

# Health and Old Age

## Health Insurance Status and Physician Behavior in Germany

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### Abstract

Germany has a two-tier system of statutory and primary private health insurance. Both insurance types provide fee-for-service insurance, but chargeable fees for identical services are more than twice as large for privately insured as for statutorily insured patients. Using German SOEP 2002 data, I analyze the effect of insurance status on the insured's number of doctor visits. Conditional on health, privately insured patients are less likely to contact a physician than publicly insured but more frequently visit a doctor following a first contact. This is indirect evidence for the hypothesis that physicians over-treat privately insured patients at least relative to the statutorily insured.

*JEL Classification: I11*

### 1. Introduction

This paper analyses the effect of individual health insurance status on health care utilization in Germany. This is important because, although fees-for-service are generally fixed for patients in either type of health insurance, they are more than twice as large for privately insured patients. Physicians thus have a strong incentive to over-treat this patient type at the expense of the statutorily insured. Besides illustrating part of the inequity built into the current two-tier German health insurance system, this study also makes a general, some might say unsurprising, point: when faced with strong financial incentives, physicians do behave rationally and act upon these incentives.

To date, there is quite a number of empirical studies of health care utilization in Germany using a variety of data sources (e.g. Krämer, 1981; Breyer, 1984; Pohlmeier / Ulrich, 1995; Cassel / Wilke, 2002; Thode et al., 2004; Kopsch, 2007). These studies generally deal with issue of supplier-induced de-

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mand (SID) by estimating the effect of physician density on health care utilization (with mixed results). Due to data limitations, effects of insurance status have so far been neglected. Supplier-induced demand, however, has always been a contentious issue in health economics, and it is unlikely that the debate will ever be settled (see e.g. Fuchs, 1978; Wilensky/Rossiter, 1981 or Cromwell/Mitchell, 1986 for evidence for SID; and Sweeney, 1982; McCarthy, 1985; Stano, 1985; or Carlsen/Grytten, 1998 for evidence against SID).

Whereas many earlier studies have used physician density as a source of exogenous variation in demand to identify SID, Gruber/Owings (1996) use an exogenous decline in US birth rates (in the 1970s and 80s) and hence exogenous decline in the income of obstetricians and gynecologists to explain a substantial increase in the proportion of cesarean deliveries. Moreover, they find higher cesarean section rates for mothers with private health insurance than for women covered by Medicaid or without coverage (also see Stafford, 1990) and an even larger increase in cesarean section rates in response to birth rate declines for privately insured than for other mothers. These findings are noteworthy because relative remuneration for cesarean delivery was much higher for the privately insured than for the publicly insured or the uninsured. Although one might dispute that the increase in cesarean deliveries is sufficient evidence for supplier induced demand, the Gruber & Owings study provides convincing evidence for a differential treatment of patients according to their insurance status.

The central hypothesis tested in the present paper is that physicians' behavior is affected by the incentives created in the German health insurance system. Since fees for identical treatments are higher for privately insured patients than for statutorily insured patients, the former will be treated more intensively, conditional on health. While the available data are sufficient to make claims about the relative treatment of privately and publicly insured patients in Germany, it is not possible, though, to determine whether privately insured patients are over-treated in *absolute* terms, i.e. that physicians induce excess demand for medical care. The paper is organized as follows. Section 2 gives the institutional background by briefly describing some salient features of the German health care system. Section 3 describes the data. Section 4 contains the regression results. Section 5 gives a summary and conclusion.

## **2. Institutional Background: Insurance, Fees, and Incentives**

About 90 percent of the German population are insured in the German statutory health insurance system (SHI), see Colombo/Tapay (2004). SHI is financed by wage-dependent contributions. Contribution rates are independent of individual health risks and provide coverage not only for the insured but

also for non-employed dependents. SHI provides free ambulatory care from family doctors and specialists – only in 2004 a co-payment of € 10 per quarter has been introduced. Physician's remuneration follows a fixed fee-for-service schedule (for examples see Table 1). For instance, in 2002 (the year of our data), a short family doctor consultation (of less than 10 minute length) earned about € 5.80, and an ECG earned about € 8.80. The € 5.80 are actually earned only for the 'first' consultation 'case', i.e. once per patient per quarter. Follow-up (short) consultations in the same quarter yield only about € 1.35.

Table 1

**Fees for selected physician services, by health insurance status (2002)**

	Statutory health insurance	Private health insurance
Short consultation < 10min	€5.80	€ 13.02
Thyroid sonography	€9.20	€ 28.15
Electrocardiogram	€ 8.80	€ 20.38
Long-term blood pressure measurement (> 18 hrs)	€ 8.40	€ 20.11

Source: Einheitlicher Bewertungsmaßstab (EBM), Gebührenordnung für Ärzte (GOÄ).

