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Markus M. Grabka

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German Socio-Economic Panel Study (SOEP)
DIW Berlin
Mohrenstrasse 58
10117 Berlin, Germany

Contact: Uta Rahmann | urahmann@diw.de

Copayments for Ambulatory Care in Germany: A Natural Experiment Using a Difference-in-Difference Approach

Jonas Schreyögg[1,2] and Markus M. Grabka[3]

1. Department for Health Care Management, Berlin University of Technology, Germany
2. Center for Health Policy/Center for Primary Care and Outcomes Research, Stanford University, USA
3. DIW Berlin, German Socio-Economic Panel (SOEP), Germany

Corresponding author:

Jonas Schreyögg
Berlin University of Technology
Department for Health Care Management
Strasse des 17. Juni 135 (H65)
10623 Berlin
Germany
jonas.schreyoegg@tu-berlin.de
Phone: +49-30-314-28420
Fax: +49-30-314-28433

Abstract

In response to increasing health expenditures and a high number of physician visits, the German government introduced a copayment for ambulatory care in 2004 for individuals with statutory health insurance (SHI). Because persons with private insurance were exempt from the copayments, this health care reform can be regarded as a natural experiment. We used a difference-in-difference approach to examine whether the new copayment effectively reduced the overall demand for physician visits and to explore whether it acted as a deterrent to vulnerable groups, such as those with low income or chronic conditions. We found that there was no significant reduction in the number of physician visits among SHI members compared to our control group. At the same time, we did not observe a deterrent effect among vulnerable individuals. Thus, the copayment has failed to reduce the demand for physician visits. It is likely that this result is due to the design of the copayment scheme, as the copayment is low and is paid only for the first physician visit per quarter.

JEL classification: C13; I18; L31

Keywords: copayments, ambulatory care, difference-in-difference, count data, zero-inflated-model, SOEP

1. Introduction

In many industrialized countries, health expenditures account for a substantial share of GDP and are increasing more rapidly than GDP in a considerable number of cases. Between these countries, however, there are large differences with respect to the share of health expenditures in GDP. Germany has the third-highest share of health expenditures among OECD countries. One of the more likely reasons for this can be found in the moral hazard inherent in public health care systems. Indeed, looking at the demand for ambulatory care in Germany, it is striking that the average person made 10.0 physician visits per year in 2006,[1] whereas this same figure was 7.8 for all European countries and 6.8 for the EU (World Health Organization 2008).

To help counter increasing health expenditures and the high number of physician visits, the German government introduced a copayment of €10 per calendar quarter to be paid by individuals covered under statutory health insurance (SHI) upon their first contact with a physician's or dentist's office. The legislation came into effect on 1 January 2004 and has attracted attention in many European countries, leading to discussions about introducing similar schemes. Like earlier attempts to reform the German health care system, the introduction of copayments for ambulatory care aimed at tackling the moral hazard problem. Exemption rules based on income and chronic disease status were defined as a way to avoid a deterrent effect that might cause certain vulnerable

[1] In the absence of WHO data for Germany, we have used data on the number of physician contacts, provided by the German Socio-Economic Panel (SOEP) for the year 2006. According to a study based on claims data from one of the largest German sickness funds, the average person in Germany makes as many as 16.3 physician visits annually (Gmünder Ersatzkasse 2006).

individuals, such as poor or disabled persons, or those with chronic disease, to avoid seeking necessary care.

In this study we aimed to evaluate the effects of this reform. In particular, we analysed whether the reform has had an impact on the demand for ambulatory physician services while retaining the necessary and desirable demand of vulnerable groups. The reform can be regarded as a natural experiment, because privately insured individuals are fully exempt from the copayments. Thus, within the framework of this natural experiment, we used a difference-in-difference approach, comparing the demand for physician visits before and after the reform among individuals with SHI and those with private insurance. At the same time, we examined the effects of the reform on vulnerable groups.

2. Copayments for ambulatory care in the German health care system

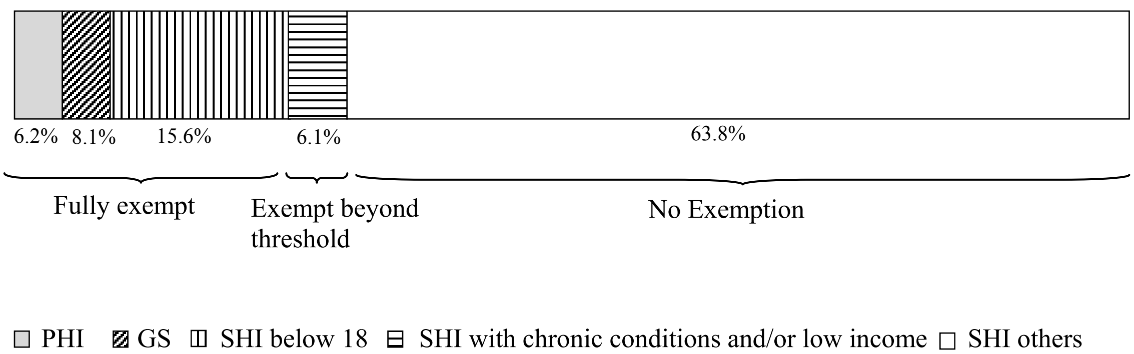
The German health care system is dominated by statutory heath insurance (SHI), which is financed primarily by mandatory payroll deductions. Nearly 88% of the population is covered by comprehensive SHI. Beyond a certain income threshold, employees can decide either to remain in the SHI or to obtain private health insurance (PHI) instead. Self-employed persons can always choose between SHI and PHI. Approximately 6% of the population is fully covered by PHI. Another 6%, including civil servants, pensioners, or their families, are covered by governmental schemes (GS). All persons insured under SHI, PHI, or GS have access to a comprehensive benefit catalogue covering hospital services, ambulatory visits, pharmaceuticals, medical aids, etc. Ambulatory services include visits to general practitioners, specialists, and dentists. Before 2004, patients with

