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ECONOMIC PAPERS

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Waiting Times for Outpatient Treatment in Germany: New Experimental Evidence from Primary Data

Imprint

Ruhr Economic Papers

Published by

Ruhr-Universität Bochum (RUB), Department of Economics
Universitätsstr. 150, 44801 Bochum, Germany

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Ruhr Economic Papers #683

Responsible Editor: Jochen Kluge

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ISSN 1864-4872 (online) – ISBN 978-3-86788-792-2

The working papers published in the Series constitute work in progress circulated to stimulate discussion and critical comments. Views expressed represent exclusively the authors' own opinions and do not necessarily reflect those of the editors.

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Bibliografische Informationen der Deutschen Nationalbibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über:
<http://dnb.d-nb.de> abrufbar.

Das RWI wird vom Bund und vom Land Nordrhein-Westfalen gefördert.

<http://dx.doi.org/10.4419/86788792>

ISSN 1864-4872 (online)

ISBN 978-3-86788-792-2

Nils Heinrich, Ansgar Wübker, and Christiane Wuckel¹

Waiting Times for Outpatient Treatment in Germany: New Experimental Evidence from Primary Data

Abstract

Long waiting lines are a common feature and a major concern in many public health care delivery systems. The waiting lines are often characterized as inefficient, because they are a burden to patients without generating any gains for providers. There is an ongoing debate in Germany regarding the preferential treatment given to private health insurance (PHI) holders while statutory health insurance (SHI) holders face continuously increasing waiting times. In order to tackle this problem in the outpatient sector, in 2015 Germany introduced a reform that was aimed at providing SHI holders with appointments within an acceptable time frame. We exploited longitudinal experimental data to examine waiting times for six elective outpatient treatments in Germany and assessed the reform's impact on this issue. We found a sizeable difference in waiting times favoring private patients. For SHI holders, waiting times remained stable over time (27.5 days in 2014; 30.7 days in 2016; Δ 3.2 days, p -value = 0.889), while PHI holders experienced a significant improvement (13.5 days in 2014; 7.8 days in 2016; Δ 5.7 days, p -value = 0.002). The results indicate that there is an unequal access to elective outpatient treatment depending on the patient's insurance status. Our conclusion is that, the reform did not repair the existing inequalities. The gap has rather widened.

JEL Classification: I10, I11, I18

Keywords: Waiting times; outpatient care; Germany; public health insurance; private health insurance

March 2017

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1. Introduction

Long waiting lines for medical treatment are a major concern in many public health care delivery systems (Cullis et al. 2000; Siciliani et al. 2005; Siciliani & Verzulli 2009). Long waiting lines are inefficient and therefore an undesirable form of rationing, because they diminish utility gains from consultation and treatment (Lindsay & Feigenbaum 1984). They put costs on patients without providing benefits for providers (Siciliani et al. 2005). Over the past decades many countries devised administrative measures to reduce waiting lines. The measures included higher spending, waiting-times target schemes and incentive mechanisms, which reward higher levels of activity (see for an overview Siciliani et al. 2005; Viberg et al. 2013 or Siciliani et al. 2014).

In Germany, the ongoing debate around increasing waiting times focuses on equity concerns rather than on efficiency aspects. In particular, the multi-player health insurance system and its impact on access to outpatient health care is a critical issue in the political and scientific debate (e.g. Lungen et al. 2008; Wübker et al. 2011; Roll et al. 2012). More precisely, there is an increasing concern in Germany that there exists discrimination in access to medical care by insurance type (e.g. Lungen et al. 2008; Roll et al. 2012).

