Risk Selection in the German Public Health Insurance System*

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Abstract

The German statutory health insurance market was exposed to competition in 1996. To limit direct risk selection the regulator required open enrollment. As the risk compensation scheme, introduced in 1994, is highly incomplete, substantial incentives for risk selection exist. Due to their low contribution rates, company-based sickness funds have been able to attract a lot of new members. We analyze, using data from the German Socio-Economic Panel, the determinants of switching behavior from 1995 to 2000. There is no evidence for selection by funds. The success of the company-based sickness funds originates in incomplete risk adjustment together with the negative correlation between health status and switching costs.

Keywords: Sickness Fund Competition, Risk Selection, Switching Costs, Health Insurance Choice.

JEL classification numbers: I11, I18.

1 Introduction

About 90 per cent of the German population are insured with statutory sickness funds (in Germany the health insurance companies are called sickness funds), most of them compulsorily. Essentially free choice of sickness funds has been available since 1996. Competition among sickness funds is said to foster quality competition and thus the quality of care improves. In addition, patients may benefit from the funds becoming more responsive to their preferences and more cost conscious (Van de Ven and Van Vliet (1992, p. 24)). For equity reasons, sickness funds must not charge risk related premiums, i.e., there is community rating.[1] With community rating, sickness funds have strong incentives to select the low risks as they make profits with low risks and losses with high risks. Note that these incentives stem from regulation rather than competition (Pauly (1984)).

About 400 sickness funds are active in the market. These can be grouped into four categories: regional funds, substitute funds, company-based sickness funds (Betriebskrankenkassen, BKKs), and other funds. The BKKs historically have had a much better risk structure than all the other funds resulting in significantly lower contribution rates even after risk adjustment (carried out since 1994).[2] They gained a great many new members after free choice of funds was made available to the insured. As the contribution rates of the BKKs were, on average, well below those of all other types of funds, and as this differential further increased in the late 1990s, one might ask whether there was risk selection by BKKs.

Although there are no health care cost figures, the data of the German Socio-Economic Panel (GSOEP) is well suited to answering that question. The data set provides information on self-assessed health, which we use as a proxy for risk type, and health insurance choice. This enables us to analyze the impact of health status on individual decisions to switch between funds. Several studies have shown that healthy people are more likely to

[1] To a large extent health status is not considered to be the responsibility of the individual (see, e.g., Kifmann (2002)). Community rating can thus be seen as an insurance against premium risk, increasing efficiency from an ex ante perspective.

[2] In order to emphasize that health insurance premiums are payroll taxes we refer to them as contribution rates throughout the paper.

switch. This may - to a large extent - be due to lower *switching costs* for the healthy.[3] So even if the BKKs were able to attract the healthy, this does not necessarily point to selection by BKKs. To identify *selection by funds* there must be an additional health effect over and above switching costs.[4] Although the market outcome, namely, an increased risk differential between funds, may be rather similar, distinguishing between the different sources of risk separation is crucial for the interpretation of results and for public policy recommendations. Consider there is selection by funds. This direct negative effect of competition would prevent a regulator from allowing for more competition as market distortions would be likely to increase. In contrast, risk separation that originates in switching costs would point to an inappropriate organization of competition rather than to direct negative effects of competition. Therefore, allowing for more competition may still be beneficial. Thus, the main empirical task is to separate selection by funds from switching costs.

The empirical strategy applied here involves a recursive two-equation model focussing on five transition years from 1995 to 2000. At the first stage we estimate the self-assessed health status using an ordered probit model. In this way we obtain a continuous health index that is used as an explanatory variable at the second stage, where a multinomial logit model is fitted for switching behavior. As the BKKs seem to be the main beneficiaries of competition, we analyze BKK members and non-BKK members separately. The latter have to make a choice from three alternatives: stay with their fund, i.e. not switching at all, switch to a BKK fund, or switch to a non-BKK fund. It turns out that better health significantly reduces the probability of not switching, or, in other words, the sick are more likely to stay with their fund. The health effect for a switch to a BKK is significantly positive whereas the positive but smaller health effect for a switch within the non-BKKs is insignificant. Note that this result by itself provides no evidence for selection by BKKs as both health effects may largely reflect switching costs. We will assume that there was

[3] Strombom et al. (2002) found that the price sensitivity is much higher for younger and healthier individuals than for elderly or sick individuals.

[4] We are greatly indebted to an anonymous referee for providing this interpretation and for suggesting the empirical strategy of testing the resulting hypothesis as applied here.

no selection amongst non-BKKs so that the health effect on the probability to switch within the non-BKKs can be attributed entirely to switching costs.[5] As the two positive health effects do not differ significantly, we conclude that there is no health effect over and above switching costs, i.e., there is no evidence for selection by BKKs.

To complete the analysis we also investigate the switching behavior of the BKK members. Again, the less healthy are less likely to switch and there is no significant difference between the positive health effects on switching probabilities. We thus find clear evidence that transitions are a result of switching costs. Selection by funds seems to be a negligible problem. As the flow towards the BKKs is much larger than the flow towards the non-BKKs, the BKKs were nevertheless able to improve their risk pool. Associated distortions are best reduced by improving the risk adjustment scheme that is currently on the political agenda. There are two policy messages that come across from our analysis. First, since there is no selection by funds, there are no direct negative effects of competition. Thus, for Germany, fostering competition among sickness funds appears as a sensible public policy option. Second, good risk adjustment is important even if there is no selection by funds.

There is some literature on sickness fund competition in Germany. In their report, Lauterbach and Wille (2001) analyze whether those individuals who change their sickness fund entail lower health care costs than individuals who stay with their fund. They use micro data provided by several sickness funds and find that changers have a positive effect on profits after risk compensation is carried out. Using a different data set, Jacobs et al. (2002) also find that changers cause lower health care costs than non-changers.

Andersen and Schwarze (1999) analyze the determinants of switching a fund using, as we do, data from the German Socio-Economic Panel (GSOEP). They concentrate on 1997 and 1998. In their single equation probit model, individual health satisfaction affects the probability of switching positively and significantly. At the same time, they obtain a significant negative effect of self-assessed health on the probability of transition. As both

[5]This interpretation requires that non-BKK funds are sufficiently homogenous. Homogeneity among these and among the BKKs is assumed throughout the paper. We discuss this assumption in some detail in Section 6.3.

variables are measures of the actual health status, the overall effect of health remains unclear. Moreover, the different signs raise doubts about the appropriateness of the specification. In the more recent work of Schwarze and Andersen (2001), the effect of the contribution rate on the probability of switching is analyzed. Using 1999 and 2000 GSOEP data and matched contribution rates, they find that a higher contribution rate in 1999 significantly increases the probability of changing the sickness fund. Since contribution rate data are not available before 1999, we cannot include these in our analysis. As a proxy we use dummies for the different types of health insurance companies. For health status, the effects in Schwarze and Andersen (2001) are ambiguous and insignificant.

All papers cited above have in common that they analyze all switchers and do not distinguish between different types of switchers. The reports by Lauterbach and Wille (2001) and Jacobs et al. (2002) can thus only come up with lower average expenditures of switchers. They do not analyze switching behavior at all. This is what Andersen and Schwarze do in both of their papers applying a simple probit model. As they analyze all switchers they are unable to identify risk selection. This would require analyzing subsets of the data separately, e.g. BKKs and non-BKKs. Moreover, one needs a *reference switching group* where a multinomial procedure with at least three outcomes is needed rather than an ordinary probit model. Schut et al. (2003) consider, as we do, a multinomial logit model of health plan choice. Analyzing a different data set, they focus on price effects on switching behavior rather than risk selection and find an increasing price elasticity for the German market. This result is mirrored in our year dummies.

Nicholson et al. (2003) apply the switcher methodology to analyze risk selection in the United States. They find that people who switched to a Health Maintenance Organization (HMO) use substantially fewer medical services than they did in the period prior to switching and use less than people who stayed with a non-HMO. This is the other way round for switchers from HMOs to non-HMOs. They thus conclude that there is selection by HMOs. In our analysis the BKKs play the role of the HMOs. However, we find no evidence for selection by funds.

Our paper also contributes to the large literature on adverse selection in health care markets, e.g., Ellis (1989), Cutler and Reber (1998) and Cutler and Zeckhauser (1998).[6] Buchner and Wasem (2003, p. 30) state that "[...] large-scale empirical evidence is missing for 'anti-selection' against bad risks [...]". This is especially true for Germany, as, up to our knowledge, tests whether funds take measures to select the low risks have not been carried out so far. We fill this gap by modelling all relevant transitions between funds.