SHI were not required to make copayments for ambulatory physician visits. However, other types of copayments have a long tradition in the SHI system. Copayments are required, for example, for prescription drugs, hospital care, or health care-related transportation. These copayments have not had a substantial impact on the demand for health care services, and can thus be described as having a pure funding effect.

As part of the Statutory Health Insurance Modernization Act, copayments for doctor visits were introduced with effect from 1 January 2004. One copayment of €10 per calendar quarter is paid by patients upon their first visit to a physician's office. Subsequent visits to the same physician during the same quarter do not require a copayment. Similarly, visits to other physicians during the same quarter do not require a copayment if the patient presents a referral from the first physician. However, patients who visit another physician during the same quarter without a referral by the first physician must make an additional copayment of €10. Thus, if a patient always presents a referral from the first physician, the total fee will be €10 per quarter.

This new copayment regulation was fully applied only to persons covered by SHI. Persons with PHI and some individuals with GS are exempt from the regulation. Children and adolescents up to the age of 18 who are covered by SHI are excluded, as well. In order to reduce the financial burden of the various copayments, individuals covered by SHI who have spent more than 2% of their gross household income per annum on copayments of any kind (e.g. for pharmaceuticals) are eligible for exemption from the physician fee. This also applies to SHI members with chronic conditions once they have spent more than 1% of their gross household income per annum on copayments of any kind (the so-called 1% rule). Figure 1 summarizes the application of the copayments according to insurance status.

Figure 1. Application of copayments according to insurance status



Source: own figures based on data from the German Federal Ministry of Health (2007), Association of Private Health Insurance (2007), and a Federal Ministry of Health estimate of SHI members with chronic conditions and/or low income. Displayed groups do not add up to 100% because 0.2% of the population is uninsured.

Based on economic theory, as well as on experiences with previous health care reforms in Germany and elsewhere, one would expect the introduction of copayments for ambulatory care to lead to a decline in the number of physician visits. Most previous studies on natural experiments in this area have been conducted in the US and Canada, and suggest that copayments in ambulatory care are an effective way to reduce the number of physician visits. Cherkin et al (1990) showed that a copayment of approximately US$5 resulted in a 14% decrease in physical examinations. Scitovsky and McCall (1977) found an even stronger effect, with the introduction of a 25% coinsurance provision leading one year later to approximately 24% fewer physician visits. Although the authors also argued that this was potentially a short-lived effect that could fade over time, the results of a follow-up study showed evidence that the number of doctor visits either remained much the same or was even slightly lower.

Although copayments have frequently been found to be effective in reducing the number of physician visits, they can also act as a deterrent to vulnerable groups if the system of copayments is not carefully designed (i.e. if the rules for exemption do not have the intended effect). There is substantial evidence from countries other than Germany that a change in copayments can discourage vulnerable groups from seeking necessary care. In a study described by Roemer et al (1975), only short-term effects could be observed. Imposing user charges of approximately US$1 for the first two doctor visits initially reduced demand for physician services, but led over the long-term to levels higher than those observed in the control group, thus offsetting any savings. The long-term effects of copayments were also analysed by Beck and Horne (1980) for members of a universal public medical care and hospital insurance programme in Canada. Between 1968 and 1971, the Province of Saskatchewan imposed user charges of approximately 33%. Although this clearly reduced the number of physician visits, the findings of the study showed that it was primarily elderly and low-income individuals who had been affected. Moreover, when considering substitution effects, the authors concluded that the reform had not led to significant cost savings. This finding was complemented by Manning et al (1987), who showed that a reduction in the use of physician services can also be accompanied by increased treatment intensity in the form of longer or more expensive treatment episodes. In a Swedish study presented by Elofsson et al (1998), costs appeared to be the main barrier to seeking care. Roughly 22% of all respondents within a random sample of individuals aged 17 or above stated that copayments had caused them to forgo a doctor's visit at least once during the previous year. This decision was strongly associated with poor financial circumstances. Among those who assessed their financial situation to be poor, the probability of foregoing care was 10 times higher than among those who assessed their financial situation to be fair or good. However, among women, avoiding physician visits was also associated with chronic disease.

