unique feature of the German system is that those whose income exceeds a given threshold[12] (in addition to civil servants and self-employed people) have the choice of either remaining in the statutory system[13], and even purchasing SUPP or, opting out completely and purchasing private substitutive health insurance (SUBST). However, the majority remain in the system and SUBST funds less than 10% of the population[14].

3. Empirical Strategy and Data

Empirical Strategy. The aim of the empirical analysis is to investigate whether (or not) individuals with an internal LOC are more likely to have a supplementary private health insurance (SUPP). We estimate the following equation:

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[12] The threshold varies from year to year and was €57,600 per year in 2017.

[13] Furthermore, premiums are front-loaded so that older individuals have a shorter time-horizon to build up old-age provisions. However, the premium is considerably lower than the public premium. This is particularly relevant for civil servants.

[14] Upon choosing SUBST, switching back to the statutory health insurance is restricted to cases where an individual's income falls below the threshold. Individuals aged 55 and older however are generally not allowed to switch back to the statutory health insurance. Unemployed spouses and dependents under 25 are co-insured at no additional cost. Civil servants have a strong financial incentive to purchase SUBST as they are entitled by law to a 50% subsidy ("*Beihilfe*"), whilst the self-employed people bear the full cost of insurance coverage themselves

$$SUPP_{it} = \beta_1 + \beta_2\, LOC_i + \beta_3 H_{it} + \beta_4 X_{it} + \epsilon_{it} \tag{2}$$

where ownership of supplementary private insurance ($SUPP_{it}$) of individual i at time t is a function of locus of control (LOC_i), an individual's health status which reflect the probability of sickness (H) as well as a number of relevant confounders (X_{it}) including income, risk attitudes, big-five personality traits, gender, age, education, marital status, current health conditions, and self-reported health as outlined in more detail in Section 4.2. Our goal is to estimate β_2, which depends on adequately controlling for any unobserved heterogeneity in the error structure. We assess the potential for omitted variables bias in our estimates by estimating several different model specifications including fixed effects models and controlling for a wide range of potential confounders following the literature in the field of LOC and health (Cobb-Clark et al 2014). Similarly, we examine the effect of β_3 to identify the potential presence of selection on health, consistent with our theoretical considerations, and the evidence of 'positive selection' into insurance in some empirical specifications.

Given that some small share of the population that does not have SUPP might have purchased SUPP, in an extension below we examine the effect of LOC on SUBST. Selection in this case lead to a downward bias of the effect of LOC on supplementary health insurance (as it is reasonable to assume that those that those who are more likely to have a SUBST would be more likely to have SUPP as we show below. Hence, insurance selection process might as a result entail that those with more LOC are more likely not to be observed as they have already purchase SUBST).

Data. In this main part of the analysis, we use data from the German Socio-Economic Panel (SOEP, 2019). SOEP is a longitudinal household survey that started in West Germany in 1984 and in East Germany in 1990. It collects information on a wide range of factors including LOC as well as related concepts such as willingness to take risks and other personality traits. Furthermore, we use all waves from 1999 to 2016 from the SOEP where questions about supplementary health insurance were asked.

We use all waves of SOEP data from 1999, given that LOC was first measured during that year, to 2016. Data from 2009 and 2015 are not used given that the questions about supplementary health insurance were not asked. Our sample is restricted to individuals who are between 25 and 90 years old. After dropping observations with missing values for the variables used in the analyses, our final sample includes 24,274 individuals constituting an unbalanced panel including 231,784 observations. On average, individuals were observed 9.5 times.

Private Health Insurance Uptake. Insurance records in the GSOEP include SUBST and SUPP information since 1996. Specifically, the SUBST question is as follows: *"How are you insured for sickness: Do you have state health insurance or are you almost exclusively privately insured?"*. From this, we generate a binary variable indicating whether individuals have SUBST (extensive margin).

Individuals who report to have a statutory health insurance are asked whether they additionally have private health insurance, which we define as *supplementary health insurance*. If the answer is positive, they are asked how much they pay for this insurance per month and what it covers (hospital stays, dentures, corrective devices, coverage abroad, or other) which we also use in the analysis. It is important to note that SUBST and SUPP have very different purposes. While SUBST is purchased to lower premiums and have more choice of plans as well as flexibility with cost-sharing (and lower waiting times but possibly higher out-of-pocket

spending), SUPP is an add-on for services that the generous medically necessary package in Germany does not cover dental, glasses, alternative medicine, traveler insurance, single room in a hospital etc.

Locus of Control (LOC) and other non-cognitive skills. Our main explanatory variable of interest is LOC, which was measured in 1999, 2005, 2010 and 2015 in GSOEP. Respondents had to state on a 7-point scale the extent to which they agreed or disagreed with several statements referring to perceptions about fate and control.[15] The items are based on the Psychological Coping Resources Component of the Mastery Module developed by Pearlin and Schooler (1978). We follow the recent economic literature and predict the first factor from a factor analysis, which produces a continuous measure increasing in internal locus of control tendencies (see Piatek and Pinger, 2010; Cobb-Clark et al., 2014; Cobb-Clark et al., 2016 Cobb-Clark and Schurer, 2013). We also follow Cobb-Clark et al. (2014) and calculate individual-specific averages of locus of control over time to minimize measurement error and attach those values to each wave. We then standardize LOC to mean 0 and standard deviation 1.

We also control for individuals' other non-cognitive skills which are measured by the Big Five personality traits inventory based on Saucier (1994) in wave 2005, 2009 and 2013 in GSOEP. The Big Five personality traits are extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience. To construct a summary measure for each trait, we use the 15 items in GSOEP in a factor analysis (see Cobb-Clark and Schurer, 2012). In line with our procedure for LOC, we calculate individual-specific averages and standardize each measure to mean 0 and standard deviation 1.

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[15] The questions aimed at measuring locus of control were measured on a 4-point scale in 1999 in GSOEP. We rescaled those variables from 1999 accordingly. As a robustness check, we discarded the 1999 measure to calculate the individual specific average, but we found very similar results.

We additionally control for individuals' willingness to take risks. In GSOEP risk attitude has been asked every year since 2004, except in 2005 and in 2007, using the following question: "*How do you see yourself: Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?* Please tick a box on the scale, where the value 0 means: "risk averse" and the value 10 means: "fully prepared to take risks". You can use the values in between to make your estimate". We calculate an individual-specific average and attach this value for each year.[16]

We also include two proxies for time preference that are available in 2008 and 2013. The first measure is based on the following question: "Would you describe yourself as an impatient or a patient person in general? Please answer on a scale from 0 to 10, where 0 means very impatient and 10 means very patient." The second question is: "*Do you generally think things over for a long time before acting – in other words, are you not impulsive at all? Or do you generally act without thinking things over for long, in other words, are you very impulsive? Please answer on a scale from 0 to 10, where 0 means not at all impulsive and 10 means very impulsive*". It turned out that none of these two measures were significantly associated with the ownership of private substitutive health insurance or supplementary health insurance once all the other control variables were included. We therefore do not include these variables in our main mode, however estimation results based on models that include these variables are available upon request.

Other confounders. We also control for several potential confounders that may be correlated with both LOC and the uptake of health insurance. We control for wealth which was measured

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[16] As a robustness check, we also did the analysis by using the actual measure of risk attitudes and thus restricted the sample to the waves of GSOEP for which this measure is available and we found very similar results.

in 2002, 2007 and 2012 in GSOEP. We calculated individual-specific average wealth over the three waves and created a categorical variable for the quintiles of wealth.[17]

We furthermore control for gender, age (using third order polynomials in order to take into account potential nonlinearities in the relationship between age and insurance ownership), years of education, labor force status (working, unemployed or other), after-tax net household income, partnership status (a dummy equal to one if the individual is married or partnered), the number of children and adults in the household and a dummy variable equal to one if the individual reports being in poor or bad health.

Descriptive statistics. Table 1 and A1 in the Appendix provide descriptive statistics by above/below median LOC (Table 1) and by insurance uptake (Table A1), respectively. Individuals with a LOC above the median are more likely to have a SUPP (conditional on having no SUBST). Likewise, they are more likely to have higher levels of education, employment, health, wealth, and income. Table A1 shows a higher intensity of internal LOC for individuals who take up SUPP (and similar effects are found for SUBST).

Consistently with the hypothesis of positive insurance selection, the willingness to take risks is found to be higher among those individuals with both SUPP[18]. SUPP is estimated to be normal good, we find that average income is significantly larger among those who take up private health insurance. Men are found to be more likely to have a substitutive insurance, whilst women are more likely to have supplementary insurance. However, we do not find a significance difference in average age between those with and without SUPP.

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[17] As a robustness check, we also did the analysis by using the actual measure of wealth and thus restricted the sample to the waves of GSOEP for which this measure is available and we found very similar results.
[18] A simple comparison between those with and without insurance provides suggestive evidence of advantageous risk selection as the proportion of individuals reporting being in poor/bad health is lower among those with insurance.

[Insert Table 1 about here]

Correlates of LOC. One of the questions that emerges is what correlates with LOC. We explore this in Table A2 in the Appendix. For this analysis, we only focus on observations for which LOC was measured at the time of the interview. We estimate the equation by Ordinary Least Squares (OLS) and use clustered (at the individual level) robust standard errors to allow for the possibility that the error term is correlated among observations for the same individual. Years of education, income and wealth are positively associated with an internal LOC. Unemployed individual have a lower internal LOC than employed individuals, and individuals living in larger households are also less internal. Importantly, individuals reporting poor/bad health have a lower internal LOC in Germany. There is a positive association between LOC and the willingness to take risks. Finally, extraversion, conscientiousness, agreeableness, and emotional stability are positively correlated with LOC while openness is negatively associated with it.

4. Results

Uptake of Supplementary Insurance (SUPP). The top panel of Table 2 displays the estimates of a linear probability model for uptake of SUPP[19]. As expected, the coefficient estimate of LOC is positive and statistically significant in all estimates (estimates with the full set of controls are included in the Appendix B), although the effects size declines with the inclusion of income and wealth, and to a lesser extent when we control for several other controls, including employment status, household characteristics, risk attitude, health, and individual personality traits (so called 'Big 5'). If we compare the coefficient estimate of LOC with the coefficient estimate of the logarithm of household income (estimate: 0.131; standard error:

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[19] We also estimated the extensive margin equation using a probit model and we found very similar results.

0.005), the effect of an increase in LOC by one standard deviation is equal to an estimated increase in household income by 13 percent for the ownership of SUPP.[20]

[Insert Table 2 about here]

Heterogeneity. Given that the full sample could hide important heterogeneous effects underpinning the estimated average effects, we also investigate whether predictions of LOC differ by age groups, gender and types of coverage of health insurance. In Table 3, we examine whether the observed relationship differs according to age by estimating the equations using a set of different age-based subsamples. Generally, we find that the association is higher for the youngest age group (25–39-year-old) but the positive association remains highly significant for all of them. Next, Table 4 examines the existence of gender-specific heterogeneity. Again, the coefficients are very similar across genders with respect to supplementary health insurance (estimates with a full set of controls are included in Appendix B).

[Insert Table 3 and 4 about here]

Next, given that insurance can differ by the extent of coverage provided, Table 5 reports the association between LOC and different types of health insurance coverage. More specifically, we find that the coefficient of LOC is significantly different from zero irrespective of the type of coverage, although it's when insurance contracts cover higher hospital and dental care comapred to glasses, for example. This finding suggests that LOC exerts a particularly strong influence on the uptake of insurance against costlier risks.

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[20]Wealth is positively associated with the ownership of SUPP while household size reduces the probability of having insurance, and some of the coefficients for the personality traits (emotional stability, conscientiousness, and openness) are significantly different from zero.