Tenured civil servants, the self-employed, and employees who are above a certain gross annual income threshold (€ 40,500 in 2002) are allowed to opt out of SHI and purchase insurance in the private health insurance system (PHI). In contrast to the statutory health insurers, private insurers offer a choice of contracts with different combinations of services covered and deductibles. Opting out of the SHI system is attractive because private insurance premiums – which are independent of income – are on average lower and more services are covered than in the SHI. Premiums are lower because PHI has a much better risk pool than SHI. This is not only due to the legal access constraints that effectively allow only better than average health risks to join PHI. In contrast to SHI, private health insurers are allowed to differentiate fees by age and sex (women pay more), to take individual risk premiums, and to reject bad risks. The two main drawbacks of taking out private health insurance in Germany are (1) insurance for non-employed dependants is not free and (2) insurance premiums can rise considerably over time and with age, depending on the development of the particular risk pool of an insurer.

Insurance status (statutory vs. private) potentially affects the demand for and supply of health care services in Germany. Patients with a private health insurance are attractive from the doctors' viewpoint because they can be charged much higher (but still legally fixed) fees for the same services as SHI patients. Remuneration for services to privately insured patients follows a similar fee-for-service schedule as remuneration for services to the statutorily insured.

In 2002, the ‘basic fee’ was € 5.66 for a short family doctor consultation and € 8.86 for an ECG (thus pretty much the same as for the same services rendered to SHI insured patients). However, physicians are allowed to charge up to 2.3 times the basic fee if a case is “more difficult than usual” and up to 3.5 times the basic fee in special cases. In practice of course, physicians *always* charge at least 2.3 times the basic fee.<sup>1</sup> In 2002, a short family doctor consultation of a privately insured patient thus earned about € 13 and an ECG earned € 20.38 (compared to € 5.80 and € 8.80 for a statutorily insured patient). Similar relationships hold for most other services. Utility maximizing physicians thus face a kinked budget constraint which would make it rational to first serve all privately insured patients if that was feasible. Indeed, it has been found that waiting times for treatment are on average shorter (Lungen et al. 2008), and older physicians often choose some kind of semi-retirement by treating only private patients.

### 3. Data Description

The data used in this study are drawn from the 2002 wave of the German Socio-Economic Panel (SOEP). SOEP respondents are asked to report the number of doctor visits during the last three months. The 2002 wave does not discriminate between family doctor and specialist visits. 31 percent of all statutorily insured patients and 37 percent of privately patients have not seen a doctor at all during these three months. Nearly 80 percent of the sample visited a doctor three times or less. Only 3.5 percent of the sample report more than 10 visits. The average number of physician visits in the statutorily and privately insured samples is 2.58 and 2.31, respectively, with standard deviations equal to 4.25 and 3.99, indicating substantial overdispersion. Conditional on visiting a doctor at least once, the average number of doctor visits is about 3.7 in both subsamples (only marginally larger for SHI patients). Moreover, the number of visits is highly skewed.

The explanatory variables in the working sample are described in Table 2, separately for SHI and PHI respondents. The full sample has 22,270 observations, of which 3,163 (14.2 percent) are privately insured. 41 percent of the privately insured respondents say they have a deductible. As mentioned above, the proportion of privately insured individuals in the population is only about 10 percent. Thus the privately insured are overrepresented in our data. One of the reasons to use the 2002 SOEP wave is that in this year, a supplement of high income households has been added to the SOEP. 44.2 percent of the individuals in this supplement were privately insured (compared to 10.7 percent in the original sample).

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<sup>1</sup> The fact that PHI insurance premiums are on average lower than SHI contributions although treatments of the privately insured cost more than twice as much reflects how unequal risks are distributed between the two systems.

Table 2  
Sample description

Variable	Statutorily insured ( <i>N</i> = 19,107)		Privately insured ( <i>N</i> = 3,163)		<i>p</i> -value difference
	Mean	StdDev	Mean	StdDev	
Number of doctor visits	2.58	4.25	2.31	3.99	< 0.01
Visited doctor	0.69	0.46	0.63	0.48	< 0.01
Conditional # of doctor visits <sup>a</sup>	3.75	4.67	3.66	4.51	0.44
Deductible			0.41	0.49	
Self-rated health: very good	0.09	0.28	0.13	0.34	
Self-rated health: good	0.40	0.49	0.48	0.50	
Self-rated health: fair	0.34	0.47	0.29	0.46	< 0.01 <sup>b</sup>
Self-rated health: poor	0.14	0.34	0.09	0.28	
Self-rated health: very poor	0.04	0.19	0.01	0.11	
SF12 summary score	-0.04	0.72	0.19	0.62	< 0.01
Hospital stay in 2001	0.12	0.33	0.10	0.33	< 0.01
Age	47.45	16.92	48.19	13.62	< 0.01
Female	0.54	0.50	0.39	0.49	< 0.01
Married	0.64	0.48	0.72	0.45	< 0.01
Years of education	11.69	2.41	14.47	3.03	< 0.01
Log equivalent household income	9.81	0.52	10.34	0.55	< 0.01
Weekly working hours	21.25	21.24	31.68	23.47	< 0.01

<sup>a</sup> conditional on visiting; *N* = 13,167 (SHI), *N* = 1,995 (PHI).