Winkelmann (2004) examined whether increased copayments for prescription drugs in Germany, a measure introduced as part of an earlier health care reform in 1997, had indirect effects on the number of physician visits. Since prescriptions are issued by physicians, Winkelmann argued that the demand for prescription drugs and the demand for physician visits are intrinsically linked. He concluded that increased copayments reduced the number physician visits by approximately 10% on the average.

Our study adds to earlier approaches by conceptually dividing the copayment effect into two effects. Firstly, a person may want to avoid making a copayment for the first visit per quarter and thus not visit any physician at all during that quarter. Secondly, a person may reduce the number of physician visits after the first visit due to the increased transaction costs of obtaining the necessary referrals. Consequently, we investigated whether (a) the probability of visiting a physician has decreased and (b) the demand for physician visits declined among non-exempt SHI members since the introduction of copayments compared to the PHI members as our control group. We also investigated whether vulnerable groups such as members of the SHI with chronic conditions or low income have shown lower demand for physician visits since the introduction of copayments compared to our control group.

3. Data and methods

The primary data source in this study is the German Socio-Economic Panel (SOEP) (see Wagner et al 2007). Initiated in 1984, the SOEP is a representative longitudinal survey of approximately 22,000 individuals aged 16 and above living in private households. Part of the core questionnaire, which is administered each year, gathers data on health-related variables such as current health status, insurance status, and health care utilization (e.g. number of physician visits over the past 3 months). Because 2004 was the year of the intervention, we used data from the pre-intervention years 2000-2003 and the post-intervention years 2005-2006. We excluded all individuals under the age of 18, as well as GS members, from the dataset, because it seemed likely that the age restriction and changes to the reimbursement system of the GS during the post-reform period would make these groups unsuitable as controls. As a result, only data on PHI members, and on SHI members over the age of 18, remained in the dataset.

Our study approach was to pool the data from the abovementioned 5 years (i.e. from 2000-2003 and 2005-2006) and to estimate the effects of copayments by comparing the expected number of physician visits before and after the intervention using a difference-in-difference (DID) approach (Blundell and Costa Dias, 2002; Wooldridge, 2002). Few studies have used a DID approach to measure the effects of changes in copayment (Winkelmann, 2004; Zhang, 2007). In the present study, we used the following model:

$$y_{it} = \beta_0 + \beta_1 x_i + \beta_2 z_t + \beta_3 (x_i \times z_t) + \beta_4 w_{it} + \varepsilon_{it}$$

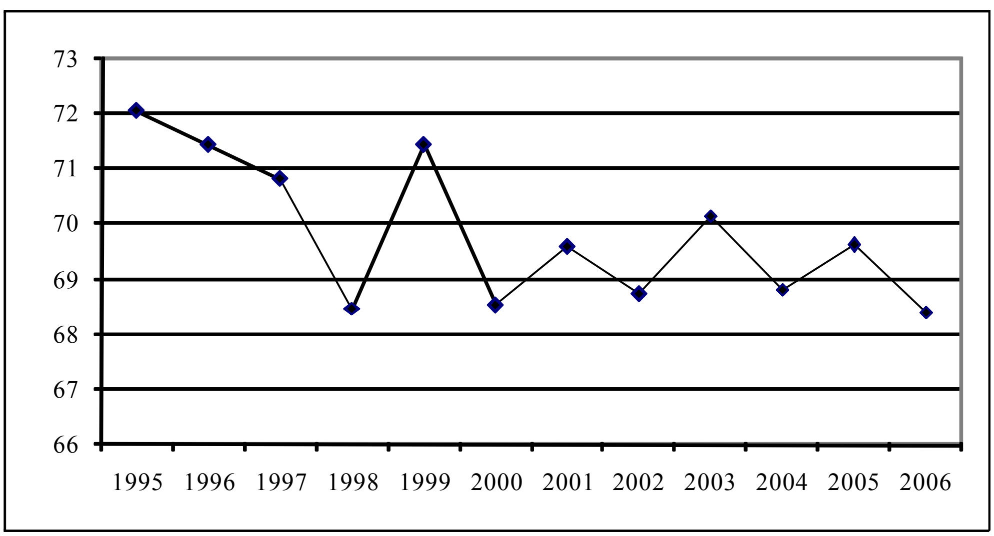
where y_{ij} is the outcome variable for person i at time t. x_i is the treatment vector indicating whether person i is subject to the increased copayment, while z_t indicates the occurrence of the copayment in period t. The interaction term denotes the utilization of a person who was required to make a copayment after the new copayment came into effect. The vector w_{it} represents a variety of socio-economic characteristics that we controlled for.