[Insert Table 5 about here]

Robustness Checks. We then account for the inclusion of panel dimension, which allows us to controls for some unobserved heterogeneity[21], though it reduces the sample to the years for which a current measure of private substitutive or supplementary health insurance and a current measure of LOC is available, [22] and include regional fixed effects, year fixed effects, and a set of time-varying covariates such as a third order polynomial in age, the logarithm of net monthly household income, employment status (working, unemployed or other), partnership status, the number of adults and children in the household, and health status.

Although Cobb-Clark and Schurer (2013) have shown that LOC is relatively stable (but not time-invariant) over a four-year period, there may be meaningful variations in the measure of LOC over a longer time span as we have in our data as we observe individuals for 16 years. It should also be stressed that the estimates from a fixed effects regression are likely downward biased as the presence of measurement error in the measure of LOC might result in an attenuation bias which tends to be exacerbated in fixed effects estimators.

[Insert Table 6 about here]

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[21] We use a linear fixed effects estimator for the extensive margin equations. Our results are robust to alternative estimation methods such as the fixed effects logit model or the correlated random effects probit based on the Mundlak correction approach (Mundlak 1978).

[22] Note, however, that the information about supplementary insurance is not available in 2015. We thus impute the supplementary insurance information from 2016 to 2015. We also did a robustness check by discarding the observations from 2015 and the results are robust to this exclusion.

In Table 6, examines the effect of SUPP including individual fixed effects to control for time invariant unobserved heterogeneity. We find that the association between the uptake of supplementary health insurance and LOC drops by about 60% *but remains positive and highly significant*. The effect of an increase in a one standard deviation in LOC is equivalent to an increase in household income by 17.9 percent (the coefficient estimate of the logarithm of household income is equal to 0.039, standard error: 0.008), which is slightly larger to what we found in the previous analysis where the effect was compares to an increase in household income by 13 percent. Importantly, the fact that LOC remains significant in the FE specifications reduces the possibility that the observed association between LOC and private supplementary health insurance uptake is still due to other unobervables.

We also investigate whether there are non-linearities in the association between LOC and PHI uptake. Table A3 and A4 show the role of LOC on SUPP when we include dummy variables corresponding to the different deciles of LOC instead of the continuous measure of LOC. In general, the coefficients are stronger for the higher deciles of LOC.

Effects of LOC on health care use. Next, Table 7 examines whether health care is uses more heavily among individuals with an internal LOC as an explanation for the uptake of insurance by high internal LOC individuals. Health care utilization could either reflect the fact that one is sicker, or that one simply visits a health care provider more often as a preventive measure. However, none of the effects turns out to be significant. Table 7 shows that LOC is not significantly associated with number of doctor visits or the probability to have been hospitalized in the last twelve months. This suggests that *a more frequent use of health care utilization of individuals with a higher internal locus is unlikely to be a significant driver in their uptake of SUPP*.

5. LOC and health selection into SUPP

An important question is whether the inclusion of LOC can explain the existence of positive selection in the market for SUPP, which has been showed in previous studies (Lange et al, 2017, Buchmueller et al, 2013). Previous studies discuss the effect of risk selection (Schmitz, 2011). To control for the effect of risk selection, our specification includes two covariates, self-reported health, and risk preferences. Table A2 in the appendix suggests that LOC is negatively associated with poor health and positively associated with the willingness to take risks. a negative correlation between poor health and LOC and a positive correlation of risk preferences. However, throughout the different specifications we examine the effect of self - reported health in the demand for SUPP to identify the effect of positive risk selection.

Tables 8 panel A and B examine the specific effect of LOC on the effect of self-reported health on SUPP uptake. To clearly interpret the effect of self-reported health, we report the effect of poor health (defined by categories of the Likert scale) on the uptake of insurance including and excluding LOC. Our estimates show that when we exclude LOC from the specification, poor self-reported health is negatively associated with SUPP uptake (Table 8). This is consistent with the presence of positive selection into insurance. In contrast, the effect of self-reported health becomes insignificant once LOC is controlled for. This result is consistent with the presence of omitted variable bias when ignoring LOC. Another interesting finding is that when LOC is controlled for, the effect of risk aversion does not predict the uptake of SUPP anymore

(See Table B20 in the appendix). This result is in line with previous studies for Germany (Lange et al, 2017).

[Insert Table 8 about here]

7. An extension: the effect of LOC on substitutive health insurance (SUBST)

Additionally, given the specific German setting where some small share of individuals can choose between statutory insurance and a substitutive private health insurance (SUBST), we apply the same logic as before, except that the choice is between purchasing SUBST or staying with the statutory insurance and either paying out of pocket costs or purchasing SUPP. Table B0 in the appendix report estimates using individual fixed effects estimators on the uptake of SUBST, with and without individuals fixed effects. The first panel reports the effects without fixed effects and estimates suggest at the extensive margin, the effect of an increase in one standard deviation in LOC is equivalent to an increase in household income by 8.5 percent.[23] We also find that the signs and significance level of the demographic characteristics are consistent with the descriptive statistics. Willingness to take risks is not significantly associated with the ownership of a private substitutive insurance. Furthermore, being married and the number of adults and children in the household are associated with a lower uptake of insurance. We find a non-monotonous effect of wealth and a significant effect of employment.

Results in Table B0 in the appendix still show a significant positive coefficient for LOC on the probability of owning a private substitutive health insurance in Germany once individual fixed effects are controlled for. If we compare this coefficient estimate with the coefficient

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[23] Based on the estimates from the third column. The coefficient estimate of the logarithm of the household income is equal to 0.177 (standard error of 0.005).

estimate of the logarithm of household income, it implies that the effect of an increase in one standard deviation in LOC on the probability to own a private substitutive insurance is equivalent to an increase in household income by 6.9 percent. Quite interestingly, this comparison is close to our previous results showing that this increase was like an 8.5 percent increase in household income.

8. LOC and supplementary health insurance in Australia

To assess the external validity of our results, and our overall claim, we have performed a similar set of analysis with Australian data. Below we briefly describe the setting for the Australian SUPP in section 6.1, a description of the Australian dataset in section 6.2, and in section 6.3 we report the main results of estimating equation (4) with Australian data.

Australian private health insurance. In Australia, private health insurance plays a complementary role to a universal public insurer (*Medicare*) in granting access extra services that are not included in its public catalogue. Hence, it compares to what we have labelled as 'supplementary insurance' in the German system as it provides speedier access to private health care for elective procedures that mostly take place in hospitals (Buchmueller et al, 2013). The uptake of a private hospital health insurance plan is incentivized by income and age specific rebates ranging between 0%-36%. Furthermore, individuals who have an income above $90,000 ($180,000 for families) and no private hospital insurance are liable to pay the *Medicare Levy Surcharge*. A unique feature of the Australian system is that it relies on a regulated gatekeeper model, whereby private health insurance cannot cover outpatient services which are already financed by both Medicare and out of pocket payments. Like other complementary insurance schemes in Europe, Medicare listed prescription drugs are not covered by private insurance plans. More generally, similarly to Germany, having private health care improves quality of care as it provides access to a wider choice of providers and

additional health care amenities. Again, those quality dimensions are more likely to be anticipated, and hence valued, among those individuals that have a higher internal LOC.

Data. We employ data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. HILDA collects longitudinal information from a large nationally representative sample of Australian households since 2001 and contains information on LOC, willingness to take risks and other personality traits. We employ all waves from 2005 to 2014 from the HILDA when information on annual household expenditures on private health insurance coverage is available.

For Australia, out of the 120,185 observations (19,597 individuals) in 2005 to 2014 aged between 25 and 90 years old, we lose 6% due to missing information on LOC and another 8% due to missing information in any of the other control variables. This leaves us with a final sample of 103,448 observations (10,406 individuals).

In the HILDA, individuals report on their annual expenditures on private supplementary health insurance. More specifically, we generate a binary variable indicating whether households have private supplementary health insurance if they report any expenditure for private health insurance (extensive margin). We additionally calculate the log of the expenditures on private health insurance as an outcome variable. Our measure for LOC is based on 7 questions in the HILDA as described in Cobb-Clark et al. (2014). We follow Cobb-Clark et al. (2014) and calculate individual-specific averages of LOC over time to minimize measurement error and attach those values to each wave. HILDA allows us to control for the same variables as in GSOEP, such as the Big-Five personality traits as well as risk attitudes. All relevant questions in HILDA are directly comparable to GSOEP except for the risk measure. Instead of self-assessed general willingness to take risks in GSOEP, HILDA asks about financial risk taking. We generate a binary variable indicating whether someone is an

above average financial risk taker based on a question on the extent to which individuals are willing to take financial risks (substantial, above-average, average, no risk). Furthermore, given that the variable was not asked in 2005, 2007 and 2009, we impute information for these years from previous waves.

7.3 Results

Consistently with the evidence from Germany, we find that men exhibit a higher internal LOC, and that years of education, income and wealth are also positively associated with an internal LOC. Table A.5.0 provides the descriptive statistics for the Australian sample to match those for the German sample. Further, Table A5.1 displays the correlates of LOC in HILDA. The association between income and wealth and internal LOC in in Australia is slightly weaker. As for the German sample, LOC is associated with health satisfaction, yet the size of the correlation is almost double than for Germany. Consistent with the German sample, we identify small associations with risk attitudes and personality traits.

We examine the association of LOC with the decision to have a supplementary private health insurance in Australia. Results are presented in Tables 9[24] and reveal that LOC exhibits significantly positive coefficient across all models: A more internal locus is associated with SUPP uptake. Other controls exhibit the expected signs[25]. Risk attitude exhibits a significant coefficient consistent with the results for Germany.

[Insert Table 9 about here]

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[24] The extensive margin equation is estimated using a linear probability model. The results from a probit model are very similar.

[25] Wealth is positively associated with the probability of having SUPP and household size is negatively associated with the probability of SUPP. Some personality traits (openness and extraversion for Australia and emotional stability) exhibit significant coefficients

In Tables A6 and A7 in the appendix we examine the extent to which the results hold when we examine a set of different subsamples by age group and gender. The results for Australia are comparable to the ones for Germany.

We next examine in Table A8 whether the association between LOC and insurance uptake varies by type of insurance coverage. Since information on coverage is only available in 2009 and 2013 in HILDA, we re-estimate in column (1) the association between LOC and insurance uptake overall for this smaller sample. In line with results of the second panel of Table 2 for Germany, the association is positive and significant. Splitting the sample by coverage type for Australia reveals that LOC is only significantly positive associated with uptake of insurance coverage for hospitals and extra services whilst it is not significant for partial hospital or extra services alone.[26] This is somewhat in line with the German results which suggested that internals are more likely than externals to insure comprehensively. Table A10 in the appendix shows that in Australia LOC is associated with reduced number of doctor visits consistent with the theory of positive selection. Hence, we do not find strong or consistent evidence that the association between LOC and SUPP uptake could be driven by different utilizations of health care by LOC, rather it seems likely that LOC directly influences the utility value of supplementary and substitutive private health insurance. Finally, Tables A10.1 and A10.2 the extensive margin of SUPP for Australia which confers similar results as those of Germany. Namely, we find evidence of positive selection (poor health is associated with reduced insurance uptake and spending) but controlling for LOC reduces and eventually renders the effect of poor health insignificant.

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[26] Because wealth is not measured in the years that coverage type is available for Australia (2009 and 2013), we attach individual specific average wealth from the years 2002, 2006 and 2010 to this smaller sample. Table A9 in the Appendix shows that our results for Australia are robust to attaching wealth from the previously available year to the data (year 2006 wealth to the year 2009 data and wealth from the year 2010 to the year 2013 data).

9. Conclusion

Individuals update of supplementary health insurance (SUPP) differs with an individual's internal locus of control, a preference parameter influencing the extent to which they believe they control their future health care use. We document robust evidence that *individuals' LOC predicts the purchase of SUPP* in a context where statutory social insurance (Germany, a country with a large and established market for private supplementary health insurance) is available to the entire population, and in Australia subject to a similar institutional setting, where in addition, SUPP is community rated.