The health insurance system consists of two key components: the Statutory Health Insurance (SHI) and the Private Health Insurance (PHI). The SHI is financed by income related contribution rates and covers about 88% of the population. PHI rates, in contrast, are calculated based on individual risk; approximately 12% of the population is privately insured (BMG - Bundesministerium für Gesundheit 2015). The SHI is the default form of health insurance and compulsory for everybody below a dynamic income threshold (56,250 € in 2016). Employees that earn an income above this threshold are able to opt out of the public insurance system and take on a private health insurance. In addition, self-employed and civil servants have the choice between SHI and PHI.¹

There are a number of financial advantages for physicians to treat private patients. If a PHI patient is treated, reimbursement rates are about 3 times higher (Niehaus 2009, Niehaus 2013). Moreover, for

¹ Civil servants have very strong financial incentives to join PHI, because they receive high public allowances for PHI which covers a big part of the overall PHI-contributions.

SHI-holders there are deductions on payment for physicians who are deemed to provide too much treatment and the SHI benefit package is less generous than the PHI benefit package (e.g. Roll et al. 2012). Those differences provide strong incentives for physicians to offer preferential treatment to privately insured patients. This includes offering appointments to PHI holders with a higher priority. For example, Lungen et al. (2008) analyzed waiting times for 5 elective treatments and found that SHI patients have to wait about 3 times longer for an appointment than PHI patients. In some cases, waiting times for SHI patients substantially exceeded a month.

In 2015, policy-makers initiated a reform which was intended to tackle the problem of rising waiting time in the outpatient sector. The reform is part of a law that is aimed at improving medical services in general (Versorgungsstärkungsgesetz). Part of the requirements is the creation of service stations for appointments (Terminservicestellen). Upon a patient's request, those service stations are supposed to find an appointment at a practice that lies within an acceptable distance from the patients' place of residence. Furthermore, the appointment should not be further away than 4 weeks. The reform is also aimed at reducing the backlog at high-demand practices and shifting demand towards practices with free capacities. If the reform is effective, it would reduce waiting times, since appointments would be spread more evenly, and excessive waiting times could be avoided.

Against this background this study has three objectives: Firstly, it aims to assess the waiting times for elective outpatient treatments in a big urban region. Secondly, it examines, whether PHI-holders obtain quicker appointments than SHI patients. Thirdly, it evaluates the overall impact of the reform in reducing waiting times as well as its effect on the system's disparities.

To answer this questions, we conducted an experiment, whereby a team of trained research assistants called in 163 specialist practices in the region of Cologne, Leverkusen and Bonn. The experiment was carried out for the first time in 2014, and was repeated again in 2016. The research assistants were immersed as patients who were in need of medical care. Depending on the specialist, they requested one of the following six outpatient elective treatments: eye examination, hearing test, allergy test, pulmonary function test, MRT of the knee and gastroscopy. In order to provide an exogenous variation of the insurance status the callers were randomly assigned to either PHI or SHI status.

We discovered that publicly insured patients face high waiting times that remain stable over time – with the average waiting time rising from 28 working days in 2014 to 31 working days in 2016. In contrast, privately insured patients' waiting time decreased from 14 days in 2014 to 8 days in 2016. We found a strong variation between treatments. While pulmonary function test required the longest waiting time (SHI: 54 days in 2014 and 70 days in 2016; PHI: 26 days in 2014 and 21 days in 2016), hearing test required the shortest time (SHI: 10 days in 2014 and 8 days in 2016; PHI: 8 days in 2014 and 3 days in 2016). Additionally, we also examined the disparities between the members of the both insurance schemes and discovered an increasing gap in waiting times. Our results suggest that the reform did not repair the existing inequalities between PHI and SHI policy holders.

Our paper contributes to the scarce empirical literature on waiting times in the German health care market (Lungen et al. 2008; Kuchinke et al. 2009, Schwierz et al. 2011; Schneider & Schneider 2012; Roll et al. 2012; Sundmacher et al. 2013). Compared to most of these studies the main feature of this paper is that we employ an experimental design that avoids selection biases, recall biases and response biases. These problems are a constant challenge for studies that are based on patients surveys (e.g. Asplin et al. 2005). Lungen et al. (2008) analyzed waiting times in a similar approach, evaluating the same region and identical treatments. In addition to this study, we were able to collect data over several points of time, which allows us to examine time trends and the reforms' impact, which makes it a first of this kind in Germany.