We constructed 4 DID estimators, each of which was related to a pre-post change in physician visits. Firstly, we compared non-exempt SHI members to PHI members to explore whether the introduction of copayments had led to a general reduction in the demand for physician visits. Secondly, the group of SHI members with chronic conditions was compared to the group of PHI members to investigate whether vulnerable groups had been affected by the copayment reform. We followed the official definition of 'chronic condition', based upon which affected individuals can qualify for the so-called 1% rule. We included persons with approved disability of more than 60% or who had qualified as beneficiaries of long-term care insurance (grades II or III). It should be pointed out here that there may be other persons who qualify for exemption based on individual conditions that could not be captured in this study. Thirdly, we sought to define a group of persons with low income whose total copayments (for ambulatory care and other services) most likely exceeded the threshold of 1% or 2% of gross household income per annum. Thus the lowest income quintile was taken as a proxy for SHI members with low income and compared to PHI members. Finally, as an alternative proxy for low income we included all persons who received public welfare benefits and compared this group to the group of PHI members. Public welfare recipients are not generally exempt from copayments in the SHI in Germany, but given their relatively low transfer income, copayments can easily exceed the 1% income threshold. However, as long as the transfer income of these individuals does not exceed the income threshold, one may assume a significant decline in the demand for physician visits.

Throughout the models, we controlled for a number of variables reflecting socio-economic characteristics, including gender, age, age-squared, existence of children in household (i.e. implying additional time and effort when consulting a physician), employment status (i.e. full-time, part-time, or unemployed), self-employment, educational level, resident of former East or West Germany, active sports, smoker, household income in quintiles and population at residence location. In addition, we controlled for health by including a variable on self-reported health based on the categories very good, good, fair, poor, and very poor. Variables for years and months were used to control for all other unobserved temporal factors affecting demand for physician visits. Controlling for months is particularly important in this context, because interviews take place in different months of the year and seasonal influences such as influenza during the winter months may otherwise bias the results. A descriptive overview of the sample is given in the appendix.

To model the impact of the copayment regulation, we proceeded in two steps. Firstly, we used a probit model to evaluate whether the probability of visiting a physician had decreased following the introduction of copayments. In this model, the outcome variable takes the value of 1 if the person has visited a physician and 0 if not. As can be seen in figure 2, the percentage of individuals who visited a physician during the past 3 months has decreased slightly over the last 10 years (i.e. from approximately 72% to less than 69% in 2006). However, the introduction of the copayment in 2004 appears to have had no impact on the demand for physician visits.

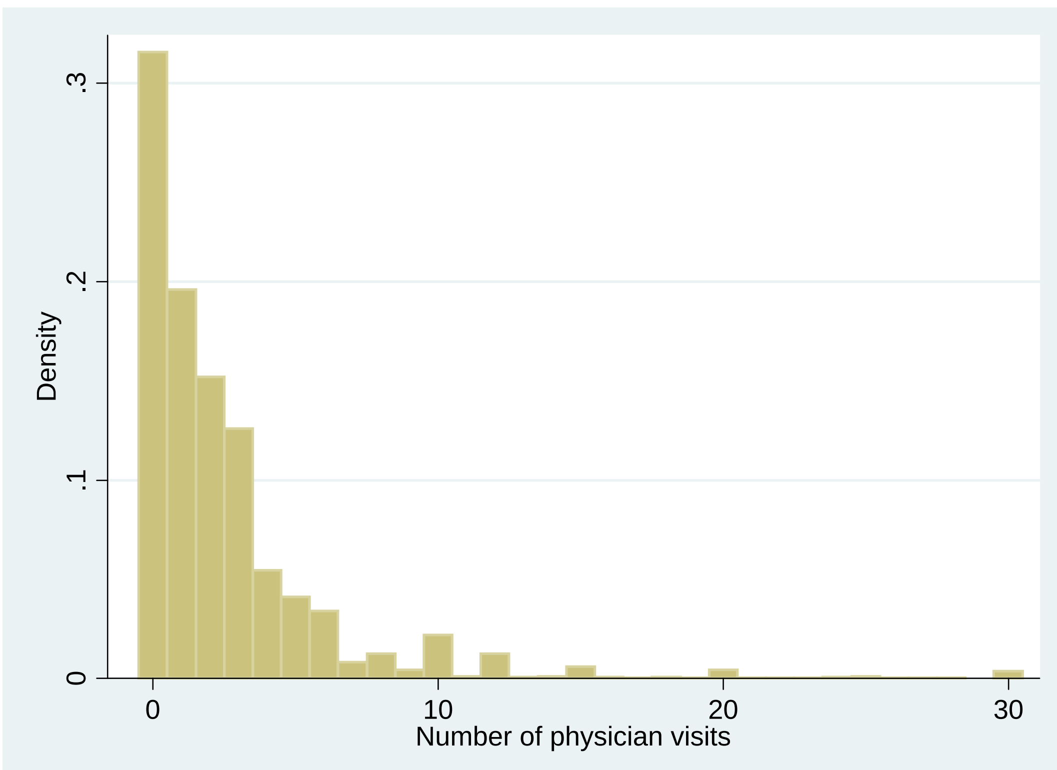
Figure 2. Percentage of individuals who had visited a physician during the past 3 months 1995-2006



Source: SOEP, including all groups.