Second, we find that the inclusion of LOC in our specification, eliminates previous evidence of positive (health) selection into insurance. That is, the inclusion of LOC renders the effect of poor self-reported health insignificant. In examining the mechanisms that explain the role of LOC, we find that the effect of LOC is qualitatively different to risk aversion[27]. Finally, we document consistent evidence for Australia, a country which presents a similar institutional setting and where longitudinal data form both LOC and SUPP is available.

Our results are driven by an internal LOC increasing health care use, instead our results suggest that individuals with a more internal LOC are more likely to undertake preventive measures as shown in Cobb-Clark et al (2014), and therefore are more likely to be healthy and less likely to face health shocks. Thus, we find that individuals' LOC provides an explanation for advantageous selection (Cutler et al, 2008).

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[27] We find that consistently with previous studies that risk aversion increases an individual's preference for staying with the mainstream insure rather purchasing SUPP (Costa-Font and Garcia, 2009), while at the same time it is consistent with the finding that risk averse individuals are more likely to engage in preventive activities (Hemmingway, 1990).

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Our main results have important implications for policy. More specifically, individuals with a strong internal LOC are more likely to purchase SUPP, whilst those with an external LOC might need extra incentives to reach similar insurance uptake. While we cannot claim causality from our estimates, a causal interpretation of our findings would suggest that LOC exerts an independent effect of SUPP, which means that individuals will react to insurance incentives depending on their LOC. Hence, all else equal, tax exemptions, rebates, and other financial incentives to the purchase of SUPP might exhibit different effects based on an individual's LOC.

References

Antwi-Boasiako, B. A. (2017). It's beyond my control: The effect of locus of control orientation on disaster insurance adoption. *International Journal of Disaster Risk Reduction*, *22*, 297-303.

Arrow, K. J. (1963). Uncertainty and the welfare economics of medical care. *The American Economic Review*, *53*(5): 941-973.

Besley, T., Hall, J. and Preston, I. (1999). The demand for private health insurance: do waiting lists matter? *Journal of Public Economics*, 72: 155–81.

Buchmueller T.C., Fiebig, D.G., Jones, G. and E. Savage (2013). Preference heterogeneity and selection in private health insurance: The case of Australia. *Journal of Health Economics,* 32(5): 757–67.

Buddelmeyer, H., & Powdthavee, N. (2016). Can having internal locus of control insure against negative shocks? Psychological evidence from panel data. *Journal of economic behavior & organization*, *122*, 88-109.

Caliendo M., Cobb-Clark, D. and Uhlendorff, A. (2015). Locus of control and job search strategies. The *Review of Economics and Statistics*, 97(1): 88–103.

Cebi, M. (2007). Locus of control and human capital investment revisited. *Journal of Human Resources*, *42*(4): 919-932.

Chiappori, P. and Salanié, B. (2000). Testing for asymmetric information on insurance markets, *Journal of Political Economy*, 108(1): 56-78.

Chiteji, Ngina (2010). Time-preference, non-cognitive skills and well-being across the life course: Do non-cognitive skills encourage healthy behavior? *The American Economic Review* 100(2): 200.

Coleman, M. and T. DeLeire (2003). An economic model of locus of control and the human capital investment decision. *Journal of Human Resources*, *38*(3): 701-721.

Costa, J. and García, J. (2003) Demand for private health insurance: How important is the quality gap?, *Health Economics,* 12: 587–99.

Costa-Font, J., and García-Villar, J. (2009). Risk attitudes and the demand for private health insurance: the importance of 'captive preferences. *Annals of Public and Cooperative Economics*, *80*(4), 499-519.

Cobb-Clark, D.A., Kassenboehmer, S.C. and S. Schurer (2014). Healthy habits: The connection between diet, exercise, and locus of control, *Journal of Economic Behavior & Organization*, 98: 1-28.

Cobb-Clark, D.A., Kassenboehmer, S.C. and M.G. Sinning (2016). Locus of control and savings, *Journal of Banking & Finance*, 73: 113-130.

Cobb-Clark, D.A. and S. Schurer (2013). Two economists' musings on the stability of locus of control, *Economic Journal*, 123(570): F358–400.

Cutler, D.M., Finkelstein, A. and K. McGarry (2008). Preference heterogeneity and insurance markets: explaining a puzzle of insurance, *American Economic Review* 98 (2): 157–162.

de Meza, D. and D.C. Webb (2001). Advantageous selection in insurance markets. *RAND Journal of Economics* 32 (2): 249–262.

Dohmen, T, Falk, A Huffman, D and U. Sunde (2012). The intergenerational transmission of risk and trust attitudes. *Review Economic Studies*, 79(2): 645-77.

Einav, L. and Finkelstein, A. (2011). Selection in insurance markets: Theory and empirics in pictures. *The Journal of Economic Perspectives*, *25*(1): 115-138.

Einav, L, Finkelstein, A. and J. Levin (2010). Beyond testing: Empirical models of insurance markets, *Annual Review of Economics*, 2: 311–36.

Fang, H., Keane, M.P. and D. Silverman (2008). Sources of advantageous selection: Evidence from the Medigap insurance market, *Journal of Political Economy*, *116*(2): 303-350.

Finkelstein, A. and McGarry, K. (2006). Multiple dimensions of private information: Evidence from the long-term care insurance market. *American Economic Review*, 96(4): 938–58.

Flynn, K. E., & Smith, M. A. (2007). Personality and health care decision-making style. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *62*(5), P261-P267

Gabaix, X. and Laibson, D. (2006). Shrouded attributes, consumer myopia, and information suppression in competitive markets. *The Quarterly Journal of Economics*, *121*(2): 505-540.

Gruber, S. and Kiesel, M. (2010). Inequality in health care utilization in Germany? Theoretical and empirical evidence for specialist consultation, *Journal of Public Health*, 18(4): 351–365.

Grunow, M. and Nuscheler, R. (2013). Public and private health insurance in Germany: The ignored risk selection problem, *Health Economics*, 23(6), 670-687.

Hullegie, P. and Klein, T. J. (2010). The effect of private health insurance on medical care utilization and self-assessed health in Germany. *Health Economics* 19(9): 1048–1062.

Lange, R., Schiller, J., & Steinorth, P. (2017). Demand and selection effects in supplemental health insurance in Germany. *The Geneva Papers on Risk and Insurance-Issues and Practice*, *42*(1), 5-30.

Lungen, M., Stollenwerk, B., Messner, P., Lauterbach, K. W. and A. Gerber (2008).Waiting times for elective treatments according to insurance status: A randomized empirical study in Germany, *International Journal for Equity in Health* 7(1).

Loewenstein, G., Friedman, J. Y., McGill, B., Ahmad, S., Linck, S., Sinkula, S. and B.C. Madrian (2013). Consumers' misunderstanding of health insurance. *Journal of Health Economics*, *32*(5): 850-862.

Mundlak, Y. (1978). On the pooling of time-series and cross-section data. *Econometrica*, 46(1), 69–85.

Murray, E., Lo, B., Pollack, L., Donelan, K., Catania, J., White, M., ... & Turner, R. (2003). The impact of health information on the internet on the physician-patient relationship: patient perceptions. *Archives of internal medicine*, *163*(14), 1727-1734.

Pearlin, L.I. and C. Schooler (1978). The structure of coping. *Journal of Health and Social Behavior*, 19: 2–21.

Piatek, R. and P. Pinger, (2016). Maintaining (Locus of) Control? Data Combination for the Identification and Inference of Factor Structure Models. *Journal of Applied Econometrics*, 31, 734-755.

Rothschild, Michael, and J.E.. Stiglitz (1976). Equilibrium in competitive insurance markets: An essay on the economics of imperfect information, *Quarterly Journal of Economics*, 90(4): 630–49.

Rotter, J. B. (1954). Social learning and clinical psychology. Englewood Cliffs, N.J.: Prentice-Hall.

Saffer, H. (2014). Self-regulation and health, NBER Working Paper No. 20483.

Saucier, G., (1994). Mini-markers: A brief version of Goldberg's unipolar Big-Five markers. *Journal of Personality Assessment,* 63: 506–516.

Socio-Economic Panel (SOEP, 2019), data for years 1984-2017, version 34, SOEP, 2019, doi: 10.5684/soep.v34.

Schmitz, H. (2011). Direct evidence of risk aversion as a source of advantageous selection in health insurance. *Economics Letters*, *113*(2): 180-182.

Wagner, G. G., Burkhauser, R. V. and F. Behringer (1993): The English language public use file of the German socio-economic panel, *The Journal of Human Resources,* 28(2): 429-433.

Tables

Table 1. Descriptive statistics according to the measure of locus of control, Germany

	Locus of control below the median	Locus of control above the median
Private substitutive health insurance	9.1%	19.5%
Supplementary private health insurance (conditional on having no private substitutive health insurance)	13.7%	21.4%
Sex (woman=1)	55.5%	49.9%
Age	52.4	50.6
Years of education	11.4	12.7
Labour force status:		
Working	54.1%	66.4%
Unemployed	6.5%	2.8%
Other	39.3%	30.8%
Married/ partnership	75.9%	78.1%
Monthly net household income	2743	3533
#adult in the household	2.1	2.1
#children in the household	0.5	0.5
Bad/poor health	24.2%	12.6%
General risk attitudes	4.0	4.6
The Big Five:		
Extraversion	-0.169	0.169
Agreeableness	-0.100	0.100
Emotional stability	-0.323	0.323
Conscientiousness	-0.154	0.154
Openness	-0.122	0.122
Wealth:		
1st quintile	25.6%	14.4%
2nd quintile	21.4%	18.6%
3rd quintile	20.2%	19.8%
4th quintile	18.2%	21.9%
5th quintile	14.6%	25.3%
Number of observations	115,889	115,895

Note: GSOEP 1999-2016 (except 2009 and 2015). This table reports the characteristics of individuals according to their degree of internal locus of control.

Table 2. Supplementary health insurance, Germany

	Supplementary private health insurance		
	(1)	(2)	(3)
Locus of control	0.041***	0.018***	0.017***
	(0.002)	(0.002)	(0.002)
Age and sex	Yes	Yes	Yes
Education, income and Wealth	No	Yes	Yes
Labour force status	No	No	Yes
Household characteristics	No	No	Yes
Health satisfaction	No	No	Yes
Big 5	No	No	Yes
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R^2	0.060	0.105	0.116
N	198,712	198,712	198,712

Note. GSOEP 1999-2016 (except 2009 and 2015). Clustered at the individual-level. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. See Table B4 and B5 for substitutive insurance and B6 and B7 for supplementary insurance in the Appendix for full set of controls.

Table 3. Age Heterogeneity of Supplementary PHI, Germany

Age group:	Supplementary private health insurance		
	25-40	41-64	65+
	(4)	(5)	(6)
Locus of control	0.021***	0.014***	0.016***
	(0.004)	(0.003)	(0.004)
Age and sex	Yes	Yes	Yes
Education, income and Wealth	Yes	Yes	Yes
Labour force status	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes
Health satisfaction	Yes	Yes	Yes
Risk attitude	Yes	Yes	Yes
Big 5	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R^2	0.083	0.116	0.179
N	52,803	99,607	46,302

Note. GSOEP 1999-2016 (except 2009 and 2015). Clustered at the individual level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. See Table B10 and B11 in the Appendix for full set of controls.

Table 4. Heterogeneity by Gender, Germany

	Supplementary private health insurance	
	Male	Female
	(3)	(4)
Locus of control	0.016***	0.017***
	(0.003)	(0.003)
Full controls	Yes	Yes
Region fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
R^2	0.107	0.126
N	89,707	109,005

Note. GSOEP 1999-2016(except 2009 and 2015). Clustered at the individual-level. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Table B12 and B13 in the Appendix for full set of controls.