Moreover, this paper contributes to the broad empirical economic literature which uses waiting times as a measure of access to medical care (e.g. Cullis et al. 2000; Sundmacher et al. 2013; Viberg et al. 2013; Siciliani et al. 2014). Several studies provide evidence that waiting times for elective treatments are strongly associated with insurance type and financial incentives (e.g. Asplin et al. 2005; Siciliani et al. 2014). The German multi-player system, with a strong separation between PHI and SHI patients (e.g. remunerations rates are 3 times higher for PHI holder, Niehaus 2009), is well suited to study how insurance types and financial incentives impact access to medical care.

The next section describes the institutional settings of the German health insurance system and provides an overview of the reform. Following, section 3 explains the data, the study design and the empirical strategy. Section 4 provides the results and Section 5 the conclusion.

2. Institutional Settings

2.1 The German Insurance System

The German health insurance system is characterized by a parallel existence of public/statutory (SHI) and private health insurance (PHI). While for large parts of society SHI is obligatory, certain groups have the possibility to opt out of the SHI into the PHI system. This applies to civil servants, self-employed and employees with an annual income above the threshold of 56,250 Euros. In 2013, approximately 12% were privately insured (BMG - Bundesministerium für Gesundheit 2015). Differences also exist regarding the determination of insurance fees. SHI providers base a patient's fees depending on the patient's income. In contrast, PHI fees are set according to an individual risk assessment.

Cost sharing within the SHI system is very low compared to international standards. It is heavily regulated, and generally identical across the 118 SHI health plans. About 95 % of the SHI benefit package is predetermined by social legislation at the federal level. In the PHI system, cost sharing has a prominent role and health plans are far less regulated. Both systems allow patients to choose freely among physicians and hospitals.

The ambulant and inpatient care sectors are strictly separated with different rules, institutions and budgets. In general, hospitals are not allowed to provide ambulatory care. There are around 130,000 physicians in the ambulatory care sector that are mostly self-employed and work in individual or small group practices (Salm and Wübker 2016).

The preferred treatment of PHI patients has a number of financial advantages for physicians in the outpatient sector. For outpatient care, reimbursement for treating PHI holders is about 3 times higher than for SHI holders (Niehaus 2009 and Niehaus 2013) and the SHI benefit package is less generous

than the PHI benefit package (Roll et al. 2012). Moreover, for SHI patients, physicians are subjected to budget limits on an individual level, the so-called Regelleistungsvolumen (RLV). The RLV defines the maximum quantity of services that a physician can charge without any discount. Services performed beyond the budget limits are reimbursed at a much lower rate (Salm and Wübker 2016). On average, PHI holders have a higher income and thus face higher opportunity costs of waiting times (Johannesson et al. 1998). This may lead to an increased willingness among private patients to change physicians based on the length of waiting times, which in turn increases physician's incentives for preferential treatment.

2.2 The Reform

In order to reduce waiting times, policymakers initiated a reform that was subsequently introduced on the 25th of January 2016. The initiative was part of a law aimed at improving medical service provision comprehensively (Bundestag et al. 2015). Service stations were installed, which patients could approach if they were not able to obtain an appointment via the usual channels. Called upon, within a week, the station must allocate an appointment to the patient with no longer than 4 weeks² waiting time and that is in an acceptable distance to the patients' place of residence. However, this applies only if the general practitioner has issued a medical referral indicating high urgency³. An acceptable distance is defined as the distance to the next specialist of the required kind plus additional 30 minutes by public transport. In case of certain specialists⁴, a travelling time of 60 minutes is considered acceptable. Neither time preferences nor preferences of a particular specialist will be taken into account. If the station cannot find an appropriate appointment, an outpatient-treatment must be arranged for the patient in a hospital.⁵

This reform aims to optimize the allocation of patients. Practices in less demanded regions might still have appointments available that are not fully utilized, while specialists in highly demanded areas are not able to satisfy the demand. In urban areas with a considerable number of specialist, time and money constraints prevent patients from inquiring about all the available appointments in different practices.