Secondly, when choosing an appropriate econometric model to examine whether the number of physician visits declined after the introduction of copayments, we had to consider that the distribution of our dependent variable 'number of physician visits' was largely skewed to the right and contained a large proportion of zeros. Figure 2 displays the kernel densities for the entire sample (i.e. including all groups). Probit or logit models would most likely have produced inefficient estimates in this context. Several estimation techniques have been proposed in the literature to deal with distributional characteristics like these. Among them are Poisson and negative binomial (NB) models, as well as zero-inflated Poisson (ZIP) and zero-inflated negative binomial (ZINB) models (Sheu et al, 2004; Yau et al, 2003).

Figure 3. Number of physician visits during the past 3 months



Source: SOEP, pooled information for the years 2000-2003 and 2005-2006.

We started with a basic Poisson model where the number of physician visits y for individual i has a Poisson distribution with a conditional mean λ depending on the individual characteristics x:

(1) $$\lambda_i = E\left(y_i \middle| x_i\right) = e^{x_i\beta}$$

The probability of y given x is:

(2) $$\Pr\left(y_i \middle| x_i\right) = \frac{e^{-\lambda_i}\lambda_i^{y_i}}{y_i!}$$

One of the main assumptions of the Poisson distribution is that variance is equal to the mean. However, in the presence of overdispersion, estimates made based on a Poisson regression model will most likely be inefficient. Overdispersion is characterized by excess zeros and/or unobservable individual characteristics. While excess zeros are obviously an issue, unobservable individual characteristics may also be relevant to this study. Although socio-demographic characteristics and self-perceived health may capture a fair portion of the variation in demand for physician visits, there are most likely further determinants of health that cannot be controlled for. In order to address the potential problem of overdispersion, we applied an NB regression as a second model. In this second model, unobserved heterogeneity is taken into account by adding an error term ε to the conditional mean of the Poisson distribution:

(3) $$\tilde{\lambda}_i = E\left(y_i \middle| x_i\right) = e^{(x_i\beta + \varepsilon_i)}$$

Because 31% (see Figure 3) of all persons in the full sample answered that they had not visited any physician at all during the past 3 months, excess zeros are clearly an issue in our data. We also assumed that some of the persons in our sample never visit physicians (necessary zeros), whereas others occasionally visit physicians, but just happened not to do so during our survey (potential zeros). Therefore, it is reasonable to model y_i as a mixture of two distributions:

- Responses that are zero with a probability one, and
- Responses that follow another model such as a Poisson or NB distribution

This problem can be addressed by applying the ZIP and ZINB models. In these models, the likelihood of being in either group is estimated using a logit or probit specification, whereas the counts in the second regime are estimated using a Poisson or NB specification (Lambert, 1992).

It would also have been possible to apply a two-part/hurdle model, which is used frequently for count data when, for instance, the recurrence of cancer is measured (Jones 2000). This model would assume that each person has the same risk of needing to visit a physician. However, some persons never visit physicians, even in the case of serious illness. Therefore, from a conceptual point of view, the ZINB model would appear to be more appropriate in this particular context. Sheu et al 2004 argued in a similar manner when analysing count data on smoking behaviour.

To determine the best model fit among ZINB, ZIP, NB, and Poisson, we followed the steps proposed by Greene (1994) and Grootendorst (1995). Firstly, we applied the Vuong test (Vuong, 1989), which compares the conditional model with the true conditional distribution, to determine whether the ZINB model (with its inherent splitting mechanism) should be rejected in favour of the NB model. In either case, we would proceed with the second step and test for heterogeneity by using the *t* test. A significant alpha suggests that unobservable heterogeneity accounts for dispersion. In this case the NB model would be more efficient than the Poisson model, and the ZINB model would be more efficient than the ZIP model.

For each of the four comparator groups, we estimated fixed effects and random effects models. However we only reported on fixed effects models, as these provided more consistent estimates, a decision that was also supported by the Hausman Test. Because ZIP and ZINB are not available as panel models, we allowed for clustering in both models.[2] In order to reduce multicollinearity, we dropped explanatory variables if they had high variance inflation factors. We reported marginal effects throughout the models.