Table 5. Coverage Type of the supplementary health insurance, Germany

	Coverage of the supplementary private health insurance (1=covered; 0=not covered or no supplementary private insurance)				
	Hospital	Denture	Glasses	Abroad	Other
Locus of control	0.012***	0.009***	0.006***	0.004***	0.002***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Full controls	Yes	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.090	0.085	0.036	0.040	0.010
N	198,712	198,712	198,712	198,712	198,712

Note. GSOEP 1999-2016(except 2009 and 2015). Clustered at the individual-level. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ See Table B14 in the Appendix for full set of controls.

Table 6. Private supplementary health insurance. OLS and individual fixed effects (FE) models, Germany

	OLS		Fixed effects	
	(1)	(2)	(3)	(4)
Locus of control	0.036***	0.008***	0.007***	0.007***
	(0.002)	(0.003)	(0.003)	(0.003)
Age	Yes	Yes	Yes	Yes
Income	No	No	Yes	Yes
Labour force status	No	No	No	Yes
Household characteristics	No	No	No	Yes
Health satisfaction	No	No	No	Yes
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
R^2	0.056	0.047	0.048	0.049
Number of observations	39,794	39,794	39,794	39,794
Number of individuals	19,413	19,413	19,413	19,413

Note. GSOEP 1999, 2005, 2010, 2015. Clustered at the individual-level. LOC time-varying. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$
See Table B16 -B19 in the Appendix for full set of controls

Table 7. Health care utilisation, Germany

	Number of doctor visits per year	Hospital stays
	(1)	(2)
Locus of control	-0.048	0.0001
	(0.067)	(0.001)
Full controls	Yes	Yes
Region FE	Yes	Yes
Year FE	Yes	Yes
R^2	0.147	0.055
N	231,232	231,514

Note. GSOEP 1999-2016 (except 2009 and 2015). Clustered at the individual level. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. See Table B15 in the Appendix for full set of controls

Table 8. Locus of Control and Positive Selection GSOEP 1999-2016. Linear models: extensive margin – Germany: Private supplementary health insurance

	Supplementary private health insurance					
	(1)	(2)	(3)	(4)	(5)	(6)
Locus of control		0.040***		0.018***		0.017***
		(0.002)		(0.002)		(0.002)
Poor/bad health	-0.042***	-0.024***	-0.010***	-0.003	-0.008**	-0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Age and gender	Yes	Yes	Yes	Yes	Yes	Yes
Income, wealth and education	No	No	Yes	Yes	Yes	Yes
Employment	No	No	Yes	Yes	Yes	Yes
Household characteristics	No	No	No	No	Yes	Yes
Personality	No	No	No	No	Yes	Yes
Risk Attitudes	No	No	No	No	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.050	0.061	0.103	0.105	0.115	0.116
N	198,712	198,712	198,712	198,712	198,712	198,712

Note. Clustered (at the individual-level) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. See Table B20 in the Appendix for full set of controls

Table 9. Supplementary private health insurance, Australia

	Extensive margin		
	(1)	(2)	(3)
Locus of control	0.071***	0.016***	0.010***
	(0.0039)	(0.0035)	(0.0039)
Age and sex	Yes	Yes	Yes
Education, income and Wealth	No	Yes	Yes
Labour force status	No	No	Yes
Household characteristics	No	No	Yes
Health satisfaction	No	No	Yes
Risk attitudes (above average financial risk taking)	No	No	Yes
Big 5	No	No	Yes
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R^2	0.042	0.264	0.273
N	103,448	103,448	103,448

Note. HILDA 2005-2014. Two-way clustered at the individual and household-level. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Online Appendix A

Table A1. Descriptive statistics by ownership of private substitutive insurance and supplementary private health insurance ownership, Germany

	Private substitutive health insurance		Supplementary private health insurance	
	No	Yes	No	Yes
Locus of control	-0.071	0.427	-0.125	0.187
Sex (woman=1)	54.9%	39.6%	54.2%	58.0%
Age	51.4	52.0	51.5	50.8
Years of education	11.6	14.5	11.4	12.6
Labour force status:				
Working	58.5%	71.1%	56.4%	68.5%
Unemployed	5.4%	0.4%	6.1%	2.0%
Other	36.2%	28.4%	37.6%	29.5%
Married/ partnership	76.2%	81.7%	75.5%	79.5%
Monthly net household income	2848	4879	2695	3580
#adult in the household	2.1	2.1	2.1	2.1
#children in the household	0.5	0.5	0.5	0.5
Bad/poor health	19.4%	12.1%	20.3%	15.6%
General risk attitudes	4.26	4.79	4.20	4.54
The Big Five:				
Extraversion	-0.014	0.085	-0.036	0.090
Agreeableness	0.016	-0.097	0.026	-0.032
Emotional stability	-0.040	0.242	-0.055	0.028
Conscientiousness	0.008	-0.048	0.004	0.025
Openness	-0.037	0.224	-0.080	0.166
Wealth:				
1st quintile	22.4%	5.8%	24.6%	11.7%
2nd quintile	21.7%	9.6%	22.4%	18.3%
3rd quintile	20.7%	15.9%	20.7%	20.9%
4th quintile	19.2%	25.3%	18.7%	21.5%
5th quintile	16.0%	43.4%	13.6%	27.6%
Number of observations	198,712	33,072	164,322	34,390

Note: GSOEP 1999-2016 (except 2009 and 2015). This table reports the characteristics of individuals having and not having private health insurance (both substitutive and supplementary) in Germany.

Table A2. Correlates of locus of control, Germany

	Locus of control (standardized)				
	All years	1999	2005	2010	2015
	(1)	(2)	(3)	(4)	(5)
Sex (woman=1)	-0.022*	-0.042**	-0.046***	0.012	-0.006
	(0.011)	(0.020)	(0.016)	(0.018)	(0.019)
Age	-0.035***	0.022	-0.040**	-0.062***	-0.061***
	(0.011)	(0.024)	(0.017)	(0.019)	(0.021)
$Age^2/100$	0.041**	-0.065	0.048	0.086**	0.083**
	(0.021)	(0.048)	(0.033)	(0.037)	(0.040)
$Age^3/1000$	-0.001	0.005*	-0.001	-0.003	-0.004
	(0.001)	(0.003)	(0.002)	(0.002)	(0.002)
Years of education	0.023***	0.023***	0.025***	0.018***	0.025***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Log(household income)	0.252***	0.144***	0.236***	0.298***	0.250***
	(0.013)	(0.028)	(0.019)	(0.021)	(0.023)
Wealth:					
1st quintile	Ref.	Ref.	Ref.	Ref.	Ref.
2nd quintile	0.089***	0.084***	0.113***	0.068**	0.068**
	(0.015)	(0.029)	(0.023)	(0.027)	(0.030)
3rd quintile	0.146***	0.133***	0.175***	0.140***	0.129***
	(0.015)	(0.030)	(0.024)	(0.026)	(0.029)
4th quintile	0.171***	0.144***	0.223***	0.179***	0.114***
	(0.016)	(0.030)	(0.025)	(0.028)	(0.030)
5th quintile	0.260***	0.302***	0.320***	0.227***	0.187***
	(0.018)	(0.034)	(0.027)	(0.030)	(0.032)
Labour force status:					
Working	Ref.	Ref.	Ref.	Ref.	Ref.
Unemployed	-0.236***	-0.214***	-0.279***	-0.239***	-0.190***
	(0.024)	(0.045)	(0.038)	(0.044)	(0.058)
Other	-0.019	-0.031	-0.037	-0.029	0.020
	(0.015)	(0.029)	(0.023)	(0.027)	(0.029)
Married/ partnership	0.034**	0.130***	0.036	0.026	-0.009
	(0.015)	(0.029)	(0.022)	(0.025)	(0.026)
#adult in the household	-0.120***	-0.122***	-0.091***	-0.159***	-0.096***
	(0.008)	(0.015)	(0.011)	(0.013)	(0.015)
#children in the household	-0.012*	-0.016	0.001	-0.024**	-0.004
	(0.006)	(0.011)	(0.009)	(0.012)	(0.013)
Bad/poor health	-0.240***	-0.236***	-0.190***	-0.272***	-0.265***
	(0.013)	(0.028)	(0.020)	(0.022)	(0.024)
General risk attitudes	0.019***	0.025***	0.022***	0.011***	0.022***
	(0.002)	(0.005)	(0.004)	(0.004)	(0.004)
Extraversion	0.102***	0.060***	0.126***	0.097***	0.098***
	(0.005)	(0.010)	(0.008)	(0.009)	(0.010)

Agreeableness	0.061***	0.035***	0.090***	0.044***	0.049***
	(0.006)	(0.011)	(0.008)	(0.009)	(0.010)
Emotional stability	0.223***	0.124***	0.265***	0.219***	0.238***
	(0.005)	(0.010)	(0.008)	(0.009)	(0.010)
Conscientiousness	0.100***	0.098***	0.135***	0.087***	0.072***
	(0.006)	(0.011)	(0.009)	(0.009)	(0.010)
Openness	-0.028***	-0.020*	-0.060***	-0.011	-0.015
	(0.006)	(0.011)	(0.009)	(0.009)	(0.010)
Constant	-1.606***	-2.026***	-1.303***	-0.888***	-0.756**
	(0.186)	(0.400)	(0.304)	(0.338)	(0.378)
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	No	No	No	No
R^2	0.219	0.165	0.254	0.199	0.202
N	46,407	7,656	15,365	12,845	10,541

Note. GSOEP 1999, 2005, 2010, 2015. Clustered at the individual-level (for column (1)). *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A3. Nonlinear Locus of Control Effects. Extensive margin, Germany

	Private substitutive insurance			Private supplementary insurance		
	(1)	(2)	(3)	(4)	(5)	(6)
Deciles of Locus of Control:						
1st decile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
2nd decile	0.020***	0.003	0.003	0.031***	0.017**	0.015**
	(0.008)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)
3rd decile	0.016**	-0.010	-0.010	0.034***	0.014*	0.012
	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
4th decile	0.038***	-0.004	-0.005	0.075***	0.045***	0.042***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
5th decile	0.063***	0.009	0.005	0.070***	0.034***	0.029***
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
6th decile	0.087***	0.017**	0.013	0.089***	0.045***	0.041***
	(0.009)	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)
7th decile	0.084***	0.003	-0.004	0.095***	0.042***	0.035***
	(0.009)	(0.008)	(0.009)	(0.009)	(0.009)	(0.009)
8th decile	0.113***	0.016*	0.010	0.116***	0.056***	0.051***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
9th decile	0.148***	0.041***	0.033***	0.127***	0.061***	0.055***
	(0.010)	(0.009)	(0.009)	(0.010)	(0.009)	(0.010)
10th decile	0.192***	0.068***	0.059***	0.129***	0.057***	0.050***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Age and sex	Yes	Yes	Yes	Yes	Yes	Yes
Education, income and Wealth	No	Yes	Yes	No	Yes	Yes
Other controls	No	No	Yes	No	No	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.064	0.192	0.207	0.060	0.105	0.117
N	231,784	231,784	231,784	198,712	198,712	198,712

Note. GSOEP 1999-2016 (except 2009 and 2015). Clustered at the individual-level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
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Table A5.0. Descriptive statistics by locus of control, Australia

	Australia – HILDA 2005-2014	
	Locus of control below the median	Locus of control above the median
Sex (woman=1)	55.1%	51.8%
Age	52.12	48.61
Years of education	11.89	12.60
Labour force status:		
Working	57.4%	71.4%
Unemployed	2.6%	1.5%
Other	40.0%	27.1%
Married/ partnership	68.0%	77.3%
Monthly net household income	6441$	8114$
#adult in the household	2.141	2.150
#children in the household	0.721	0.852
Satisfaction with health	6.579	7.691
Risk attitudes (Australia: above average financial risk taking)	7.3%	10.4%
The Big Five:		
Extraversion	-0.191	0.191
Agreeableness	-0.129	0.129
Emotional stability	-0.293	0.293
Conscientiousness	-0.227	0.227
Openness	-0.053	0.053
Wealth:		
1st quintile	19.9%	12.2%
2nd quintile	19.7%	18.4%
3rd quintile	21.4%	20.4%
4th quintile	20.8%	23.0%
5th quintile	18.2%	26.0%
Number of observations	51,724	51,724

Note. HILDA 2005-2014. This table reports the characteristics of individuals according to their degree of internal locus of control in Australia.