The paper is organized as follows: In Section 2 we discuss different sources of risk separation and their corresponding adverse effects. Section 3 provides some institutional background. This includes a discussion about the measures taken in Germany that aim at preventing risk separation or that are directed towards mitigating the distortions stemming from risk separation. In Section 4 the data set is introduced and descriptive statistics are shown. The empirical model, explained in Section 5, is followed by the results in Section 6. Finally, Section 7 concludes and provides some public policy recommendations.

2 Risk separation and its adverse effects

2.1 Selection by funds and switching costs

In a competitive health insurance market the separation of low risks from high risks may obtain for many different reasons. For the purpose of this study we only distinguish between two: selection by funds and transaction costs.[7]

We will say that a fund engages in risk selection when it takes measures in order to attract the low risks, to prevent the high risks from enrolling, or to 'encourage' the high risks to disenroll. As a result, risk separation may obtain. But, even without any selection activities by funds, risk separation may still occur. To see this, consider two funds L and H with identical benefits. Moreover assume that L has a better risk structure and can

[6] For an excellent overview see Cutler and Zeckhauser (2000).

[7] Based on the informational environment, selection by funds can be subdivided into adverse selection and cream skimming. As our major interest is whether, and not how, funds actively try to obtain a low risk pool, we refrain from that theoretical possibility. Moreover, the different forms of selection can hardly be identified econometrically. Note, that the two reasons we are focussing on may alternatively be labelled as *active* risk selection (selection by funds) and *passive* risk selection (transaction costs).

therefore offer a lower contribution rate. Take two members of fund H who are identical except that one is healthy and the other is sick. Both consider switching to L and they would benefit identically from lower contributions. Whether they actually switch to L depends on switching costs.[8] These are likely to be higher for sick people. The sick typically have better things to do than changing their fund, e.g. undergo treatments. Additionally, they are more likely to be bad risks. Through repeated consumption of medical services they know their current fund quite well and, for example, know how to get costs reimbursed. This information would be lost if they switched (both health care and health insurance are experience goods). Consequently, high risks are less likely to switch. If the average risk of the switchers is below the average of L members, the risk differential between the funds increases without any risk selection activities by L.

2.2 The adverse effects of risk separation

Selection by funds has adverse effects which counter the positive effects of competition. The adverse effects are numerous (see, e.g., Van de Ven and Van Vliet (1992, p. 24) and Van de Ven and Ellis (2000, pp. 774-776)): First, the chronically ill may get bad service. Sickness funds will not contract with providers with good reputation in treating chronic diseases in order to prevent attracting these bad risks. They will nevertheless enroll when this negative effect is outweighed by lower contributions. Second, inefficient funds that successfully engage in risk selection could drive efficient funds out of the market, or at least capture some of their market. Third, risk selection is itself costly. Since there are no positive welfare effects from reallocating individuals to funds this is pure waste. Fourth, in a Rothschild-Stiglitz world (Rothschild and Stiglitz (1976)), the health insurance market may be unstable and, fifth, the equilibrium, if any exists, will have inefficient coverage.

The adverse effects of risk separation that originates in switching costs are less manifold. However, the second and fourth effects mentioned above may jointly be at work. If a new sickness fund enters the market it can offer a lower contribution rate than the incumbent fund as it mainly attracts the healthy. In extreme cases the incumbent fund

[8] Buchmueller and Feldstein (1997, p. 233) also highlight the importance of transaction costs for switching decisions.

can thereby be driven out of the market even if more efficient than the entrant. By the same argument, the entrant faces the risk of being undercut by another entrant. Thus, the health insurance market may be dynamically unstable (see Breyer et al. (2003, p. 285)).

The adverse effects call for public policy measures that prevent risk selection, reduce incentives for risk selection and mitigate distortions originating in risk selection or risk separation in general. The next section includes a discussion about the measures taken in the German public health insurance system.

As already argued in the introduction, the difference in the adverse effects will translate into differences in public policy recommendations. More competition, e.g. through selective contracting, would equip funds with more selection devices. Thus, when selection by funds is detected, more competition is likely to be socially detrimental. This is not necessarily the case when risk separation originates in heterogenous switching costs. Then more competition will still be beneficial if the selection effects that may arise are moderate.

3 Institutional background

1989 can be seen as a starting point for introducing more competition into the German public health insurance market. Blue collar workers were put on par with white collar workers. They were now allowed to opt out of the statutory health insurance if a certain threshold income was exceeded and to buy private health insurance.[9] At that time, there was no free choice of sickness funds within the public health insurance system. Depending on their profession, members of the regional based funds were allowed to change to substitute funds and other funds (including guild funds, farmers' funds, the miners' fund, and the sailors' fund).[10] They were only allowed to change to a company-

[9]The information presented here and in the following is mainly taken from European Observatory on Health Care Systems, EOHCS (2000, pp. 21-37, 107-116).

[10]The Techniker Krankenkasse (technicians sickness fund), for example, was designed for technicians and engineers only.

based fund (BKK) if they were actually employed in the company the fund was designed for. As a result of this limited competition, the contribution rates of the regional funds were significantly higher than those of the BKKs and the substitute funds (see Figure 1).

[Figure 1 about here]

Sickness funds are not-for-profit organizations. They have to hold reserves of at least 2 per cent and at most 8.5 per cent of annual expenditures (Van de Ven et al. (2003, p. 89)). Within that frame, funds are free to set their contribution rates, however, these are subject to approval by the German Federal (Social) Insurance Authority (Bundesversicherungsamt). Note, that employers and employees share contributions equally.

With the Health Care Structure Act of 1993, competition in the health insurance market was intensified. All insured people were allowed to choose their sickness fund freely from 1996 onwards and to switch their fund once a year at the end of the respective year (annual open enrollment). In 1994, i.e. two years prior to competition, a risk adjustment scheme was introduced. This scheme reduces the incentives for risk selection and, additionally, should prevent sickness funds having comparative advantages over (historically) better risk structures. Moreover, stability of the health insurance market increases. Income, age, gender, sick pay claims, and incapacity to work are used in the adjustment mechanism. Income is included to offset different income structures that would otherwise introduce distortions via the pay-roll tax financing of the system. Note that income is, in contrast to the other variables mentioned, not a risk adjuster in the German system. For details about how German risk adjustment works see Buchner and Wasem (2003).

Competition and risk adjustment led to an adaptation of the contribution rates of the non-BKK funds. In 2001 the BKKs departed substantially from the average contribution rate of all other funds. Since 1993 the BKKs have, on average, the lowest contribution rates. As is shown in Table 1, competition between the sickness funds has led to a consolidation of the health insurance market. Due to mergers and market exits, the number of funds fell from 1,209 in 1991 by more than two thirds to 396 in 2001.

[Table 1 about here]

More interesting for the question addressed in this paper are the transitions from one sickness fund to another. For the sake of presentation, we only show the trend for the members of the three main types of sickness funds, namely, regional funds, substitute funds, and BKKs (see Figure 2). The regional funds continuously lost members from 1991 onwards. This trend actually started much earlier. In 1970, 52.4 per cent of the statutory insured population in Western Germany were insured by regional funds. This number dropped to 42.8 per cent in 1991 and 37.0 per cent 2001. This was due to the higher average contribution rates (see Figure 1). Members facing high contributions changed to substitute funds or BKKs when they were allowed to do so. In 1970, 22.9 per cent of West Germany's statutory insured population were insured in substitute funds. The share increased to 34.0 per cent in 1991, peaked in 1997 (37.1 per cent), and then dropped back to 33.9 per cent in 2001 (all numbers were taken from BMG, 2001, p. 345).

[Figure 2 about here]

The increase in members in BKKs, together with the drop of the average BKK contribution rate from 1998 onwards, may be interpreted as an indication of risk separation that favors the BKKs. From Figures 1 and 2 it may be concluded that the risk compensation scheme does not fully control for the different risk structures. In fact, it is well known from the literature on risk adjustment that a scheme relying only on simple demographic variables is highly incomplete (see Van de Ven and Ellis (2000) and, for the German case, Breyer and Kifmann (2001)).[11] However, even if the conclusion of risk separation in favor of the BKKs is correct, this is not necessarily due to selection by BKKs (see Section 2). Once again, the main empirical task is to separate selection by funds from transaction costs.