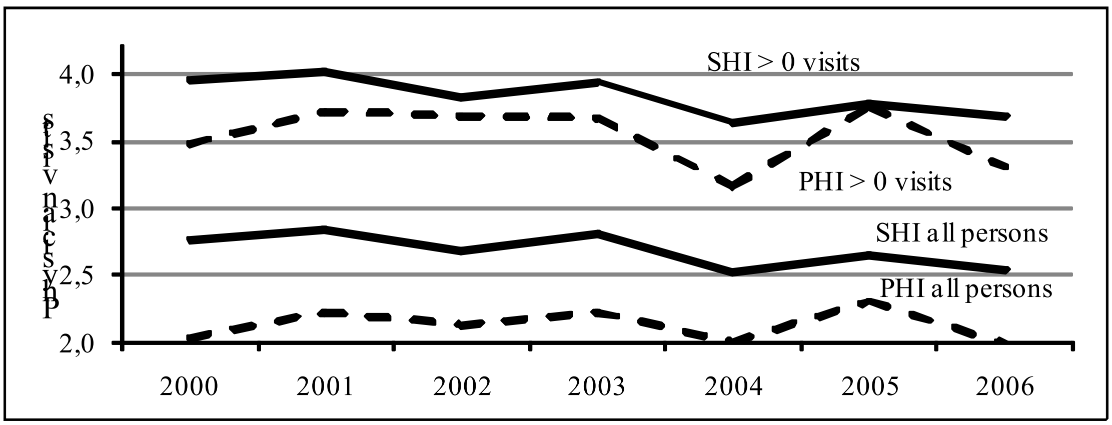
4. Results

Figure 4 illustrates how the number of physician visits for non-exempt SHI members and PHI members developed between 2000 and 2006. The upper two lines indicate the average number of physician visits for those who made at least one physician visit per quarter, whereas the lower lines indicate the average number of physician visits for all persons within each of the groups. Although there was a general trend towards a decrease in the number of physician visits for non-exempt SHI members, the number dropped sharply for both lines after the introduction of copayments in 2004, but rose to nearly pre-

[2] For sensitivity purposes we also allowed for clustering in the probit and count data models, but this did not lead to any relevant differences. Results can be provided from the authors on request.

2004 levels in 2005. Although PHI members are exempt from copayments, the number of physician visits among these individuals showed a similar drop after the introduction of copayments in 2004. One reason for this unexpected decrease in the number of physician visits among PHI members may be due to the general population's uncertainty about the new system of copayments. Indeed, the copayments were the subject of intense discussion in the media at the time and the rules for exemption were not fully transparent.

Figure 4. Number of physician visits during the previous quarter for PHI members and non-exempt SHI members



Source: SOEP, years 2000-2003 and 2005-2006.

Table 1 displays the marginal effects for the group differences and DID estimates of the probit model. We observed significant group differences (a) between non-exempt SHI members and PHI members, and (b) between SHI members with chronic conditions and PHI members. Both groups of SHI members had a higher probability of physician visits. While this finding is not surprising for those with chronic conditions, it must also me taken into account that PHI members tend to be better risks compared to non-exempt SHI members. The only individuals for whom the probability of visiting a physician decreased (by 7.9%) after the reform (i.e. compared to PHI members) were those in the lowest income quintile, whereas the other DID estimators had positive signs. However, none of the changes indicated by the DID estimators were significant.

Table 1. DID estimates for the probit models

Treatment group vas control group	Probit Model	
Model	Marg. Eff.	Standard Error
SHI w./o. exemption		
SHI	0.122***	0.022
DiD SHI	0.019	0.029
SHI w. chronic conditions		
Chronic	0.879***	0.059
DiD Chronic	0.099	0.074
SHI-lowest income quintile		
Lowest income quintile	0.023	0.064
DiD Lowest income quintile	-0.079	0.053
SHI-public welfare		
Public assistance	0.063	0.070
DiD Public assistance	0.007	0.063

***P<0.01, **P<0.05, *P<0.1

Source: SOEP, pooled information for survey years 2004-2004, 2005, 2006

Apart from the count data model with the group made up of persons from the lowest income quintile, the estimated results of all performed models show overdispersion expressed by significant Ln alphas. Therefore, throughout table 2, we present NB and ZINB models, but show only a Poisson model for the lowest income quintile group. Because the Vuong test, which compares the conditional model with the true conditional distribution, cannot be performed when we allow for clustering, we also performed ZINB models without a clustering effect to produce results for the Vuong test. Throughout the models, the Vuong test suggests that the ZINB models are more efficient than the NB models. In each model we show marginal effects and their standard errors for the group difference, as well as the DID estimators. In addition, for the ZINB model, coefficients are presented separately for each of the two regimes.

The estimated marginal effects differed slightly between the NB and ZINB models, which was due to the fact that ZINB estimates are conditional on having had at least one physician visit. According to the NB and ZINB models for the first comparator group (i.e. non-exempt SHI members), the DID estimates showed reductions of 2.3% and 5.5%, none of which, however, were significant.

It is notable that, based on the NB model, the number of visits among persons with chronic conditions dropped significantly (i.e. by 6.1%) after the introduction of copayments, and by 8.6% in the lowest income quintile group. However, the DID estimates became insignificant in the ZINB model, and the DID estimate for persons with chronic conditions actually became positive. Finally, the DID estimate for persons receiving public welfare benefits suggests a reduction in the expected number of physician visits of 6.5% in the NB model and of 4.9% in the ZINB model, which was conditional on the patient making at least one visit per quarter. However, the effects observed in both models were insignificant.