Table A5.1 Correlates of locus of control, Australia

	All years	2005	2007	2011	2014
	(1)	(2)	(3)	(4)	(5)
Sex (woman=1)	-0.119***	-0.128***	-0.113***	-0.114***	-0.128***
	(0.015)	(0.018)	(0.0178)	(0.016)	(0.016)
Age	-0.060***	-0.068***	-0.053***	-0.070***	-0.031*
	(0.013)	(0.021)	(0.0182)	(0.016)	(0.017)
Age^2	0.0009***	0.0011***	0.0008**	0.0011***	0.0004
	(0.0003)	(0.0004)	(0.0004)	(0.0003)	(0.0003)
Age^3	-0.0001***	-0.0001***	-0.0001**	-0.0001***	-0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Years of education	0.0114***	0.0068	0.0093**	0.0093**	0.0110***
	(0.0035)	(0.0043)	(0.004)	(0.0039)	(0.0039)

Log(household income)	0.1087***	0.1459***	0.1428***	0.1030***	0.0766***
	(0.0097)	(0.0179)	(0.0174)	(0.0159)	(0.0160)
<u>Wealth:</u>					
1st quintile	Ref.	Ref.	Ref.	Ref.	Ref.
2nd quintile	0.0758***	0.0536	0.063**	0.0892***	0.0810***
	(0.025)	(0.034)	(0.030)	(0.028)	(0.028)
3rd quintile	0.0990***	0.0906***	0.0660**	0.1224***	0.1220***
	(0.0256)	(0.0339)	(0.0308)	(0.0285)	(0.0285)
4th quintile	0.1319***	0.1128***	0.1061***	0.1501***	0.1534***
	(0.0261)	(0.0353)	(0.0319)	(0.0293)	(0.0291)
5th quintile	0.1762***	0.1448***	0.1376***	0.1954***	0.2208***
	(0.0276)	(0.0385)	(0.0349)	(0.0318)	(0.0317)
<u>Labour force status:</u>					
Working	Ref.	Ref.	Ref.	Ref.	Ref.
Unemployed	-0.1374***	-0.1726**	-0.1605**	-0.1700***	-0.1068**
	(0.0257)	(0.0723)	(0.0676)	(0.0554)	(0.0509)
Other	-0.0636***	-0.0343	-0.0662***	-0.0764***	-0.0657***
	(0.0169)	(0.0267)	(0.0253)	(0.0233)	(0.0232)
Married/ partnership	0.1300***	0.0621**	0.1078***	0.1389***	0.1722***
	(0.0170)	(0.0244)	(0.0234)	(0.0214)	(0.0212)
#adult in the household	-0.0812***	-0.0965***	-0.1022***	-0.0808***	-0.0723***
	(0.0077)	(0.0128)	(0.0116)	(0.0106)	(0.0103)
#children in the household	0.0068	-0.0068	-0.0004	0.0104	0.0169**
	(0.0049)	(0.0067)	(0.0064)	(0.0067)	(0.0068)
Satisfaction with health	0.1188***	0.1288***	0.1352***	0.1204***	0.1063***
	(0.0036)	(0.0056)	(0.0052)	(0.0048)	(0.0050)
Risk attitudes (Australia: above average financial risk taking)	0.0409**	0.0902***	0.0409	0.0181	0.0153
	(0.0169)	(0.0288)	(0.0271)	(0.0273)	(0.0271)
Extraversion	0.1061***	0.0943***	0.0990***	0.1117***	0.1096***
	(0.0076)	(0.0095)	(0.0091)	(0.0082)	(0.0083)
Agreeableness	0.0218**	0.0033	0.0082	0.0285***	0.0363***
	(0.0088)	(0.0110)	(0.0105)	(0.0097)	(0.0100)
Emotional stability	0.2866***	0.3089***	0.3056***	0.2728***	0.2665***
	(0.0085)	(0.0108)	(0.0101)	(0.0094)	(0.0096)
Conscientiousness	0.1039***	0.0986***	0.0973***	0.1002***	0.1133***
	(0.0080)	(0.0101)	(0.0096)	(0.0089)	(0.0089)
Openness	0.0398***	0.0437***	0.0443***	0.0434***	0.0309***
	(0.0088)	(0.0111)	(0.0106)	(0.0095)	(0.0096)
Constant	-0.3651	-0.3645	-0.8215**	-0.1602	-0.7186**
	(0.2223)	(0.3730)	(0.3404)	(0.2969)	(0.2945)
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	No	No	No	No
R^2	0.313	0.340	0.350	0.302	0.284

N		103,448	8,352	9,128	12,023	11,981

Note. HILDA 2005-2014. Two-way clustered at the individual and household-level.
*** p<0.01, ** p<0.05, * p<0.1.

Table A6. Heterogeneity by Age Groups, Australia

Age group:	Supplementary private health insurance		
	25-40	41-64	65+
	(1)	(2)	(3)
Locus of control	0.0103	0.0085	0.0093
	(0.0063)	(0.0053)	(0.0082)
Risk attitudes (Australia: above average financial risk taking)	0.0251**	0.0291***	-0.0016
	(0.0112)	(0.0097)	(0.0218)
Age and sex	Yes	Yes	Yes
Education, income and Wealth	Yes	Yes	Yes
Labour force status	Yes	Yes	Yes
Household characteristics	Yes	Yes	Yes
Health satisfaction	Yes	Yes	Yes
Big 5	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R^2	0.195	0.234	0.267
N	32,003	50,040	21,405

Note. HILDA 2005-2014. Two-way clustered at the individual and household-level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A7. Heterogeneity by Gender, Australia

Gender:	Supplementary private health insurance	
	Male	Female
	(1)	(2)
Locus of control	0.0137**	0.0074
	(0.0059)	(0.0051)
Risk attitudes (Australia: above average financial risk taking)	0.0190**	0.0262**
	(0.0096)	(0.0112)
Full controls	Yes	Yes
Region fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
R^2	0.272	0.277
N	48,147	55,301

Note. HILDA 2005-2014. Two-way clustered at the individual and household-level. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A8. Coverage Type, Australia

	Supplementary private health insurance	Coverage of the supplementary private health insurance (1=covered; 0=not covered or no supplementary private insurance)		
		Hospital	Extras	Hospital + Extras
Locus of control	0.0113***	-0.0014	-0.0007	0.0136***
	(0.0038)	(0.0022)	(0.0016)	(0.0038)
Risk attitudes (Australia: above average financial risk taking)	0.0218**	0.0075	-0.0084**	0.0238**
	(0.0090)	(0.0064)	(0.0036)	(0.0098)
Full controls	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
R^2	0.265	0.046	0.018	0.232
N	34,401	34,305	34,305	34,305

Note. Two-way clustered at the individual and household-level. HILDA Years 2009 and 2013 as information on coverage only available in those years. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A9. Alternative Specification with wealth attached from previous years, Australia

	Supplementary private health insurance	Coverage of the supplementary private health insurance (1=covered; 0=not covered or no supplementary private insurance)		
		Hospital	Extras	Hospital + Extras
Locus of control	0.0157***	0.0001	-0.0001	0.0162***
	(0.0043)	(0.0025)	(0.0017)	(0.0043)
Risk attitudes (Australia: above average financial risk taking)	0.0785***	0.0126	-0.0123*	0.0789***
	(0.0167)	(0.0125)	(0.0069)	(0.0188)
Full controls	Yes	Yes	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
R^2	0.258	0.046	0.017	0.228
N	30,922	30,838	30,838	30,838

Note. HILDA 2005-2014.Two-way clustered at the individual and household-level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A10. Health Care Utilisation, Australia

	Number of doctor visits per year	Hospital stay
	(1)	(2)
Locus of control	-0.3540***	0.0041
	(0.0579)	(0.0076)
Full controls	Yes	Yes
Region FE	Yes	Yes
Year FE	Yes	No
R^2	0.207	0.061
N	26,002	26,055

Note. HILDA 2005-2014. Two-way clustered at the individual and household-level. Locus of control is based on individual-specific averages over 2003, 2004, 2007, 2011. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A10.1 . Locus of Control and Positive Selection HILDA 2005-2014.Linear models: extensive margin – Australia: Private supplementary health insurance

	Supplementary private health insurance					
	(1)	(2)	(3)	(4)	(5)	(6)
Loc (mean, std)		0.0616***		0.0146***		0.0089**
		(0.0041)		(0.0036)		(0.0039)
Poor/bad health	-0.174***	-0.122***	-0.031***	-0.0207**	-0.0176**	-0.0127
	(0.0082)	(0.0081)	(0.0081)	(0.0081)	(0.0082)	(0.0081)
Age and gender	Yes	Yes	Yes	Yes	Yes	Yes
Income, wealth and education	No	No	Yes	Yes	Yes	Yes
Employment	No	No	Yes	Yes	Yes	Yes
Household characteristics	No	No	No	No	Yes	Yes
Personality	No	No	No	No	Yes	Yes
Risk Attitudes	No	No	No	No	Yes	Yes
Region fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.034	0.048	0.264	0.265	0.273	0.273
N	103,448	103,448	103,448	103,448	103,448	103,448

Years 2005-2014. Big 5 personality traits measured in 2005, 2009 and 2013. Locus of control measured in 2003, 2004, 2007 and 2011. Number of children includes children aged 0-14. Regional fixed effects and year fixed effects included. Number of adults includes children older than 14. Standard errors are clustered at the individual and household level. Individual level analysis, but outcome fixed within households. Tables A11 in the Appendix provides the estimates for the entire set of controls..

Table A11. Pooled sample HILDA 2005-2014. Linear probability models: extensive margin , Australia: Prob private health insurance expenditure > 0

	Supplementary private health insurance					
	(1)	(2)	(3)	(4)	(5)	(6)
Loc (mean, std)		0.0616***		0.0146***		0.0103***
		(0.0041)		(0.0036)		(0.0039)
Poor/bad health	-0.1748***	-0.1222***	-0.0315***	-0.0207**	-0.0196**	-0.0139*
	(0.0102)	(0.0102)	(0.0083)	(0.0082)	(0.0082)	(0.0081)
Female	-0.0029	0.0010	0.0209***	0.0215***	0.0209***	0.0223***
	(0.0074)	(0.0073)	(0.0061)	(0.0061)	(0.0066)	(0.0066)
Age	0.0084	0.0119*	-0.0202***	-0.0190***	-0.0082	-0.0074
	(0.0067)	(0.0067)	(0.0059)	(0.0059)	(0.0061)	(0.0061)
Age sq.	0.0001	-0.0000	0.0004***	0.0003***	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Age cub.	-0.0000*	-0.0000	-0.0000**	-0.0000**	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Years of education			0.0297***	0.0293***	0.0269***	0.0268***
			(0.0015)	(0.0015)	(0.0016)	(0.0016)
Log (disp. monthly hh income)			0.1229***	0.1212***	0.1415***	0.1402***
			(0.0049)	(0.0049)	(0.0054)	(0.0054)
Wealth: 2nd quintile			0.1533***	0.1510***	0.1431***	0.1421***
			(0.0113)	(0.0114)	(0.0112)	(0.0113)
Wealth: 3rd quintile			0.3092***	0.3063***	0.3010***	0.2996***
			(0.0117)	(0.0117)	(0.0116)	(0.0116)
Wealth: 4th quintile			0.4066***	0.4029***	0.3988***	0.3969***
			(0.0118)	(0.0119)	(0.0118)	(0.0118)
Wealth: 5th quintile			0.4880***	0.4831***	0.4761***	0.4736***
			(0.0119)	(0.0120)	(0.0119)	(0.0120)

Unemployed					-0.0527***	-0.0511***
					(0.0116)	(0.0116)
Out of labour force					-0.0385***	-0.0376***
					(0.0074)	(0.0075)
#adults in the hh					-0.0342***	-0.0335***
					(0.0037)	(0.0037)
#children in the hh					-0.0188***	-0.0190***
					(0.0024)	(0.0024)
Above avg. fin. risk taker					0.0239***	0.0235***
					(0.0075)	(0.0075)
Extraversion (std)					0.0037	0.0025
					(0.0032)	(0.0033)
Agreeability (std)					0.0073**	0.0070*
					(0.0036)	(0.0036)
Emotional Stability (std)					-0.0020	-0.0051
					(0.0037)	(0.0038)
Conscientiousness (std)					0.0085**	0.0073**
					(0.0035)	(0.0035)
Openess (std)					-0.0043	-0.0047
					(0.0037)	(0.0037)
Constant	0.3755***	0.2824**	-0.7795***	-0.7848***	-1.0031***	-1.0114***
	(0.1131)	(0.1124)	(0.1045)	(0.1045)	(0.1097)	(0.1097)
R2	0.034	0.048	0.264	0.265	0.272	0.272
N	103,448	103,448	103,448	103,448	103,448	103,448

Years 2005-2014. Big 5 personality traits measured in 2005, 2009 and 2013. Locus of control measured in 2003, 2004, 2007 and 2011. Number of children includes children aged 0-14. Regional fixed effects and year fixed effects included. Number of adults includes children older than 14. Standard errors are clustered at the individual and household level. Individual level analysis, but outcome fixed within households.