[11]The federal government plans to improve the scheme by including some morbidity measures in 2007. Risk adjustment is beyond the scope of this paper. The only thing we need for our interpretation is incompleteness.

As the German public health insurance market is heavily regulated, there are not many means for selection. Annual open enrollment prevents sickness funds from rejecting high risks, e.g. the chronically ill. Thus, the most straightforward way to obtain a low risk pool is not feasible. By contracting with providers with bad reputation in service and treatment for the chronically ill favorable risk selection may still be possible. However, selective contracting is pretty much restricted in the German public health insurance system.

In general, the benefit package could be a selection device. But as the standard benefit package - laid down in Social Code Book V - that all funds have to provide comprises roughly 95 per cent of services (Buchner and Wasem (2003)), selection through benefits appears as a negligible problem in Germany. It is therefore usually claimed that sickness fund competition is in terms of contribution rates rather than benefits (Lauterbach and Wille (2001, p. 29)). However, funds may, to some extent, provide better than standard care. Comparing the additional benefits for the three main types of sickness funds reveals substantial differences (see Table 2). Take, for example, health checkups and early cancer diagnosis. Roughly 25 per cent of the BKKs provide additional benefits in these fields, fields that are of more interest when actually healthy. Here only less than 10 per cent of the substitute funds and regional funds provide better than standard care. Things change when looking at benefits that are more likely to meet the preferences of the sick, e.g. chiro therapy, cancer therapy, and homeopathic medicine. The share of BKKs providing these benefits is well below those of the regional and substitute funds. These observations are in line with the hypothesis obtained from Figures 1 and 2, further motivating testing for selection by BKKs.

[Table 2 about here]

There is anecdotal evidence that funds use means other than additional benefits for selection, e.g., selective advertising, reduction of service quality, informing the high risks about the possibility of switching and delaying payments. These observations, together with incomplete risk adjustment, may be one reason why the fear of risk selection as a consequence of sickness fund competition has quite often been expressed (see, e.g., Lauterbach and Wille (2001, p. 209)), although the means for selection are scarce. Van de Ven et al. (2003, p. 89) conclude that risk selection is a problem in Germany.[12] By explicitly modelling all relevant switching decisions we are able to test whether there was selection by funds or, more precisely, whether selection efforts of funds were successful.

4 Data, sample selection, and descriptive statistics

To explore health and health insurance choice in Germany after the natural experiment in 1996 we use the German Socio-Economic Panel (GSOEP). The GSOEP is a representative longitudinal study of private households in Germany. The same private households, persons and families have been surveyed annually since 1984. This micro data panel provides extensive information on the individual characteristics needed to analyze health and health insurance choice in Germany.[13]

The empirical results presented in this study are based on the waves from 1995 to 2000. In 1998 the GSOEP was extended by the Supplementary Sample E. The Sample F was a major extension of the GSOEP in 2000. Both samples are included in our analysis. The different waves are pooled into one sample.

The two dependent variables to be explained by our empirical model are (self-assessed) health status and the switching decision. Health status, $y_1 \in \{0, 1, 2, 3, 4\}$, is of ordinal scale with 5 outcomes, where 0 is bad health and 4 is very good health. To save space we reduce the analysis of the switching behavior of BKK members to a minimum. This is justified as non-BKK members account for the vast majority of switches. For now, the second dependent variable is the switching behavior of the latter. They have to make a choice from three alternatives, $y_2 \in \{0, 1, 2\}$, where 0 indicates no switch, 1 a switch to a BKK and 2 a switch within the non-BKKs. y_2 equals 1 if an individual was enrolled

[12]In 2002 selection incentives have further been mitigated by the introduction of cost sharing via a high risk pool and disease management programs. However, both these measures are outside our period of investigation.

[13]For more information on the GSOEP see Wagner, Burkhauser and Behringer (1993) and also Projektgruppe Sozio-oekonomisches Panel (1995).

in a non-BKK in one year and in a BKK in the following year. All other switchers in this group must have switched within the non-BKKs. We can therefore use the variable 'change of health insurance' from the GSOEP. Thus y_2 equals 2 if this variable indicates a switch and the individual was not enrolled with a BKK before the switch and thereafter. The switching variable for BKK members is constructed accordingly.

As a sub-sample of these six waves of data we selected only individuals who were not privately insured. Only individuals who were members of the statutory health insurance are included, since they were the only ones who had new incentives to change to a BKK after the 1993 reform. Since family insured members have only limited freedom to choose their health insurance, they were excluded. Finally, we restricted our sample to the population aged between 25 and 54. This is done in order to exclude special incentives for individuals in the education system and for those close to retirement. For non-BKK members the sample sizes before and after selection are shown in Table 3. In this table we also show the percentage of switchers in every year, calculated from the selected sample. From 1995 to 1996, 6.5 per cent of the insured switched. This number continuously increased to 10.1 per cent in 1999 revealing the remarkable dynamics in the German system. The increase may reflect the fact that the information about the possibility of switching has spread over time. This pattern is mainly due to the increasing flow towards the BKKs. The incentives to enroll with them increased over time, i.e., the contribution rate differential increased (see Figure 1). In the transition equation, taking 1995 as the reference year, positive coefficients for the year dummies that increase over time would be expected for the switchers towards the BKKs. Explanations of the variables (Table 4) and the entire sample statistics based on the pooled selected sample (Table 5) are shown in the Appendix .

[Table 3 about here]

Since the benefits of switching may largely originate in lower contribution rates, it would be convenient to include such information in the econometric analysis.[14] However,

[14]The best measure for the benefit is probably the contribution rate differential. But, in the transition

as already mentioned in the introduction, contribution rate data is not directly available in the GSOEP. Moreover, prior to 1999 there only is information about the type of sickness fund (i.e. regional fund, substitute fund, company-based fund and other funds) but no fund can exactly be identified. Thus, matching contribution rates from another data set, as was done by Schwarze and Andersen (2001) for 1999/2000 data, is not feasible before 1999. Given this limitation of the data set, the best we can do is to include dummies for the different types of sickness funds. Note that this limitation of the data set also reduces the set of testable hypothesis before 1999. The hypothesis must be in terms of types of sickness funds. To test for selection by a subgroup of BKK funds, for example, is simply not feasible.

Figure 3 shows all transitions from 1995 to 2000. The stayers at the non-BKK funds (dashed line) have substantially lower average health (2.57) than the switchers (solid lines), where health of out switchers, i.e. switchers to BKKs, have better health (2.76) than within switchers (2.71). There seems to be a stronger health effect for out switchers, which would be in line with our hypothesis of risk selection by BKKs. However, our empirical analysis shows that there is no significant difference between the positive health effects. The hypothesis of risk selection by BKKs is thus to be rejected. The pattern for BKK members is essentially the same. Those who stay with their fund rate their health 2.58 on average which is much lower than for switchers. Note that the average health of switchers to non-BKKs is higher (2.81) than for switchers within the BKKs (2.73). This is in sharp contrast to the BKK risk selection hypothesis. But this observation gives rise to another hypothesis, namely, that non-BKKs engage in risk selection. Again, our estimation results find no significant difference between the positive health effects so that we conclude that selection by funds is not an issue in the German public health insurance market.

[Figure 3 about here]

equation, such a variable would obviously be endogenous. The contribution rate in the year prior to switching could be used as an instrument (see Schwarze and Andersen (2001)).

Figure 3 provides some additional information. First, we see that the non-BKKs lost members (284). They gained far fewer members from BKKs (156) than they lost to them (440). Second, the average risk of the non-BKK pool stayed roughly the same whereas average health of the BKK pool increased from 2.60 to 2.62. Note that the health status differential increased from .02 to .04 without any risk selection activities by funds. Thus, the selection of the healthy into the BKKs seems to be driven by transaction costs together with the asymmetry in the flows between BKKs and non-BKKs.[15]

We pooled the data and thereby consider the same individual in different years as different individuals. But, in fact, the number of switchers falls short of the numbers of switches. However, note that an individual can switch once a year at most. Merging the non-BKK sample and the BKK sample, 1134 switchers with 1548 switches can be identified for the period from 1995 to 2000. 762 individuals only switch once which amounts to roughly half of the overall switches. We neglect the issue of multiple switching in the econometric analysis for three reasons. First, individual characteristics change over time so that considering the same individual in different years as distinct individuals seems not unreasonable. Second, as we analyze the two samples separately, the issue of multiple switching becomes negligible. 431 switchers from non-BKKs to BKKs are responsible for the 440 observed switches. For the opposite direction the numbers are 151 and 156 respectively. Third, the decision to switch from a non-BKK to a BKK - which is the most important transition for our analysis - seems to be rather permanent: 359 out of 431 switchers in that direction stay with a BKK.