<sup>b</sup> *p*-value of chi-squared test of independence between self-rated health and insurance status.

The SHI and PHI subsamples differ in a number of important respects. In particular, privately insured respondent are in better self-rated health. 49 percent of the SHI sample, compared to 61 percent of the PHI sample, say they are in good or very good health, and 12 percent versus 10 percent have been in a hospital in the preceding year. The SF-12 health score (Nübling et al., 2006) also indicates significantly better health. Note that the health difference can be found despite the fact that the privately insured are on average nearly one year older. Still, as explained above, it is not surprising to find the privately insured sample in better health. In addition to the fact that they have most likely passed a health screening before taking out private health insurance, they are predominantly male, have nearly three years more formal education and much higher income. Among the privately insured, people work on average 10 hours more per week. Considering how selection into private health insurance works (see the minimum income threshold), this is not surprising either.

It should be noted that despite the fact that privately insured respondents are much healthier and wealthier, they visit doctors only slightly less often than respondents insured in the statutory health insurance – if they visit at all. In fact, the difference in the number of doctors visits is not statistically significant. Conditional on health, it appears as if physicians treat the privately insured more intensely. This issue will be analyzed in greater detail in the next section.

#### 4. Model Estimation and Results

In order to separately estimate the contact and frequency decision stages, I follow Pohlmeier/Ulrich (1995) and Gerdtham (1997) in computing a negative binomial hurdle model. The advantage of hurdle models for the present application is that they allow analyzing the decision to contact a physician at all (which is purely demand driven) and the decision how often to visit the physician (which combines demand and supply aspects) as different stochastic processes. The two parts of the model can be estimated by separate maximizations of the likelihood functions (Mullahy, 1986). Explanatory variables can thus have different effects on the contact (demand) and the frequency (joint demand and supply) decisions, which allows identification of demand and supply factors.<sup>2</sup>

The meaningful distinction between initial contact and frequency of contact in a hurdle model of doctor visits entails the assumptions that there must not be more than one sickness spell per reference period. Further, the first count in the reference period must constitute a first contact related to a sickness spell and not a follow-up visit belonging to sickness spell that started before the reference period. The last count must be the last of the sickness spell. Of course, either assumption will almost certainly be violated in a few cases. How many cases are concerned obviously depends on the length of the reference period. The longer the reference period, the larger the number of multiple sickness spells but the smaller the probability that the first registered contact belongs to sickness spell from a preceding period, and vice versa. The optimal length of the reference period is a priori unclear, but the three months used in the SOEP appear to be a fairly good compromise at least for acute illnesses (cf. Pohlmeier/Ulrich, 1995; Gerdtham, 1997).

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<sup>2</sup> This assumption of different effects can be tested statistically by comparing the log likelihood of the hurdle model (which is the sum of the two parts' log-likelihoods) with the log likelihood of a (single equation) negative binomial model. With the data used in this paper, the single equation model is clearly rejected.

#### 4.1 The Probability of Physician Visits

The first part of the hurdle model used to analyze the probability of contact is a logistic regression model, for which I report odds ratios. Privately insured respondents are less likely to have seen a doctor at all in the preceding three months. Note that this is conditional on *observed health*. Plausible explanations for this finding have been mentioned before. Private health insurance status might reflect unobserved better health since private insurance companies are allowed to screen applicants and to reject bad risks. Deductibles and rebates should further discourage doctor visits for minor ailments. In fact, for patients with deductibles, the estimated probability of visiting a doctor is further reduced, but the difference to privately insured without deductible is statistically insignificant.