Appendix B. Regressions with all covariates for Germany

Table B0. Private substitutive health insurance. Germany

	Substitutive health insurance- no individual fixed effects		
	Extensive margin		
	(1)	(2)	(3)
Locus of control	0.057***	0.018***	0.015***
	(0.002)	(0.002)	(0.002)
Age and sex	Yes	Yes	Yes
Education, income and Wealth	No	Yes	Yes
Labour force status	No	No	Yes
Household characteristics	No	No	Yes
Health satisfaction	No	No	Yes
Big 5	No	No	Yes
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R^2	0.062	0.190	0.206
N	231,784	231,784	231,784
	Substitutive health insurance- individual fixed effects		
	Extensive margin		
	(1)	(2)	(3)
Locus of control	0.003**	0.003**	0.002*
	(0.001)	(0.001)	(0.001)
Age	Yes	Yes	Yes
Income	No	Yes	Yes
Labour force status	No	No	Yes
Household characteristics	No	No	Yes

Health satisfaction	No	No	Yes
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Within-R^2	0.012	0.014	0.015
Number of observations	46,407	46,407	46,407
Number of individuals	22,245	22,245	22,245

Note. GSOEP 1999, 2005, 2010, 2015. Clustered at the individual-level. LOC time-varying. Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$ See Table B16 and 17 in the Appendix for full set of controls

Table B1. Descriptive statistics according to the measure of locus of control. Pooled sample GSOEP 1999-2016 - Germany

	Locus of control below the median	Locus of control above the median
Private substitutive health insurance	9.1%	19.5%
Supplementary private health insurance	13.7%	21.4%
Sex (woman=1)	55.5%	49.9%
Age	52.4	50.6
Years of education	11.4	12.7
Labour force status:		
Working	54.1%	66.4%
Unemployed	6.5%	2.8%
Other	39.3%	30.8%
Married/ partnership	75.9%	78.1%
Monthly net household income	2743	3533
#adult in the household	2.1	2.1
#children in the household	0.5	0.5
Bad/poor health	24.2%	12.6%
General risk attitudes	4.0	4.6
The Big Five:		
Extraversion	-0.169	0.169
Agreeableness	-0.100	0.100
Emotional stability	-0.323	0.323
Conscientiousness	-0.154	0.154
Openness	-0.122	0.122
Wealth:		
1st quintile	25.6%	14.4%
2nd quintile	21.4%	18.6%
3rd quintile	20.2%	19.8%
4th quintile	18.2%	21.9%
5th quintile	14.6%	25.3%
Number of observations	115,889	115,895

Note: GSOEP 1999-2016 (except 2009 and 2015). This table reports the characteristics of individuals according to their degree of internal locus of control.

Table B2. Descriptive statistics according to the ownership of private substitutive insurance and supplementary private health insurance. Pooled sample GSOEP 1999-2016 - Germany

	Private substitutive health insurance		Supplementary private health insurance	
	No	Yes	No	Yes
Locus of control	-0.071	0.427	-0.125	0.187
Sex (woman=1)	54.9%	39.6%	54.2%	58.0%
Age	51.4	52.0	51.5	50.8
Years of education	11.6	14.5	11.4	12.6
Labour force status:				
Working	58.5%	71.1%	56.4%	68.5%
Unemployed	5.4%	0.4%	6.1%	2.0%
Other	36.2%	28.4%	37.6%	29.5%
Married/ partnership	76.2%	81.7%	75.5%	79.5%
Monthly net household income	2848	4879	2695	3580
#adult in the household	2.1	2.1	2.1	2.1
#children in the household	0.5	0.5	0.5	0.5
Bad/poor health	19.4%	12.1%	20.3%	15.6%
General risk attitudes	4.26	4.79	4.20	4.54
The Big Five:				
Extraversion	-0.014	0.085	-0.036	0.090
Agreeableness	0.016	-0.097	0.026	-0.032
Emotional stability	-0.040	0.242	-0.055	0.028
Conscientiousness	0.008	-0.048	0.004	0.025
Openness	-0.037	0.224	-0.080	0.166
Wealth:				
1st quintile	22.4%	5.8%	24.6%	11.7%
2nd quintile	21.7%	9.6%	22.4%	18.3%
3rd quintile	20.7%	15.9%	20.7%	20.9%
4th quintile	19.2%	25.3%	18.7%	21.5%
5th quintile	16.0%	43.4%	13.6%	27.6%
Number of observations	198,712	33,072	164,322	34,390

Note: GSOEP 1999-2016 (except 2009 and 2015). This table reports the characteristics of individuals having and not having private health insurance (both substitutive and supplementary) in Germany.

Table B3. Pooled sample GSOEP 1999, 2005, 2010, 2015. Correlates of locus of control

	Locus of control (standardized)				
	All years	1999	2005	2010	2015
	(1)	(2)	(3)	(4)	(5)
Sex (woman=1)	-0.022*	-0.042**	-0.046***	0.012	-0.006
	(0.011)	(0.020)	(0.016)	(0.018)	(0.019)
Age	-0.035***	0.022	-0.040**	-0.062***	-0.061***
	(0.011)	(0.024)	(0.017)	(0.019)	(0.021)
Age^2/100	0.041**	-0.065	0.048	0.086**	0.083**
	(0.021)	(0.048)	(0.033)	(0.037)	(0.040)
Age^3/1000	-0.001	0.005*	-0.001	-0.003	-0.004
	(0.001)	(0.003)	(0.002)	(0.002)	(0.002)
Years of education	0.023***	0.023***	0.025***	0.018***	0.025***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
Log(household income)	0.252***	0.144***	0.236***	0.298***	0.250***
	(0.013)	(0.028)	(0.019)	(0.021)	(0.023)
Wealth:					
1st quintile	Ref.	Ref.	Ref.	Ref.	Ref.
2nd quintile	0.089***	0.084***	0.113***	0.068**	0.068**
	(0.015)	(0.029)	(0.023)	(0.027)	(0.030)
3rd quintile	0.146***	0.133***	0.175***	0.140***	0.129***
	(0.015)	(0.030)	(0.024)	(0.026)	(0.029)
4th quintile	0.171***	0.144***	0.223***	0.179***	0.114***
	(0.016)	(0.030)	(0.025)	(0.028)	(0.030)
5th quintile	0.260***	0.302***	0.320***	0.227***	0.187***
	(0.018)	(0.034)	(0.027)	(0.030)	(0.032)
Labour force status:					
Working	Ref.	Ref.	Ref.	Ref.	Ref.
Unemployed	-0.236***	-0.214***	-0.279***	-0.239***	-0.190***
	(0.024)	(0.045)	(0.038)	(0.044)	(0.058)
Other	-0.019	-0.031	-0.037	-0.029	0.020
	(0.015)	(0.029)	(0.023)	(0.027)	(0.029)
Married/ partnership	0.034**	0.130***	0.036	0.026	-0.009
	(0.015)	(0.029)	(0.022)	(0.025)	(0.026)
#adult in the household	-0.120***	-0.122***	-0.091***	-0.159***	-0.096***
	(0.008)	(0.015)	(0.011)	(0.013)	(0.015)
#children in the household	-0.012*	-0.016	0.001	-0.024**	-0.004
	(0.006)	(0.011)	(0.009)	(0.012)	(0.013)
Bad/poor health	-0.240***	-0.236***	-0.190***	-0.272***	-0.265***
	(0.013)	(0.028)	(0.020)	(0.022)	(0.024)
General risk attitudes	0.019***	0.025***	0.022***	0.011***	0.022***
	(0.002)	(0.005)	(0.004)	(0.004)	(0.004)
Extraversion	0.102***	0.060***	0.126***	0.097***	0.098***
	(0.005)	(0.010)	(0.008)	(0.009)	(0.010)

Agreeableness	0.061***	0.035***	0.090***	0.044***	0.049***
	(0.006)	(0.011)	(0.008)	(0.009)	(0.010)
Emotional stability	0.223***	0.124***	0.265***	0.219***	0.238***
	(0.005)	(0.010)	(0.008)	(0.009)	(0.010)
Conscientiousness	0.100***	0.098***	0.135***	0.087***	0.072***
	(0.006)	(0.011)	(0.009)	(0.009)	(0.010)
Openness	-0.028***	-0.020*	-0.060***	-0.011	-0.015
	(0.006)	(0.011)	(0.009)	(0.009)	(0.010)
Constant	-1.606***	-2.026***	-1.303***	-0.888***	-0.756**
	(0.186)	(0.400)	(0.304)	(0.338)	(0.378)
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	No	No	No	No
R^2	0.219	0.165	0.254	0.199	0.202
N	46,407	7,656	15,365	12,845	10,541

Note. GSOEP 1999, 2005, 2010, 2015. Clustered at the individual-level (for column (1)). *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table B4. Pooled sample GSOEP 1999-2016. Linear probability models: extensive margin – Germany: Private substitutive health insurance

	Private substitutive health insurance		
	(1)	(2)	(3)
Locus of control	0.057***	0.018***	0.015***
	(0.002)	(0.002)	(0.002)
Sex (woman=1)	-0.065***	-0.044***	-0.051***
	(0.005)	(0.004)	(0.004)
Age	0.015***	-0.012***	0.001
	(0.003)	(0.003)	(0.003)
Age^2	-0.016**	0.026***	0.003
	(0.006)	(0.006)	(0.007)
Age^3	0.000	-0.002***	-0.001
	(0.000)	(0.000)	(0.000)
Years of education		0.024***	0.021***
		(0.001)	(0.001)
Log(household income)		0.124***	0.177***
		(0.004)	(0.005)
Wealth:			
1st quintile		Ref.	Ref.
2nd quintile		-0.021***	-0.027***
		(0.004)	(0.004)
3rd quintile		-0.011**	-0.014***
		(0.005)	(0.005)
4th quintile		0.027***	0.026***
		(0.006)	(0.006)
5th quintile		0.092***	0.080***
		(0.008)	(0.008)
Labour force status :			
Working			Ref.
Unemployed			0.013***
			(0.004)
Other			0.021***
			(0.005)
Married/ partnership			-0.044***
			(0.005)
#adult in the household			-0.046***
			(0.003)
#children in the household			-0.016***
			(0.002)
Bad/poor health			-0.005
			(0.003)
General risk attitudes			0.002
			(0.001)