Finally, we want to shed some more light on the relationship between age, health and switching behavior. Consider, for example, the non-BKK members shown in Table 7 below. As already argued above, healthy people are more likely to switch. This may (to a large extent) be due to lower switching costs. A similar argument applies for age. Medical consumption increases with age. So old people are likely to be much better informed about their fund than young people. If they need advice, they might know whom to ask and how to get costs reimbursed. This information would be lost when changing the fund, creating

[15] In Table 6 in the Appendix we provide disaggregated information about the relationship between health and switching behavior.

higher switching costs for the old. As age is negatively correlated with the probability of switching and as it is one of the main determinants of health, it is not clear whether there is still an effect of health on switching behavior after controlling for age.

[Table 7 about here]

5 The empirical model

We estimate a recursive two equation system with an ordered probit model for health status at the first stage and a multinomial logit model for switching behavior at the second stage.[16] The (self-assessed) health status can take 5 values, $y_1 \in \{0, 1, 2, 3, 4\}$, where $y_1 = 0$ is bad health and $y_1 = 4$ is very good health. As the order of different health outcomes can be interpreted but the distance cannot, we fit an ordered probit model,

$$y_1^* = \alpha' x_1 + \epsilon_1. \tag{1}$$

The latent variable, y_1^*, is unobservable. Instead we observe $y_1 = j$ if $\mu_{j-1} < y_1^* \leq \mu_j$, $j = 0, ..., 4$, where $\mu_0 = 0$ is a convenient normalization. For this simple notation to be correct we have to set $\mu_{-1} = -\infty$ and $\mu_4 = \infty$. The probabilities are given by $\text{Prob}(y_1 = j|x_1) = \Phi(\mu_j - \alpha' x_1) - \Phi(\mu_{j-1} - \alpha' x_1)$, $j = 0, ..., 4$, where Φ denotes the standard normal cumulative distribution function. Estimates for the parameter vector α as well as for the threshold values μ_1, μ_2 and μ_3 are obtained by maximum likelihood. This regression yields a continuous (fitted) health index that will be used as an explanatory variable at the second stage.

The switching behavior of the non-BKK members is described by

$$y_2 = \begin{cases} 0 & \text{no switch} \\ 1 & \text{switch to BKK} \\ 2 & \text{switch to non-BKK} \end{cases} . \tag{2}$$

[16] For an excellent introduction to both models see, e.g., Wooldridge (2002, pp. 497-509)

We fit a multinomial logit model, where the probabilities are given by (Greene (1997, p. 915))

$$(3) \qquad P_j := \text{Prob}(y_2 = j | x_2, y_1^*) = \frac{\exp(\beta_j' x_2 + \gamma_j y_1^*)}{\sum_{k=0}^{2} \exp(\beta_k' x_2 + \gamma_k y_1^*)} \qquad j = 0, 1, 2.$$

Note that we consider the error terms to be uncorrelated. Unique parameterization requires a normalization and we set $\beta_0 = \gamma_0 = 0$. For identification of the model, there must be at least one variable in x_1 that is not in x_2 in order to obtain some variation for the estimation of γ_1 and γ_2. Our identifying assumption is that all objective measures of health, i.e. IMPAIR, DISAB, DOCTOR, VISITS, HOSPITAL, SICK6, SPORTS, only affect health status and do not directly affect switching behavior (see Table 4 for the explanation of variables). x_2 may contain a number of additional variables not included in x_1.

Due to the arbitrarily chosen reference category, the absolute values of the parameter estimates are meaningless. Only the differences can be interpreted. The log-odds ratios are given by

$$(4) \qquad \ln\left(\frac{P_j}{P_k}\right) = x_2'(\beta_j - \beta_k) + \widehat{y}_1(\gamma_j - \gamma_k),$$

where $\widehat{y}_1$ denotes the fitted value of y_1^*. Nevertheless interpretation remains difficult. Things get easier when looking at the marginal effects. Define $\widetilde{\beta}' := (\beta' \mid \gamma)$ and $\widetilde{x}_2 := (x_2 \mid \widehat{y}_1)$, then the marginal effect of the attributes are given by (see, e.g., Ronning (1991, p. 42))

$$(5) \qquad \frac{\partial P_j}{\partial \widetilde{x}_{2l}} = P_j \left(\widetilde{\beta}_{jl} - \sum_{k=0}^{2} P_k \widetilde{\beta}_{kl} \right).$$

Note that we use the 'standard' marginal effects of the multinomial logit model. We thus consider $\partial \widehat{y}_1 / \partial x_2 = 0$. Estimation is by maximum likelihood yielding consistency.

Let δ_j denote the marginal *health* effect on the probability that a non-BKK member chooses action $j = 0, 1, 2$, i.e. $\delta_j = \partial P_j / \partial \widehat{y}_1$. The marginal *health* effects for BKK members are η_j. Note that for BKK members $y_2 = 1$ also denotes an "out-switch", i.e. a switch to a non-BKK. Then risk selection activities of BKKs are detected if $\delta_1 > \delta_2$ or $\eta_2 > \eta_1$.

The main advantage of our two equations approach is the following: there is only one health variable to interpret in the second equation. One could estimate, and we do, a single equation model with all health care utilization variables in the switching equation as well as some health dummies. Then there would be 10 'health effects' and comparison across choices would require that the health effects of one choice dominate all the others. As can be seen from our estimates, this is clearly not the case (see Table 8 in the Appendix). There are simply too many dimensions. We reduce dimensions to 1 by using the health index obtained from an ordered probit regression. Note that we nevertheless use all the information available although the number of dimensions is dramatically reduced. Moreover, as already argued above, this strategy helps to identify the health effect in the transition equation.

In principle, our first stage estimates can suffer from a simultaneity bias if health status and the objective measures of health or health care utilization are determined at the same time. We are optimistic that this is not the case. Self-assessed health status measures health at present. At present in absolute terms means in February/March of the respective year (interviewers are in the field in that period of time). As can be seen from Table 4, the health care utilization measures, i.e., VISITS, DOCTOR, HOSPITAL, and SICK6, measure utilization within the last three months or, even further in the past, during the last year. So health status may be seen as the outcome of these variables.[17] It may indeed be the case that an individual is referred to a hospital due to his poor health status and that individual health is improved by hospital treatment. However, this is not the focus of the paper as transitory health effects are measured. When analyzing risk selection the permanent component of health status is of particular interest. An individual with a hospital stay in the year prior to the interview may still have, and, as our analysis shows, does have a lower health status. We do not see any reason why simultaneity should be a problem with IMPAIR and DISAB. We admit that this is less clear with SPORTS as poor health may prevent people from doing sport at all. We nevertheless included it in our analysis as active sport can also be interpreted from the health production perspective

[17] Analyzing GSOEP data, Pohlmeier and Ulrich (1992) also use health care utilization measures as explanatory variables for individual health.

(Grossman (1972)).

The health status variable itself requires some more discussion. On the one hand, we consider health to be exogenous in the transition equation. This seems plausible since health status is measured more than 6 months prior to the switching decision. Endogeneity would require some unobservable variables that influence health and are somehow related to switching behavior. We do not see any variable that is linked to both.[18] On the other hand, and maybe more seriously, there is the potential measurement error of health. As nothing is known about the reliability of self-assessed health in the GSOEP we neglect that problem.

6 Results

Before interpreting the outcome of the recursive model, let us briefly examine the single equation results for non-BKK members where a multinomial logit model is fitted with 10 health related explanatory variables and a number of controls. The marginal effects, shown in the Appendix (Table 8), reveal that it is impossible to figure out a clear health effect. At first glance, it seems as if the effect of health on within switchers ($y_2 = 2$) is larger than for the out switchers ($y_1 = 2$): the marginal effects are higher for all health dummies.[19] However, it is the other way round for the health care utilization measures DOCTOR, VISITS, and HOSPITAL as well as for the more permanent health characteristics IMPAIR and DISAB. SICK6 goes, like the health dummies, in the opposite direction.[20] The mixed picture motivates our recursive approach that enables us to overcome that dimensionality problem.