Table 3

**Hurdle model of doctor visits in last three months  
(coefficients are reported in exponential form)**

	Contact equation		Frequency equation	
	exp(b)	robust z-value	exp(b)	robust z-value
Private health insurance	0.844**	-2.918	1.202***	4.182
Deductible	0.941	-0.743	0.935	-0.952
Self-rated health: very good	0.432***	-13.306	0.661***	-5.664
Self-rated health: good	0.640***	-11.027	0.718***	-10.182
Self-rated health: poor	1.947***	9.136	1.487***	11.072
Self-rated health: very poor	2.835***	5.486	1.794***	9.435
SF-12 index	0.628***	-12.786	0.702***	-14.440
Hospital stay in 2001	2.474***	14.078	1.601***	15.140
Age / 10	0.570***	-7.848	0.957	-0.891
(Age / 10)^2	1.076***	9.602	1.002	0.326
Female	1.806***	11.132	1.175***	3.394
Married	1.170**	3.166	1.064	1.401
Female * Married	0.871*	-2.049	0.884*	-2.242
Years of education	1.056***	8.148	1.008	1.622
Log equivalent household income	1.275***	7.128	1.051*	1.984
Weekly working hours	0.995***	-5.313	0.996***	-4.840
N	22270		15162	

\* significant at 5%; \*\* significant at 1%; \*\*\* significant at 0.1%.

Let us also briefly discuss the effects of the other covariates, which are mostly plausible and in line with earlier studies for Germany (e.g. Pohlmeier / Ulrich, 1995). Large effects on the decision to contact a physician can be found for the health measures: self-rated general health, the SF-12 index and

for hospital stays in the preceding year (as a more objective health indicator).<sup>3</sup> The odds of visiting a doctor at least once are about 2.8 times larger for respondents in very poor self-rated health than for those in fair health (the reference category). Likewise, those in very good health have odds that are about half as large as those of the reference category. Hospital stays in the preceding year lead to about 2.5 higher odds of physician contacts.

Conditional on all covariates, the probability of having visited a doctor in the last three months first decreases and then increases in age. The minimum is reached at about age 38. Women are substantially more likely to visit doctors even if health is controlled for, and married individuals are more likely to contact doctors than others. This holds particularly for men, as the interaction effect of marital status with sex reveals. Better educated and higher income individuals also show a higher likelihood of visiting a doctor. Since this effect is measured conditional on health, it might reflect the tendency of better educated and higher income individuals to care more for their health (higher allocative efficiency or stronger preferences for the future; cf. Grossman, 2005). It might also reflect socio-economic inequality in access to health care (e.g. Gerdtham, 1997). The number of hours worked significantly reduces the likelihood to contact a physician, which is probably largely a matter of opportunity costs.

#### 4.2 The Frequency of Physician Visits

The frequency of doctor visits is analyzed conditional on visiting a physician at least once in the last three months using the zero-truncated negative binomial model. I find that insurance status has a fundamentally different effect on the frequency of doctor visits than on the contact probability. While the privately insured are less likely to contact a doctor, the conditional number of doctor visits is significantly larger than that of patients covered by statutory health insurance. However, if the privately insured are on average healthier, one can expect them also to visit their doctor less often. This seemingly contradictory finding can be explained by physicians treating privately insured patients differently. Just because the health services rendered to a privately insured individual pay so much better than the same services rendered to individuals insured in the statutory health insurance, physicians have an incentive to over-treat the privately insured, either by giving them more intense treatments or by stretching treatments of the same intensity over more visits.

Let us also look at the effects of the covariates. All three measures of health have an independent, strong, and highly significant impact on the frequency of doctor visits. For instance, the estimated number of visits of respondents in

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<sup>3</sup> Including further health measures such as BMI, dummy variables for obesity, or smoking status does not change the main results in this paper.



the full sample who are in very poor health is about 1.7 times as large as the number of visits of those in fair health. Respondents with hospital stays in the preceding year go to the doctor 1.6 times as often as those without hospital stays.

Age plays no role for the number of doctor visits, conditional on a visiting a doctor at all. Education and income also have no significant effect on the frequency of physician visits. Gerdtham (1997) reports similar results for Sweden and interprets this finding as evidence that patients' income does not affect the decisions of physicians. Marital status (in the case of men) has no effect on the frequency of visits. Thus married men contact a doctor more often than unmarried men but conditional on contact they do not visit a doctor significantly more often. Conditional on health, women visit doctors about 1.2 times as often as men. Finally, the number of hours worked reduces not only the likelihood of visiting a doctor but also the subsequent number of visits.

## 5. Summary and Conclusion

In this short paper I have analyzed the relationship between health insurance status and the frequency of individual doctor visits in Germany in a negative binomial hurdle model. The hurdle model statistically distinguishes between the decision to contact a physician (which is purely demand driven) and the frequency of contact decision (which combines demand and supply aspects). Conditional on health, privately insured patients are less likely to contact a physician but more frequently visit a doctor following a first contact. This finding is consistent with the idea that physicians in Germany over-treat privately insured patients relative to statutorily insured. Physicians have an incentive to do this because patients with a private health insurance are more attractive as they can be charged higher fees for the same services. Therefore, the findings presented in this paper give plausible albeit indirect evidence for the hypothesis that in Germany, physicians do react to the financial incentives created by the two-tier health insurance system.

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