Extraversion			0.005**
			(0.002)
Agreeableness			0.003
			(0.002)
Emotional stability			-0.002
			(0.002)
Conscientiousness			-0.012***
			(0.002)
Openness			0.006**
			(0.002)
Constant	-0.214***	-0.993***	-1.459***
	(0.052)	(0.054)	(0.061)
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R^2	0.062	0.190	0.206
N	231,784	231,784	231,784

Note. Clustered (at the individual-level) standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B6. Pooled sample GSOEP 1999-2016. Linear probability models: extensive margin – Germany: Supplementary private health insurance

	Supplementary private health insurance		
	(1)	(2)	(3)
Locus of control	0.041***	0.018***	0.017***
	(0.002)	(0.002)	(0.002)
Sex (woman=1)	0.026***	0.036***	0.032***
	(0.004)	(0.004)	(0.004)
Age	0.001	-0.018***	-0.010***
	(0.003)	(0.003)	(0.004)
Age^2	0.006	0.038***	0.023***
	(0.007)	(0.007)	(0.007)
Age^3	-0.001**	-0.003***	-0.002***
	(0.000)	(0.000)	(0.000)
Years of education		0.012***	0.009***
		(0.001)	(0.001)
Log(household income)		0.090***	0.131***
		(0.004)	(0.005)
Wealth:			
1st quintile		Ref.	Ref.
2nd quintile		0.032***	0.023***
		(0.005)	(0.005)
3rd quintile		0.043***	0.036***
		(0.006)	(0.006)
4th quintile		0.051***	0.045***
		(0.006)	(0.006)
5th quintile		0.120***	0.106***
		(0.008)	(0.008)
Labour force status :			
Working			Ref.
Unemployed			-0.004
			(0.004)
Other			-0.015***
			(0.005)
Married/ partnership			-0.001
			(0.005)
#adult in the household			-0.050***
			(0.003)
#children in the household			-0.020***
			(0.002)
Bad/poor health			-0.005
			(0.004)
General risk attitudes			0.004***
			(0.001)

Extraversion			0.003
			(0.002)
Agreeableness			-0.003
			(0.002)
Emotional stability			-0.009***
			(0.002)
Conscientiousness			-0.007***
			(0.002)
Openness			0.012***
			(0.002)
Constant	0.045	-0.498***	-0.812***
	(0.055)	(0.059)	(0.065)
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R^2	0.060	0.105	0.116
N	198,712	198,712	198,712

Note. Clustered (at the individual-level) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table B8. Pooled sample GSOEP 1999-2016. Linear probability models: extensive margin – Germany: Private substitutive health insurance

	Private substitutive health insurance		
	(1)	(2)	(3)
Log(household income)		0.123***	0.176***
		(0.004)	(0.005)
Deciles of Locus of Control:			
1st decile	Ref.	Ref.	Ref.
2nd decile	0.020***	0.003	0.003
	(0.008)	(0.007)	(0.007)
3rd decile	0.016**	-0.010	-0.010
	(0.007)	(0.007)	(0.007)
4th decile	0.038***	-0.004	-0.005
	(0.008)	(0.008)	(0.008)
5th decile	0.063***	0.009	0.005
	(0.009)	(0.008)	(0.008)
6th decile	0.087***	0.017**	0.013
	(0.009)	(0.008)	(0.008)
7th decile	0.084***	0.003	-0.004
	(0.009)	(0.008)	(0.009)
8th decile	0.113***	0.016*	0.010
	(0.009)	(0.009)	(0.009)
9th decile	0.148***	0.041***	0.033***
	(0.010)	(0.009)	(0.009)
10th decile	0.192***	0.068***	0.059***
	(0.010)	(0.010)	(0.010)
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Control variables	Yes	Yes	Yes
R^2	0.064	0.192	0.207
N	231,784	231,784	231,784

Note. Clustered (at the individual-level) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The control variables included in columns (1), (2), and (3) are the same as in columns (1), (2), and (3) in Table a4.

Table B9. Pooled sample GSOEP 1999-2016. Linear probability models: extensive margin – Germany: Private supplementary health insurance

	Private supplementary health insurance		
	(1)	(2)	(3)
Log(household income)		0.090***	0.131***
		(0.004)	(0.005)
Deciles of Locus of Control:			
1st decile	Ref.	Ref.	Ref.
2nd decile	0.031***	0.017**	0.015**
	(0.008)	(0.007)	(0.007)
3rd decile	0.034***	0.014*	0.012
	(0.008)	(0.008)	(0.008)
4th decile	0.075***	0.045***	0.042***
	(0.008)	(0.008)	(0.008)
5th decile	0.070***	0.034***	0.029***
	(0.008)	(0.008)	(0.008)
6th decile	0.089***	0.045***	0.041***
	(0.009)	(0.009)	(0.009)
7th decile	0.095***	0.042***	0.035***
	(0.009)	(0.009)	(0.009)
8th decile	0.116***	0.056***	0.051***
	(0.009)	(0.009)	(0.009)
9th decile	0.127***	0.061***	0.055***
	(0.010)	(0.009)	(0.010)
10th decile	0.129***	0.057***	0.050***
	(0.010)	(0.010)	(0.010)
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Control variables	Yes	Yes	Yes
R^2	0.060	0.105	0.117
N	198,712	198,712	198,712

Note. Clustered (at the individual-level) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The control variables included in columns (1), (2), and (3) are the same as in columns (1), (2), and (3) in Table a6.

Table B10. Pooled sample GSOEP 1999-2016. Linear probability models: extensive margin – Germany: Private substitutive health insurance. Results by age group

	Private substitutive health insurance		
Age group:	25-39	40-64	65+
	(2)	(3)	(4)
Locus of control	0.017***	0.016***	0.009**
	(0.003)	(0.003)	(0.004)
Sex (woman=1)	-0.045***	-0.066***	-0.016**
	(0.007)	(0.006)	(0.008)
Age	-0.289***	-0.075**	0.027
	(0.059)	(0.032)	(0.100)
Age^2	0.891***	0.152**	-0.044
	(0.185)	(0.062)	(0.134)
Age^3	-0.090***	-0.010**	0.002
	(0.019)	(0.004)	(0.006)
Years of education	0.011***	0.026***	0.027***
	(0.001)	(0.001)	(0.002)
Log(household income)	0.144***	0.188***	0.179***
	(0.007)	(0.007)	(0.010)
Wealth:			
1st quintile	Ref	Ref	Ref
2nd quintile	0.001	-0.040***	-0.031***
	(0.007)	(0.006)	(0.007)
3rd quintile	0.015*	-0.024***	-0.024***
	(0.008)	(0.007)	(0.009)
4th quintile	0.046***	0.017**	0.001
	(0.012)	(0.008)	(0.009)
5th quintile	0.107***	0.069***	0.021*
	(0.016)	(0.010)	(0.012)
Labour force status :			
Working	Ref	Ref	Ref
Unemployed	-0.001	0.018***	-0.049**
	(0.005)	(0.005)	(0.022)
Other	0.025***	0.040***	-0.018
	(0.006)	(0.007)	(0.016)
Married/ partnership	-0.031***	-0.054***	-0.033***
	(0.006)	(0.007)	(0.010)
#adult in the household	-0.054***	-0.041***	-0.050***
	(0.004)	(0.003)	(0.008)
#children in the household	-0.020***	-0.019***	-0.012
	(0.003)	(0.003)	(0.016)
Bad/poor health	-0.002	-0.005	-0.007
	(0.006)	(0.004)	(0.005)
General risk attitudes	0.003	0.003*	-0.006**

	(0.002)	(0.002)	(0.002)
Extraversion	0.009***	0.008**	-0.005
	(0.003)	(0.003)	(0.004)
Agreeableness	0.005	0.001	0.006
	(0.003)	(0.003)	(0.004)
Emotional stability	-0.001	-0.003	0.000
	(0.003)	(0.003)	(0.004)
Conscientiousness	-0.014***	-0.010***	-0.011***
	(0.003)	(0.003)	(0.004)
Openness	0.001	0.004	0.010***
	(0.004)	(0.003)	(0.004)
Constant	2.023***	-0.310	-1.908
	(0.627)	(0.542)	(2.473)
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R^2	0.114	0.230	0.260
N	59,461	119,571	52,752

Note. Clustered (at the individual-level) standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B11. Pooled sample GSOEP 1999-2016. Linear probability models: extensive margin – Germany: Private supplementary health insurance. Results by age group

	Private supplementary health insurance		
Age group:	25-39	40-64	65+
	(2)	(3)	(4)
Locus of control	0.021***	0.014***	0.016***
	(0.004)	(0.003)	(0.004)
Sex (woman=1)	0.020***	0.038***	0.042***
	(0.008)	(0.006)	(0.008)
Age	-0.110	0.005	0.294**
	(0.077)	(0.041)	(0.123)
Age^2	0.366	-0.015	-0.394**
	(0.243)	(0.079)	(0.164)
Age^3	-0.039	0.001	0.017**
	(0.025)	(0.005)	(0.007)
Years of education	0.005***	0.011***	0.013***
	(0.001)	(0.001)	(0.002)
Log(household income)	0.102***	0.127***	0.172***
	(0.008)	(0.007)	(0.011)
Wealth:			
1st quintile	Ref	Ref	Ref
2nd quintile	0.049***	0.021***	-0.014*
	(0.009)	(0.007)	(0.008)
3rd quintile	0.044***	0.042***	0.008
	(0.010)	(0.008)	(0.010)
4th quintile	0.043***	0.051***	0.020*
	(0.012)	(0.008)	(0.010)
5th quintile	0.109***	0.091***	0.097***
	(0.017)	(0.010)	(0.013)
Labour force status :			
Working	Ref	Ref	Ref
Unemployed	-0.018***	-0.005	-0.061
	(0.007)	(0.006)	(0.044)
Other	-0.013*	-0.021***	-0.037**
	(0.007)	(0.006)	(0.017)
Married/ partnership	0.011	-0.013*	0.015
	(0.007)	(0.008)	(0.010)
#adult in the household	-0.048***	-0.040***	-0.081***
	(0.004)	(0.003)	(0.008)
#children in the household	-0.026***	-0.016***	-0.008
	(0.003)	(0.003)	(0.013)
Bad/poor health	-0.001	0.001	-0.008
	(0.007)	(0.005)	(0.006)
General risk attitudes	-0.001	0.002	0.009***

	(0.002)	(0.002)	(0.002)
Extraversion	0.009**	0.006*	-0.007
	(0.004)	(0.003)	(0.004)
Agreeableness	-0.007*	-0.004	0.003
	(0.004)	(0.003)	(0.004)
Emotional stability	-0.010***	-0.010***	-0.005
	(0.004)	(0.003)	(0.004)
Conscientiousness	-0.006*	-0.005	-0.012***
	(0.004)	(0.003)	(0.004)
Openness	0.004	0.009***	0.022***
	(0.004)	(0.003)	(0.004)
Constant	0.386	-0.976	-8.404***
	(0.816)	(0.689)	(3.069)
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
R^2	0.083	0.116	0.179
N	52,803	99,607	46,302

Note. Clustered (at the individual-level) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table B12. Pooled sample GSOEP 1999-2016. Linear probability models: extensive margin – Germany: Private substitutive health insurance. Results by sex

	Private substitutive health insurance	
	Men	Women
	(1)	(2)
Locus of control	0.018***	0.012***
	(0.004)	(0.003)
Age	0.015***	-0.013***
	(0.006)	(0.004)
Age^2	-0.021*	0.029***
	(0.011)	(0.008)
Age^3	0.001	-0.002***
	(0.001)	(0.000)
Years of education	0.019***	0.022***
	(0.001)	(0.001)
Log(household income)	0.205***	0.151***
	(0.007)	(0.006)
Wealth:		
1st quintile	Ref	Ref
2nd quintile	-0.030***	-0.022***
	(0.007)	(0.005)
3rd quintile	-0.012	-0.012**
	(0.008)	(0.006)
4th quintile	0.035***	0.021***
	(0.010)	(0.007)
5th quintile	0.093***	0.065***
	(0.012)	(0.010)
Labour force status :		
Working	Ref	Ref
Unemployed	0.014**	0.023***
	(0.006)	(0.005)
Other	0.010	0.033***
	(0.008)	(0.006)
Married/ partnership	-0.032***	-0.047***
	(0.008)	(0.006)
#adult in the household	-0.061***	-0.030***
	(0.004)	(0.003)
#children in the household	-0.022***	-0.013***
	(0.004)	(0.003)
Bad/poor health	-0.007	-0.003
	(0.005)	(0.004)
General risk attitudes	0.003	0.000
	(0.002)	(0.002)
Extraversion	0.005	0.005*