[18] Foster (1997) demonstrated for a binary logistic regression that the results of the 'Pseudo Instrumental Variable' estimator that we use and the Generalized Methods of Moments estimator only differ little even if there is a substantial endogeneity problem.

[19] We use HEALTH0 and HEALTH1 as reference category. As there is only 1 per cent with health status 0, significance is lost when using HEALTH0 only.

[20] As DISAB and SICK6 are risk adjusters they are of little importance for risk selection distortions. Individuals are eligible for sick pay after 6 weeks of sickness. Before that the employer is obliged to pay the salary.

6.1 Health status

As we can see from Table 9, all measures of health care utilization, i.e. DOCTOR, VISITS, HOSPITAL, and SICK6, have the expected negative sign. They all are significantly negatively correlated with health. This also applies to the variables approximating the sickness history of an individual, IMPAIR and DISAB.

[Table 9 about here]

Doing active sport (SPORTS) and the log of net income (LNNET) are means of health production.[21] Actively doing sport significantly increases health. As already mentioned above, there could be the reverse causality. The effect of net income on health is positive measuring, although insignificant, the impact of improved access to economic resources of health production.

The positive sign of education (EDU), measured in years spent in the education system, points to the complementarity between education and health. Its insignificance may stem from the positive correlation with income: education is a major determinant of wage earning ability.

Insured of non-German nationality (FOREIGN) significantly rate their health better than Germans, while gender (FEMALE) has no significant effect. Of course, one of the most important determinants of individual health is AGE. The elderly report a significantly lower health status. This points to the difficulty of disentangling health from age effects in the transition equation (see also Table 7).

Being unemployed (UMEMPL) has a negative impact on health status. The link may be indirect: all other things equal, the life satisfaction of unemployed people is much lower than that of the employed (Frey and Stutzer (2002)). This may feedback into actual health or at least into the self-rating of it. Unemployment plays a minor role among BKK members (see Table 5), so, not surprisingly, this effect is insignificant. Like with active

[21] We have excluded LNNET from the single equation multinomial logit specification because of its strong correlation with LNGROSS.

sports, there may be the reverse causality. However, we do not follow this route and simply include this variable as a control. White collar employees (WHITEC) are found to be significantly healthier on average. This seems plausible as their jobs are typically physically less demanding. Again, significance is lacking for BKK members.

Finally, we included YEAR dummies in the regression in order to control for variation over time. For non-BKK members average health in all subsequent years is significantly higher than in 1995. No significant effects obtain for BKK members.

6.2 Switching behavior of non-BKK members

Using the fitted health index from the ordered probit regression we obtain the parameter estimates of the multinomial logit model. There is only one health variable left, namely, the fitted health index Y1F. It is tempting to simply compare the size of the estimated coefficient, but this would be misleading as the health effect does not only depend on this single coefficient (see equation (5)). For interpretation we will thus focus on the marginal effects shown in Table 10 below.

[Table 10 about here]

A marginal increase in the health index significantly reduces the probability of not switching, i.e., the sick are less likely to switch. As already argued above, sick people (bad risks) simply have higher switching costs. There is no significant health effect on the probability of switching within the non-BKK funds ($y_2 = 2$). In contrast, better health significantly increases the probability of switching to a BKK ($y_2 = 1$). Comparing these types of switchers thus reveals a difference: there is a health effect on top of transaction costs for out switchers.[22] We find $\delta_1 > \delta_2$ and thus some evidence for risk selection by BKKs. Before drafting policy recommendations we have to test whether this difference is actually significant. When rerunning estimates with switchers to non-BKKs as reference category it turns out that the difference in health effects is insignificant. Thus, for the non-BKK sample we find no evidence for selection by BKKs.

[22]The p-values of the marginal health effects are .055, .086, and .278, respectively.

White collar workers, WHITEC, are more likely to switch and, if they switch, they are more likely than others to enroll with a BKK. Potentially there are some financial incentives operating in the background. White collar workers are more likely to be employed by large companies. As employers pay half of the contribution, there might be some employer pressure to switch to a 'cheaper' fund. Unfortunately the data on firm size is very incomplete and prevents us from including it as an explanatory variable.[23]

All other things equal (especially income), FULLTIME employed are significantly more likely to switch. As there are no special financial incentives, this might reflect better access to information. If they switch, non-BKK funds are the main beneficiaries.

As unemployment insurance pays contributions, there are no financial incentives for the unemployed to switch. Consequently, a lower propensity to switch results. However, the model yields no significant effects. Insured enrolled with a substitute fund (SUBST), or with other funds (OTHER), are more likely to switch than regional fund members. As the contribution rates of the regional funds are, on average, the highest the negative signs, although not significant, are surprising. Members of the regional funds should have stronger financial incentives to switch. This may indeed be the case, but it appears as if our dummies are improper approximations of actual contribution rates. That may be due to the large variation of contribution rates within sickness fund types. However, if a switch occurs, regional fund members are less likely to switch to a BKK. Switching activity within the non-BKK funds follows no pattern.

FOREIGN controls for the systematic difference between individuals of German nationality and non-German nationality. Being German increases the probability of switching. This can mainly be attributed to the much lower tendency of non-Germans to switch within the non-BKK funds. Household size has no effect on switching behavior as single households do not significantly differ from NOSINGLE households.

The following two variables, FEMALE and AGE, are of little interest from the risk selection perspective as they are risk adjusters in the German scheme. However, they offer some valuable insights. First, gender has no significant effect on switching behavior.

[23]Comparing the parameter estimates of the single equation approach with the outcome of the recursive model reveals only small differences, i.e. results are robust.

Second, the probability of switching significantly decreases with AGE. A ten years increase in age lowers the probability of switching by .02. As already argued above, transaction costs are higher for the elderly. The age effect is about twice as high for within switchers than for out switchers, pointing to the relative appeal of BKKs. Note that we obtain a significant health effect although we control for age which is one of the major determinants of health.

Higher education, measured in years spent in the education system, EDU, significantly increases the probability switching. A three years increase in education increases the probability of switching by .01.[24] A marginal increase in gross income (LNGROSS) significantly increases the probability of switching to a BKK, pointing to the financial incentives of doing so (contributions are payroll taxes).

Finally, as already anticipated from Table 3, the switching dynamics have significantly increased over time. This pattern is mainly due the increasing flow towards the BKKs. Recall that the contribution rate differential increased from 1998 onwards, i.e., BKKs became more and more financially attractive, while there was an adaptation of contribution rates of all other types of funds (see Figure 1).[25]

6.3 Switching behavior of BKK members

Although there is no evidence for selection by funds when considering the non-BKK sample, it is theoretically possible that there is evidence for it when looking at the BKK sample. A complete analysis thus requires also analyzing these. The marginal effects are given in Table 11 in the Appendix.

Our hypothesis of selection by BKKs can clearly be rejected as $\eta_1 > \eta_2$. Again, the difference is not significantly different from 0. Together with our result from the previous subsection we can conclude that there is no indication of any selection activities in the German public health insurance system. As already mentioned above, this interpretation relies on our homogeneity assumption. It may well be that there are some BKKs as well

[24]In Germany compulsory education is 10 years. In general 13 years are required for a school leaving examination (Abitur). So this simulation approximates the impact of different school leaving certificates.

[25]Schut et al. (2003) found increasing price elasticities over time.

as some non-BKKs actively trying to select the low risks. If this were true, then our conclusion would be that BKKs and non-BKKs are, on average, equally successful in risk selection. However, given the development of members and contribution rates and the limitations of the data set described above, directing attention to BKKs and non-BKKs rather than to other subgroups of funds is obvious and without reasonable alternatives. Moreover, note that we found no evidence for selection by funds where it was - following the aggregate data shown in Figures 1 and 2 - most likely that it would be found.

Only the following three variables require some further discussion: UNEMPL, AGE, and LNGROSS. People who become unemployed may somehow be forced to leave the BKK of their employer. Being unemployed thus reduces the probability of staying. The flow is mainly directed towards the non-BKKs. Age is a rather unimportant determinant of switching behavior. The income effects are much more pronounced than for non-BKK members. BKK members may be more aware of the financial benefits of being enrolled with a BKK. As BKK members have a higher propensity to switch (see Table 5), it could also be argued that they are, in general, better informed about the health care market than non-BKK members. Finally, there is no time pattern in switching behavior. The important dynamics of competition are in the switches from non-BKK members towards the BKKs.