Table 2. DID estimates for the count data models and the zero-inflated count data models

Treatment group vs. PHI as control group	Negative Binomial Model		Zero-Inflated Negative Binomial Model				
			Probit Model		Count Model		Combined
Model	Marg. Eff.	SE	Coefficient	SE	Coefficient	SE	Marg. Eff.
SHI w./o. exemption							
SHI	0.133***	0.022	-0.047**	0.023	-0.004	0.030	-0.001
DiD SHI	-0.023	0.022	-0.196	0.054	-0.038	0.076	-0.055
Lnα	-0.194***	0.011			-0.403***	0.009	
Voung test of ZINB vs. ZIP					24.87***		
SHI w. chronic condition							
Chronic	0.620***	0.057	0.255***	0.042	0.003	0.037	0.947
DiD Chronic	-0.061**	0.029	-1.373***	0.318	-1.890	7.470	0.100
Lnα	-0.296***	0.0244			-0.519***	0.018	
Voung test of ZINB vs. ZIP					13.81***		
SHI-lowest income quintile							
Lowest income quintile	0.130*	0.071	-0.075	0.076	0.008	0.048	-0.128
DiD Lowest income quintile	-0.086**	0.019	-0.100	0.191	0.129	0.155	-0.015
Lnα	-0.005	0.024			-0.234***	0.022	
Voung test of ZINB vs. ZIP					11.20***		
SHI-public welfare							
Public assistance	0.108	0.088	0.010	0.069	-0.049	0.060	-0.019
DiD Public assistance	-0.065	0.059	0.136	0.199	-0.170	0.166	-0.049
Lnα	0.080***	0.026			-0.157***	0.026	
Voung test of ZINB vs. ZIP					9.34***		

***P<0.01, **P<0.05, *P<0.1

Source: SOEP, pooled information for survey years 2004-2004, 2005, 2006

5. Discussion

In this study, we examined the effects of introducing quarterly copayments for ambulatory care in Germany in 2004. We developed a DID framework by using PHI members as a control group throughout the models. For our modelling approach, we subdivided the effects of the copayment conceptually and proceeded in two steps. We first applied a probit model measuring the probability of visiting a physician and subsequently applied count data models measuring the change in the number of physician visits. Our study expands upon approaches to measuring the effect of copayments by adding a zero-inflated negative binomial model within a DID framework. This model allowed us to differentiate between persons who never visit physicians and persons who occasionally visit a physician.

Our results suggest that the copayment initially reduced the number of physician visits in 2004, the year of the intervention. However there was no significant reduction in the number of non-exempt SHI members with at least one physician visit, or in the overall number of physician visits made by non-exempt SHI members compared to our control group. Our findings suggest that the introduction of this specific copayment has had only a transitory effect and has failed to reduce the demand for physician visits. It is likely that this result is due to the design of the copayment scheme. The copayment is low and has to be paid only for the first visit per quarter and not for each visit (i.e. as long as patients present a referral from the first physician). Thus, the potential behaviour-modifying effect of the copayments largely disappears after the first physician visit. Evidence from the US suggests that a copayment for each visit might be more effective (Cherkin et al, 1990;

Scitovsky and McCall, 1977). For example, in a study on HMO enrolees in Washington State, Cherkin et al (1990) found that a copayment of only $5 per physician visit led to a significant decrease in the overall number of visits. For Germany, Winkelmann's findings (2004) also suggest that the 1997 increase in copayments for prescription drugs was more effective at reducing the number of physician visits than the copayment scheme examined in this study.

According to our results, there is no evidence that the copayment introduced in 2004 decreased the probability that persons with chronic conditions or low income will visit a physician. However, the results of the NB models indicate that persons with chronic conditions and low income, defined as the lowest income quintile, significantly reduced their number of physician visits compared to our control group. These results have to be interpreted with caution, because both effects were only significant at the 0.05 level and became insignificant in the ZINB models, which were found to be more appropriate for the structure of our data. Therefore, based on our ZINB models, we have to conclude that the copayments do not act as a deterrent among vulnerable populations. This result may be due either to the low amount of the copayment or the effectiveness of the income thresholds.

It is important to consider the limitations of our study when interpreting its results. Before the health care reform in 2004, a number of over-the-counter (OTC) drugs were still in the SHI benefit catalogue. After the reform, however, these were completely excluded. This also has the potential to lead to a reduction in the number of physician visits. Although our data do not allow us to control for this effect, it is unlikely that this has subjected our study results to bias, because the copayments for prescriptions before the reform often exceeded the price for OTCs.

Our observations have important policy implications for decision-makers in Germany and other countries. Given the current framework, the copayments for ambulatory care in Germany have a pure funding effect and do not provide behavioural incentives with respect to physician visits. If decision-makers intend to reduce moral hazard effectively, a different copayment scheme is needed. Based on the US experience, imposing copayments for each physician visit might be more effective. An alternative might be to launch prevention programmes that focus on helping vulnerable groups avoid certain health problems and the physician visits that these would entail. This could reduce the financial burden for vulnerable groups and has the potential to decrease overall health expenditures.