	(0.004)	(0.003)
Agreeableness	0.004	0.001
	(0.003)	(0.003)
Emotional stability	0.000	-0.002
	(0.004)	(0.003)
Conscientiousness	-0.014***	-0.011***
	(0.003)	(0.003)
Openness	0.015***	-0.001
	(0.004)	(0.003)
Constant	-1.894***	-1.099***
	(0.101)	(0.074)
Region fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
R^2	0.214	0.186
N	109,687	122,097

Note. Clustered (at the individual-level) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table B13. Pooled sample GSOEP 1999-2016. Linear probability models: extensive margin – Germany: Private supplementary health insurance. Results by sex

	Private supplementary health insurance	
	Men	Women
	(1)	(2)
Locus of control	0.016***	0.017***
	(0.003)	(0.003)
Age	-0.005	-0.012**
	(0.005)	(0.005)
Age^2	0.012	0.028***
	(0.010)	(0.009)
Age^3	-0.001	-0.002***
	(0.001)	(0.001)
Years of education	0.011***	0.008***
	(0.001)	(0.001)
Log(household income)	0.120***	0.141***
	(0.007)	(0.007)
Wealth:		
1st quintile	Ref	Ref
2nd quintile	0.027***	0.019***
	(0.007)	(0.007)
3rd quintile	0.025***	0.043***
	(0.008)	(0.008)
4th quintile	0.034***	0.054***
	(0.009)	(0.009)
5th quintile	0.091***	0.121***
	(0.011)	(0.012)
Labour force status :		
Working	Ref	Ref
Unemployed	0.012*	-0.020***
	(0.006)	(0.006)
Other	-0.002	-0.022***
	(0.007)	(0.006)
Married/ partnership	0.018**	-0.016**
	(0.007)	(0.007)
#adult in the household	-0.043***	-0.055***
	(0.004)	(0.004)
#children in the household	-0.020***	-0.021***
	(0.003)	(0.003)
Bad/poor health	-0.009*	-0.003
	(0.005)	(0.005)
General risk attitudes	0.003	0.004**
	(0.002)	(0.002)
Extraversion	0.003	0.003

	(0.003)	(0.003)
Agreeableness	-0.001	-0.005
	(0.003)	(0.003)
Emotional stability	-0.005	-0.013***
	(0.003)	(0.003)
Conscientiousness	-0.008**	-0.006*
	(0.003)	(0.003)
Openness	0.009***	0.014***
	(0.003)	(0.003)
Constant	-0.810***	-0.819***
	(0.097)	(0.088)
Region fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
R^2	0.107	0.126
N	89,707	109,005

Note. Clustered (at the individual-level) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table B14. Robustness Checks. Pooled sample GSOEP 1999-2016. Linear probability models- Germany

	Coverage of the supplementary private health insurance (1=covered; 0=not covered or no supplementary private insurance)				
	Hospital	Denture	Glasses	Abroad	Other
Locus of control	0.012***	0.009***	0.006***	0.004***	0.002***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Sex (woman=1)	0.019***	0.027***	0.014***	0.007***	0.002
	(0.004)	(0.004)	(0.003)	(0.003)	(0.001)
Age	-0.004	-0.008***	-0.001	-0.003	0.004***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.001)
Age^2	0.008	0.020***	0.003	0.005	-0.007***
	(0.006)	(0.006)	(0.004)	(0.004)	(0.002)
Age^3	-0.000	-0.002***	-0.000	-0.000*	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Years of education	0.006***	0.004***	0.002***	0.004***	0.000*
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Log(household income)	0.097***	0.071***	0.035***	0.049***	0.012***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.001)
Wealth:					
1st quintile	Ref.	Ref.	Ref.	Ref.	Ref.
2nd quintile	-0.004	0.027***	0.017***	0.012***	0.005***
	(0.004)	(0.004)	(0.004)	(0.003)	(0.001)
3rd quintile	0.009**	0.030***	0.019***	0.019***	0.007***
	(0.004)	(0.005)	(0.004)	(0.003)	(0.002)
4th quintile	0.027***	0.028***	0.022***	0.023***	0.005***
	(0.005)	(0.005)	(0.004)	(0.003)	(0.002)
5th quintile	0.094***	0.039***	0.019***	0.034***	0.014***
	(0.007)	(0.006)	(0.005)	(0.004)	(0.002)
Labour force status :					
Working	Ref.	Ref.	Ref.	Ref.	Ref.
Unemployed	0.019***	-0.017***	-0.011***	-0.003	-0.003**
	(0.004)	(0.004)	(0.003)	(0.002)	(0.001)
Other	0.002	-0.024***	-0.015***	-0.003	-0.004***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.001)
Married/ partnership	-0.009**	0.005	0.002	0.002	0.002
	(0.004)	(0.004)	(0.003)	(0.003)	(0.001)
#adult in the household	-0.032***	-0.030***	-0.014***	-0.017***	-0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
#children in the household	-0.011***	-0.014***	-0.006***	-0.011***	-0.004***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Bad/poor health	-0.006**	-0.003	-0.002	-0.003	0.004***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.001)
General risk attitudes	0.002**	0.002**	0.001	0.001	0.001***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)

Extraversion	0.004**	0.003	0.002	0.002*	0.001*
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Agreeableness	-0.002	-0.002	-0.001	-0.002*	-0.000
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Emotional stability	-0.006***	-0.003	-0.002	-0.001	-0.001
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Conscientiousness	-0.003	-0.003	-0.001	-0.002*	-0.001
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Openness	0.006***	0.006***	0.003**	0.002*	0.002***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Constant	-0.627***	-0.408***	-0.232***	-0.310***	-0.135***
	(0.053)	(0.053)	(0.042)	(0.037)	(0.020)
Region fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.090	0.085	0.036	0.040	0.010
N	198,712	198,712	198,712	198,712	198,712

Note. Clustered (at the individual-level) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table B15. GSOEP 1999-2016. Health care use. OLS estimations - Germany

	Number of doctor visits per year	Hospital stay
Locus of control	-0.048	0.000
	(0.067)	(0.001)
Sex (woman=1)	0.999***	0.009***
	(0.128)	(0.002)
Age	-0.239**	-0.017***
	(0.117)	(0.002)
Age^2	0.568**	0.028***
	(0.231)	(0.004)
Age^3	-0.036**	-0.001***
	(0.014)	(0.000)
Years of education	0.093***	0.001***
	(0.021)	(0.000)
Log(household income)	0.568***	-0.005**
	(0.133)	(0.002)
Wealth:		
1st quintile	Ref.	Ref.
2nd quintile	0.105	-0.006**
	(0.184)	(0.003)
3rd quintile	-0.071	-0.004
	(0.178)	(0.003)
4th quintile	-0.060	-0.001
	(0.205)	(0.003)
5th quintile	-0.623***	-0.007**
	(0.210)	(0.003)
Labour force status :		
Working	Ref.	Ref.
Unemployed	1.817***	0.013***
	(0.276)	(0.004)
Other	2.126***	0.022***
	(0.195)	(0.003)
Married/ partnership	0.823***	0.012***
	(0.148)	(0.002)
#adult in the household	-0.694***	-0.006***
	(0.069)	(0.001)
#children in the household	-0.475***	0.009***
	(0.060)	(0.001)
Bad/poor health	13.221***	0.160***
	(0.218)	(0.003)
General risk attitudes	-0.021	0.003***
	(0.037)	(0.001)
Extraversion	0.383***	0.004***
	(0.065)	(0.001)

Agreeableness	-0.104	0.001
	(0.067)	(0.001)
Emotional stability	-1.076***	-0.007***
	(0.070)	(0.001)
Conscientiousness	-0.111	-0.002
	(0.071)	(0.001)
Openness	0.257***	0.001
	(0.073)	(0.001)
Constant	5.212**	0.381***
	(2.083)	(0.035)
Region fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
R^2	0.147	0.055
N	231,232	231,514

Note. Clustered (at the individual-level) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table B16. Pooled sample GSOEP 1999, 2005, 2010, 2015. Linear probability models-Individual fixed effects models: extensive margin – Germany: Private substitutive health insurance

	Private substitutive health insurance		
	(1)	(2)	(3)
Locus of control	0.003**	0.003**	0.002*
	(0.001)	(0.001)	(0.001)
Age	0.020***	0.017***	0.019***
	(0.005)	(0.005)	(0.005)
Age^2	-0.036***	-0.030***	-0.036***
	(0.006)	(0.006)	(0.006)
Age^3	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)
Log(household income)		0.022***	0.029***
		(0.004)	(0.005)
Labour force status :			
Working			Ref.
Unemployed			-0.005
			(0.004)
Other			0.009**
			(0.004)
Married/ partnership			-0.002
			(0.006)
#adult in the household			-0.008***
			(0.002)
#children in the household			-0.003
			(0.002)
Bad/poor health			-0.003
			(0.002)
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Within-R^2	0.012	0.014	0.015
N	46,407	46,407	46,407

Note. Clustered (at the individual-level) standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B17. Pooled sample GSOEP 1999, 2005, 2010, 2015. Linear probability models-Individual fixed effects models: extensive margin – Germany: Private substitutive health insurance

	Log(Premium private substitutive health insurance)		
	(1)	(2)	(3)
Locus of control	0.011	0.011	0.012
	(0.010)	(0.010)	(0.009)
Age	0.123***	0.113***	0.090**
	(0.041)	(0.040)	(0.040)
Age^2	-0.194***	-0.176***	-0.133***
	(0.046)	(0.045)	(0.046)
Age^3	0.009***	0.008***	0.006**
	(0.003)	(0.003)	(0.003)
Log(household income)		0.072***	0.041*
		(0.022)	(0.024)
Labour force status :			
Working			Ref.
Unemployed			-0.165***
			(0.056)
Other			-0.189***
			(0.026)
Married/ partnership			0.046
			(0.032)
#adult in the household			-0.019
			(0.014)
#children in the household			0.001
			(0.014)
Bad/poor health			-0.004
			(0.020)
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Within-R^2	0.128	0.132	0.157
N	5,458	5,458	5,458

Note. Clustered (at the individual-level) standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table B18. Pooled sample GSOEP 1999, 2005, 2010, 2015. Linear probability models- Individual fixed effects models: extensive margin – Germany: Supplementary private health insurance

	Supplementary private health insurance		
	(1)	(2)	(3)
Locus of control	0.008***	0.007***	0.007***
	(0.003)	(0.003)	(0.003)
Age	-0.009	-0.013	-0.010
	(0.009)	(0.009)	(0.009)
Age^2	0.020**	0.027***	0.020*
	(0.010)	(0.010)	(0.010)
Age^3	-0.002***	-0.002***	-0.002***
	(0.001)	(0.001)	(0.001)
Log(household income)		0.030***	0.039***
		(0.007)	(0.008)
Labour force status :			
Working			Ref.
Unemployed			0.000
			(0.008)
Other			0.008
			(0.007)
Married/ partnership			0.006
			(0.009)
#adult in the household			-0.013***
			(0.004)
#children in the household			-0.005
			(0.004)
Bad/poor health			-0.008
			(0.006)
Region fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Within-R^2	0.047	0.048	0.049
N	39,794	39,794	39,794

Note. Clustered (at the individual-level) standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The question about supplementary health insurance is not asked in 2015. We impute the response from 2016.