7 Conclusion and policy recommendations

After the natural experiment in 1996, switching dynamics in the German statutory health insurance system have been on the increase. The company-based sickness funds (BKKs) were the main beneficiaries of these dynamics. This is likely to be due to the noticeably lower contribution rates, even after risk adjustment. The increasing contribution rate differential from 1998 onwards, together with the different (additional) benefits packages of the BKKs, gives rise to the conjecture that BKKs were actively and successfully engaged in risk selection.

Using 1995 to 2000 GSOEP data, we tested this hypothesis by analyzing switches within and between non-BKKs and BKKs. We set up a recursive model and estimated the self-assessed health status by an ordered probit model at the first stage and fitted a multinomial logit model for health plan choice at the second stage. This procedure enabled us, first, to come up with a single health coefficient that can easily be compared across switching types, and, second, to disentangle switching costs and selection by funds.

We found that better health significantly increases the probability of switching. Sick people simply have higher switching costs. There is no significant difference in the (positive) health effects on switching behavior. As this is true for both samples, non-BKK members and BKK members, there is no indication of any (successful) risk selection activities in the German public health insurance market. Although there is anecdotal evidence for selection activities like, for example, selective advertising and the observed differences in additional benefits, we found no evidence that these were actually successful.

Nevertheless risk separation in favor of the BKKs obtained. This originates in the historically better risk structures of BKKs, together with incomplete risk adjustment. Since low risk consumers are - due to lower switching costs - more likely to switch, the resulting flow towards the BKKs improved their pool. Public policy should thus be directed towards mitigating comparative advantages stemming from this asymmetry, i.e. an improvement of the risk adjustment mechanism is required. The planned consideration of morbidity measures as risk adjusters from 2007 onwards goes in that direction. As additional risk adjusters Breyer et al. (2003) suggest income, family status and a dummy for the last year of life. Note that good risk adjustment is necessary even in the absence of selection by funds.

Since there is no evidence for selection by funds, fostering competition in the German public health insurance market is a sensible policy recommendation. The regulator could, for example, allow for more variation in benefits, for deductibles and for selective contracting. Efficiency of the system may increase and funds would be enabled to be more responsive to consumer preferences. But more competition also involves a risk. It may well be that there was no selection by funds because the means for risk selection were rather limited. More competition would now give funds more selection devices. However, for moderate selection effects more competition would still be socially desirable. Again, good risk adjustment would mitigate the distortions that may arise.

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Appendix

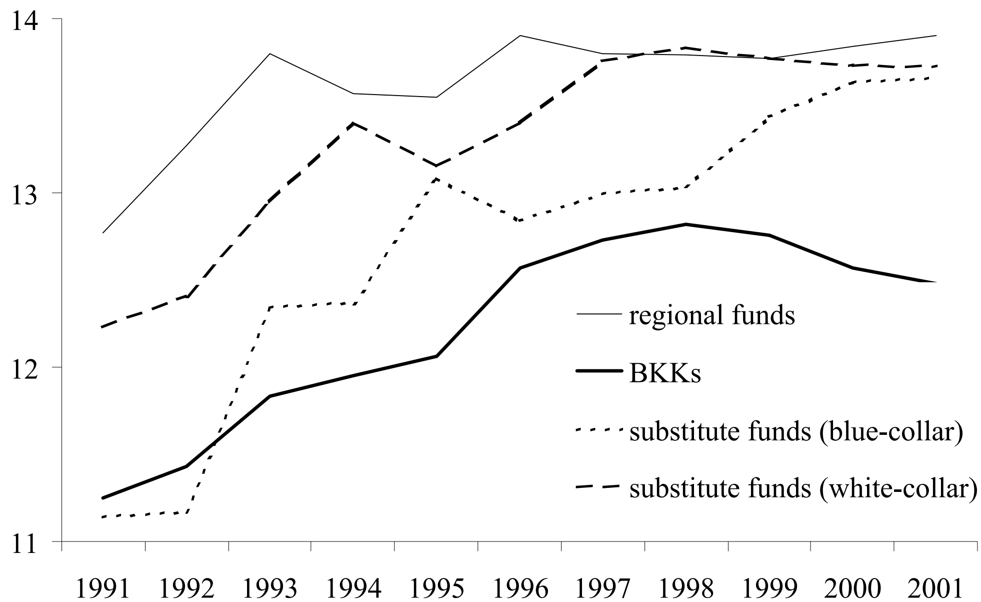

Figure 1: Percentage contribution rate averages for the different types of sickness funds. Source: BMG (2001, p. 396).

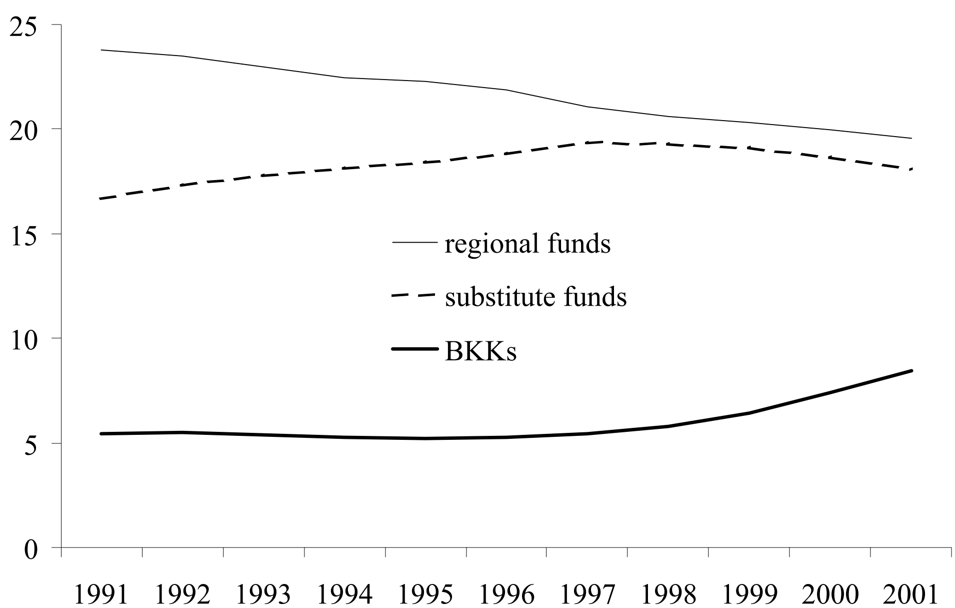

Figure 2: Members in 1,000,000 (without their dependants) of the different types of sickness funds. Source: BMG (2001, p. 344).

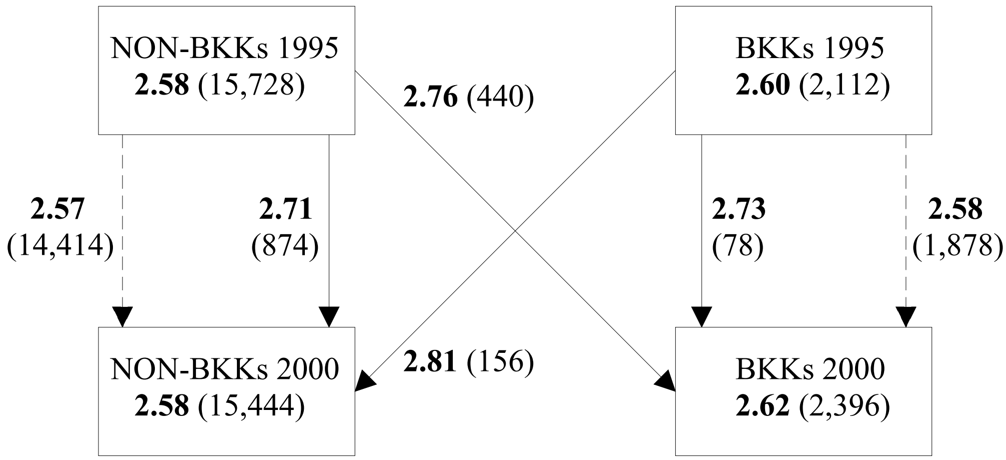

Figure 3: The market after 5 years of transition activity. Source: GSOEP 1995-2000, own calculations. Dashed lines denote non-switchers, solid lines switchers. Bold numbers show average health status, numbers in brackets N.

year	**overall**	**regional funds**	**company-based funds**	**substitute funds**
1991	1,209	276	721	15
1992	1,223	271	741	15
1993	1,221	269	744	15
1994	1,152	235	719	15
1995	960	92	690	15
1996	642	20	532	15
1997	554	18	457	14
1998	482	18	386	13
1999	455	17	361	13
2000	420	17	337	12
2001	396	17	318	12

Table 1: Number of active sickness funds in the German statutory health insurance market, other funds are omitted. Source: BMG (2001, p. 342).