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Appendix: Descriptive overview of the sample

	PHI		SHI w/o exemption		SHI with chronic conditions		SHI poor		SHI with public assistance	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Physician contact	0.60	0.49	0.68	0.47	0.94	0.24	0.69	0.46	0.63	0.48
No. physician visits	2.03	3.30	2.31	3.35	6.04	5.95	2.63	3.80	2.43	3.76
Current health status										
Very good	0.14	0.35	0.10	0.30	0.01	0.08	0.1020	0.29	0.10	0.30
Good	0.47	0.50	0.42	0.49	0.07	0.25	0.36	0.48	0.37	0.48
Fair	0.29	0.45	0.34	0.47	0.30	0.46	0.34	0.47	0.31	0.46
Poor	0.08	0.28	0.12	0.33	0.36	0.48	0.17	0.37	0.17	0.37
Very poor	0.01	0.11	0.02	0.15	0.28	0.45	0.04	0.20	0.05	0.21
Active sports	0.41	0.49	0.28	0.45	0.14	0.35	0.22	0.41	0.13	0.34
Smoker	0.26	0.44	0.29	0.45	0.18	0.38	0.33	0.47	0.53	0.50
Household Income										
1. quintile	0.05	0.22	0.15	0.36	0.23	0.42	1.00	0.00	0.62	0.48
2. quintile	0.06	0.23	0.21	0.41	0.26	0.44	0.00	0.00	0.19	0.39
3. quintile	0.11	0.31	0.22	0.42	0.22	0.41	0.00	0.00	0.09	0.28
4. quintile	0.19	0.39	0.21	0.41	0.17	0.37	0.00	0.00	0.05	0.22
5. quintile	0.58	0.49	0.19	0.39	0.11	0.32	0.00	0.00	0.02	0.15
Male	0.61	0.49	0.46	0.50	0.51	0.50	0.33	0.47	0.42	0.49
Age	47.5	16.1	46.5	17.1	63.6	14.8	46.3	19.7	39.7	14.5
Age squared	2514	1585	2457	1697	4271	1776	2528	1964	1788	1276
Children in household	0.07	0.26	0.08	0.27	0.01	0.11	0.09	0.29	0.19	0.39
Educational level										
High	0,39	0.49	0.14	0.35	0.09	0.29	0.07	0.25	0.08	0.27
Medium	0.44	0.49	0.60	0.49	0.59	0.49	0.48	0.50	0.49	0.50
Without any degree	0.16	0.37	0.25	0.43	0.30	0.46	0.43	0.50	0.41	0.49
Information is Missing	0.01	0.12	0.01	0.11	0.02	0.12	0.02	0.13	0.02	0.14
Employment status										
Full-time empl.	0.52	0.50	0.41	0.49	0.09	0.28	0.12	0.33	0.11	0.31
Part-time empl.	0.04	0.20	0.11	0.31	0.02	0.15	0.10	0.30	0.06	0.25
Unemployed	0.01	0.11	0.07	0.25	0.04	0.19	0.17	0.38	0.49	0.50
Self-employed	0.30	0.46	0.04	0.20	0.01	0.10	0.02	0.15	0.02	0.16
West-German	0.87	0.33	0.74	0.44	0.77	0.42	0.73	0.44	0.65	0.48
Population at residence location										
< 2,000	0.06	0.24	0.10	0.30	0.07	0.26	0.09	0.28	0.07	0.26
2 -5,000	0.09	0.29	0.15	0.36	0.14	0.35	0.15	0.36	0.15	0.35
5-20,000	0.22	0.41	0.20	0.40	0.18	0.38	0.18	0.38	0.14	0.35
20-50,000	0.17	0.37	0.19	0.39	0.18	0.38	0.18	0.39	0.19	0.39
50.-100,000	0.09	0.29	0.08	0.26	0.09	0.28	0.08	0.27	0.07	0.25
100.-500,000	0.19	0.40	0.17	0.38	0.20	0.40	0.18	0.39	0.21	0.41
>500,000	0.17	0.38	0.11	0.32	0.15	0.36	0.13	0.34	0.17	0.37
Month of interview										
January	0.12	0.33	0.19	0.39	0.23	0.42	0.21	0.40	0.10	0.30
February	0.23	0.42	0.27	0.44	0.29	0.45	0.25	0.43	0.32	0.47
March	0.21	0.41	0.21	0.40	0.19	0.39	0.18	0.38	0.24	0.43
April	0.16	0.37	0.13	0.34	0.11	0.32	0.13	0.33	0.14	0.35
May	0.11	0.31	0.08	0.27	0.07	0.25	0.08	0.28	0.07	0.26
June	0.08	0.27	0.06	0.23	0.05	0.22	0.06	0.24	0.06	0.24
July	0.05	0.21	0.03	0.18	0.03	0.16	0.04	0.18	0.04	0.19
August	0.02	0.15	0.02	0.14	0.02	0.13	0.02	0.15	0.02	0.14
September	0.01	0.11	0.01	0.11	0.01	0.08	0.02	0.13	0.01	0.10
October	0.01	0.08	0.01	0.08	0.00	0.07	0.01	0.09	0.00	0.06
N	14,762		121,876		7,998		8,184		4,317	

Source: SOEP, pooled information for survey years 2000-2003, 2005-2006.