Benefit	**Percentage of funds providing the benefit**		
	regional funds	**substitute funds**	**BKKs**
Acupuncture	18.18	16.67	20.79
Anthroposophic medicine	72.73	50.00	12.50
Chiro therapy	90.91	83.33	33.33
Autohemotherapy	9.09	33.33	3.16
Homeopathic medicine	70.00	83.33	25.51
Cancer therapy	63.64	50.00	13.98
Phytotherapy	81.82	63.64	9.68
Oxygen therapy	20.00	25.00	2.11
Naturopathy	75.00	41.67	22.58
Health checkups	9.09	8.33	25.49
Early cancer diagnosis	0.00	8.33	24.51
Health seminars	72.73	36.36	47.37
Logopedia	100.00	63.64	32.35
Nutrition consultancy	90.91	41.67	12.24
Yoga/meditation	30.00	33.33	12.24
N	11 (of 17)	12 (of 12)	103 (of 318)

Table 2: Additional benefits (or better than standard benefits) provided by sickness funds in per cent of funds that generally provide it. Source: AFW Dienstleitungsgesellschaft, April 2002, own calculations.

year	**N full sample**	**N after selection**	**Percentage of switchers**		
			to BKK	**to non-BKK**	**overall**
1995	13,768	1,713	1.23	5.31	6.54
1996	13,511	3,571	1.96	5.15	7.11
1997	13,283	3,431	2.80	4.93	7.72
1998	14,670	3,463	3.03	6.32	9.36
1999	14,085	3,550	4.17	5.94	10.11
overall	69,317	15,728	2.80	5.56	8.35

Table 3: Sample selection and the percentage of changers, non-BKK members. Source: GSOEP 1995-2000, own calculations.

Variable	Explanation
HEALTH	self-assessed health status, 0 = bad, 1 = not so good,
	2 = satisfactory, 3 = good, 4 = very good
SWITCH (non-BKK)	0 = no switch, 1 = switch to a BKK, 2 = switch to a non-BKK
SWITCH (BKK)	0 = no switch, 1 = switch to a non-BKK, 2 = switch to a BKK
LNNET	natural logarithm of net income
LNGROSS	natural logarithm of gross income
EDU	years in the education system
AGE	age in years
VISITS	number of visits to doctors during the last three months
dummy variables:	
HEALTHX	1 = health status is X=0,...,4, HEALTH0*, HEALTH1*
SUBST	1 = membership in a substitute fund
OTHER	1 = membership in other funds
REGIONAL*	1 = membership in a regional fund
FULLTIME	1 = full time employed
LESSTIME*	1 = short working hours, part time contract, maternity leave,...
NOSINGLE	1 = no single household
YEARXX	1 = year 19XX, YEAR95*
DISAB	1 = disability or incapacity to work
WHITEC	1 = white collar employee
UNEMPL	1 = unemployed
FEMALE	1 = female
FOREIGN	1 = non-German nationality
IMPAIR	1 = health status prevents from completing everyday tasks
DOCTOR	1 = at least one visit to a doctor during the last three months
HOSPITAL	1 = hospital stay during the last year
SICK6	1 = work disability for longer than 6 weeks during the last year
SPORTS	1 = active sport at least once a month

Table 4: Explanations of variables. Note: * indicates that the variable is a reference category in our estimation.

	non-BKK members		BKK members	
Variable	**Mean**	**SD**	**Mean**	**SD**
HEALTH	2.5846	.8143	2.6013	.8351
SWITCH = 1	.0280	–	.0739	–
SWITCH = 2	.0556	–	.0369	–
LNNET	7.7008	.4843	7.8975	.4233
LNGROSS	8.1380	.5021	8.3385	.4244
EDU	11.8831	2.4412	11.7083	2.4138
AGE	38.4865	8.1378	38.5223	8.0558
VISITS	2.0167	3.4027	2.1832	4.0595
HEALTH0	.0114	.1064	.0118	.1082
HEALTH1	.0837	.2770	.0862	.2807
HEALTH2	.3057	.4607	.2978	.4574
HEALTH3	.5071	.5000	.4972	.5001
HEALTH4	.0921	.2891	.1070	.3092
SUBST	.4796	.4996	.0000	.0000
OTHER	.0988	.2984	.0000	.0000
FULLTIME	.8361	.3701	.9096	.2869
NOSINGLE	.6804	.4663	.6908	.4623
YEAR95	.1089	.3115	.1051	.3068
YEAR96	.2270	.4189	.1965	.3974
YEAR97	.2181	.4130	.2012	.4010
YEAR98	.2202	.4143	.2386	.4264
YEAR99	.2257	.4181	.2585	.4379
DISAB	.0451	.2075	.0559	.2297
WHITEC	.5238	.4995	.4446	.4970
UNEMPL	.0598	.2372	.0199	.1396
FEMALE	.4512	.4976	.3101	.4627
FOREIGN	.1307	.3371	.1544	.3614
IMPAIR	.2528	.4346	.2472	.4315
DOCTOR	.6285	.4832	.6383	.4806
HOSPITAL	.0828	.2556	.0715	.2577
SICK6	.0408	.1977	.0417	.1999
SPORTS	.3384	.4732	.3561	.4789
observations	15,728		2,112	

Table 5: Sample statistics. Source: GSOEP 1995-2000, own calculations.

Non-BKK members

Health status	Full sample			Stayers			Switch within (switch to non-BKK)			Switch out (switch to BKK)		
	N	**(%)**	**Perc.**	**N**	**(%)**	**Perc.**	**N**	**(%)**	**Perc.**	**N**	**(%)**	**Perc.**
0 (bad)	180	(1.000)	.0114	168	(.933)	.0117	7	(.039)	.0080	5	(.028)	.0114
1 (not so good)	1,317	(1.000)	.0837	1,273	(.967)	.0883	29	(.022)	.0332	15	(.011)	.0341
2 (satisfactory)	4,808	(1.000)	.3057	4,435	(.922)	.3077	262	(.054)	.2998	111	(.023)	.2523
3 (good)	7,975	(1.000)	.5071	7,225	(.906)	.5012	490	(.061)	.5606	260	(.033)	.5909
4 (very good)	1,448	(1.000)	.0921	1,313	(.907)	.0911	86	(.059)	.0984	49	(.034)	.1114
All	15,728	(1.000)	1.0000	14,414	(.916)	1.0000	874	(.056)	1.0000	440	(.028)	1.0000
Average health			2.58			2.57			2.71			2.76

BKK members

Health status	Full sample			Stayers			Switch within (switch to BKK)			Switch out (switch to non-BKK)		
	N	**(%)**	**Perc.**	**N**	**(%)**	**Perc.**	**N**	**(%)**	**Perc.**	**N**	**(%)**	**Perc.**
0 (bad)	25	(1.000)	.0118	19	(.760)	.0101	1	(.040)	.0128	5	(.200)	.0321
1 (not so good)	182	(1.000)	.0862	169	(.929)	.0900	5	(.027)	.0641	8	(.044)	.0513
2 (satisfactory)	629	(1.000)	.2978	582	(.925)	.3099	16	(.025)	.2051	31	(.049)	.1987
3 (good)	1,050	(1.000)	.4972	922	(.878)	.4909	48	(.046)	.6154	80	(.076)	.5128
4 (very good)	226	(1.000)	.1070	186	(.823)	.0990	8	(.035)	.1026	32	(.142)	.2051
All	2,112	(1.000)	1.0000	1,878	(.889)	1.0000	78	(.037)	1.0000	156	(.074)	1.0000
Average health			2.60			2.58			2.73			2.81

Table 6: Health status and switching behavior. Source: GSOEP 1995-2000, own calculations.

Age	N	Average health	Percentage of			Average health of		
			Stayers	Withins	Outs	Stayers	Withins	Outs
25–29	2,609	2.90	88.77	7.24	3.99	2.89	2.97	2.92
30–34	3,139	2.72	90.38	6.12	3.50	2.71	2.77	2.85
35–39	3,070	2.62	90.68	6.78	2.54	2.62	2.70	2.74
40–44	2,626	2.48	92.84	4.84	2.32	2.47	2.55	2.62
45–49	2,452	2.37	93.76	4.24	2.00	2.35	2.47	2.71
50–54	1,832	2.27	94.98	2.95	2.07	2.27	2.44	2.34
overall	15,728	2.58	91.65	5.56	2.80	2.57	2.71	2.76

Table 7: Age, health status and switching decisions of non-BKK members. Source: GSOEP 1995-2000, own calculations. Notes: "Within" stands for switchers within the non-BKKs and "Outs" for switchers to BKKs.

	Prob($y_2 = 0$) (no switch)		Prob($y_2 = 1$) (switch to BKK)		Prob($y_2 = 2$) (switch to non-BKK)	
Variable	**Coeff.**	**s.e.**	**Coeff.**	**s.e.**	**Coeff.**	**s.e.**
Constant	2.9879***	.4248	−1.6674***	.2888	−1.3205***	.3569
HEALTH2	−.4896***	.1025	.1131*	.0597	.3765***	.0928
HEALTH3	−.5771***	.1067	.1631***	.0629	.4140***	.0970
HEALTH4	−.5258***	.1229	.1524**	.0708	.3734***	.1093
IMPAIR	−.0097	.0581	−.0027	.0341	.0125	.0480
DISAB	−.1538	.1017	.0324	.0594	.1214	.0845
DOCTOR	−.0443	.0465	.0024	.0263	.0419	.0391
VISITS	−.0111	.0071	−.0001	.0045	.0112**	.0056
HOSPITAL	−.0121	.0783	−.0403	.0473	.0524	.0641
SICK6	.2355*	.1359	.1110*	.0583	−.3466***	.1288
SPORTS	−.0992**	.0417	.0342	.0235	.0649*	.0353
WHITEC	−.1011*	.0536	.0703**	.0313	.0308	.0448
FULLTIME	−.1594**	.0711	.0203	.0412	.1390**	.0600
UNEMPL	−.0034	.0871	−.0826	.0593	.0861	.0666
SUBST	−.0056	.0519	.0610**	.0310	−.0555	.0430
OTHER	−.0892	.0690	.1651***	.0382	−.0760	.0605
NOSINGLE	.0113	.0438	−.0304	.0245	.0192	.0370
FOREIGN	.4661***	.0807	−.0169	.0386	−.4493***	.0825
FEMALE	−.0183	.0486	.0139	.0277	.0044	.0406
AGE	.0201***	.0027	−.0068***	.0017	−.0133***	.0025
EDU	−.0281***	.0089	−.0033	.0051	.0315***	.0077
LNGROSS	−.0448	.0539	.0955***	.0330	−.0507	.0447
YEAR96	−.1244	.0823	.1079*	.0579	.0165	.0624
YEAR97	−.1734**	.0817	.1809***	.0581	−.0076	.0634
YEAR98	−.3168***	.0797	.1966***	.0582	.1202*	.0615
YEAR99	−.3687***	.0790	.2692***	.0595	.0995	.0618
Observations	15,728					
Log likelihood	-5,164.83					
Pseudo R^2	0.0359					
LR chisq(50)	384.55					

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Coefficients and standard errors were multiplied by 10.

Table 8: Single equation marginal effects for non-BKK members.

	non-BKK members		BKK members	
Variable	**Coeff.**	**s.e.**	**Coeff.**	**s.e.**
Constant	4.2034***	.1732	3.9306***	.5423
IMPAIR	−1.3377***	.0236	−1.4568***	.0677
DISAB	−.1732***	.0437	−.2435**	.1053
DOCTOR	−.1913***	.0207	−.2775***	.0564
VISITS	−.0551***	.0021	−.3528***	.0047
HOSPITAL	−.1551***	.0336	−.3408***	.0981
SICK6	−.2522***	.0482	−.4514***	.1292
SPORTS	.1910***	.0198	.2359***	.0537
EDU	.0069	.0043	.0198	.0121
FOREIGN	.1020***	.0270	.1482**	.0690
FEMALE	.0122	.0228	.0430	.0646
AGE	−.0254***	.0011	−.1384***	.0032
UNEMPL	−.0846**	.0365	−.0879	.1531
WHITEC	.0600***	.0225	.0121	.0613
LNNET	.0264	.0212	.0003	.0667
YEAR96	.0863***	.0327	.0570	.1000
YEAR97	.0956***	.0337	.0453	.0990
YEAR98	.1057***	.0336	.1371	.0982
YEAR99	.0958***	.0334	.1306	.0961
μ_1	1.3560***	.0347	1.3973***	.1011
μ_2	2.8515***	.0370	2.9073***	.1115
μ_3	4.7530***	.0399	4.7345***	.1182
Observations	15,728		2,112	
Log likelihood	$-15,337.62$		$-2,085.42$	
Pseudo R^2	0.1771		0.1847	
LR chisq(18)	6,602.96		944.78	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Table 9: First stage estimation results: ordered probit for health status.

	Prob($y_2 = 0$) (no switch)		Prob($y_2 = 1$) (switch to BKK)		Prob($y_2 = 2$) (switch to non-BKK)	
Variable	**Coeff.**	**s.e.**	**Coeff.**	**s.e.**	**Coeff.**	**s.e.**
Constant	2.6579***	.4313	−1.6482***	.2877	−1.0097***	.3587
Y1F	−.0574*	.0299	.0302*	.0176	.0272	.0251
WHITEC	−.1166**	.0547	.0742**	.0318	.0424	.0460
FULLTIME	−.1546**	.0725	.0205	.0418	.1341**	.0613
UNEMPL	.0051	.0890	−.0824	.0603	.0773	.0683
SUBST	−.0111	.0530	.0635**	.0315	−.0523	.0441
OTHER	−.0983	.0705	.1684***	.0388	−.0701	.0620
NOSINGLE	.0104	.0445	−.0322	.0248	.0217	.0377
FOREIGN	.4923***	.0824	−.0193	.0392	−.4730***	.0849
FEMALE	−.0215	.0492	.0115	.0278	.0100	.0413
AGE	.0213***	.0030	−.0068***	.0018	−.0145***	.0027
EDU	−.0316***	.0090	−.0030	.0051	.0346***	.0079
LNGROSS	−.0510	.0549	.0971***	.0333	−.0461	.0457
YEAR96	−.1025	.0839	.1112*	.0589	−.0087	.0639
YEAR97	−.1524*	.0832	.1864***	.0590	−.0340	.0649
YEAR98	−.3024***	.0811	.2044***	.0592	.0980	.0628
YEAR99	−.3534***	.0804	.2778***	.0605	.0756	.0631
Observations	15,728					
Log likelihood	$-5,194.69$					
Pseudo R^2	0.0303					
LR chisq(32)	324.84					

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Coefficients and standard errors were multiplied by 10.

Table 10: Second stage marginal effects for non-BKK members.

	Prob($y_2 = 0$) (no switch)		Prob($y_2 = 1$) (switch to non-BKK)		Prob($y_2 = 2$) (switch to BKK)	
Variable	**Coeff.**	**s.e.**	**Coeff.**	**s.e.**	**Coeff.**	**s.e.**
Constant	−2.3775*	1.3664	3.6243***	1.2575	−1.2468	.8609
Y1F	−.2184***	.0832	.1586**	.0761	.0598	.0477
WHITEC	−.3044**	.1474	.1610	.1289	.1434*	.0829
FULLTIME	−.2104	.2609	.2888	.2318	−.0785	.1352
UNEMPL	−.7719**	.3251	.6404**	.2617	.1315	.2016
NOSINGLE	.0482	.1347	−.0306	.1169	−.0177	.0699
FOREIGN	.0286	.1854	.1985	.1443	−.2272	.1426
FEMALE	.2782*	.1550	−.2703*	.1405	−.0079	.0795
AGE	.0108	.0084	.0023	.0071	−.0131**	.0058
EDU	−.0080	.0291	.0158	.0254	−.0078	.0150
LNGROSS	.6988***	.1812	−.7355***	.1847	.0367	.1002
YEAR96	−.4139	.2996	−.1349	.1993	.5489*	.3337
YEAR97	−.3998	.2980	−.1707	.2007	.5705*	.3358
YEAR98	−.9055***	.2804	.2565	.1819	.6490*	.3441
YEAR99	−.2386	.2958	−.2971	.2017	.5357	.3298
Observations	2,112					
Log likelihood	−834.46					
Pseudo R^2	0.0563					
LR chisq(28)	99.66					

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Coefficients and standard errors were multiplied by 10.

Table 11: Second stage marginal effects for BKK members.