2 Upon transferal, except in the case of gynecologists and optometrists.

3 By a remark „A“ – otherwise „B“.

4 Radiologists, specialized internists and child psychiatrists.

5 https://www.kvno.de/downloads/tss/infoblatt_patienten_tss.pdf

The service stations are intended to overcome this inefficiency and find an acceptable appointment on behalf of the patient. In addition, a prioritization is given according to the urgency status.

This reform is specifically directed towards individuals with urgent indications that were not able to obtain short-term appointments. Due to this narrow target group, it is likely that the reform will not directly affect the majority of patients. However, if the reform is successful, we can expect an indirect effect. An improved resource allocation by matching patients to free specialist appointments can reduce the backlog of practices and therefore decrease overall waiting times.

As the placement is not limited to a certain kind of insurance, SHI holders as well as PHI holders could take advantage of the reform. However, under the assumption of preferential treatment of private patients, it is reasonable to assume that only few PHI holders are not able to get an appointment within 4 weeks. We therefore expect that mainly publicly insured patients will approach the service hotlines. However, if the reform improves resource allocation, practices will have more resources in form of appointments at hand. As physicians face incentives to offer preferential treatment to private patients (Roll et al. 2012), those capacities are likely to be used in favor of PHI holders without positive effects for SHI holders. While the reform might have a negative effect on general waiting times, the insurance specific effect depends highly on the behavior of physicians and hence cannot be fully predicted by theoretical considerations.

3. Methods

3.1 Experimental Design

The experimental design follows closely the approach taken by Lungen et al. (2008), which allows to compare our results. The experiment was carried out in the area of Cologne, Leverkusen and Bonn: an urban, high-density region in Germany. Although this region does not represent all of Germany, its strong advantage is the high number of physicians, patients, and the respective data.

The sampling frame includes all available specialists assumed to offer the respective treatments. Physicians were called by telephone and an appointment for the respective elective treatment was

requested. Telephone numbers were taken from public directories. The first wave of telephone calls took place between February 18 and 25, 2014. The second wave was carried out between August 24 and October 14 2016.

Similar to Lungen et al. (2008), during the first wave each physician received a call in which the insurance status was mentioned. The caller's insurance status was assigned randomly. In the second wave, a refinement was made to further ensure the absence of unobserved heterogeneity. Each physician was called a second time for an appointment with the reversed insurance status. As a result, for each physician an appointment for a SHI and a PHI holder were made. Both appointments are directly comparable since practice specific effects that influence the length of waiting time do not play a role here. Except for the insurance status, all other conditions were equal and a sufficient time between the calls was maintained.⁶ This double call design enables us to check for unobserved heterogeneity without losing the comparability of the results to the first wave and to the former studies.

During the call, no reason for exceptional treatment was given nor was urgency indicated. If a physician asked for the particular health insurance company, a major insurance provider of the respective kind was named. When the physician requested the name of the general practitioner, a fictitious name was provided with the argument of having recently moved to the area. All the telephone calls were ended with the cancellation of the pretense appointments.

The study excluded the practices that did not offer a treatment at all or only offered it to private patients. In addition, we excluded all practices that were closed for more than a week or those that were not reached after three calls, respectively six calls if the line was busy. Finally, we omitted the practices that did not accept new patients or did not offer fixed appointments.

Treatments were chosen for several reasons: all treatments can be considered elective rather than emergency, but must be carried out by a specialist. Additionally, those treatments are not limited to a certain subpopulation, can be performed during a single visit and are relatively prominent among the population (see Lungen et al. 2008). Table 1 summarizes the choice of specialists and treatments as well

⁶ Calls were at least a week apart.

as the number of contacted and included practices, with respect to the insurance status. Inclusion rates are high with over 80 percent in 2014 and about 75 percent in 2016.

[Insert table 1]

3.2 Statistical Methods

The data was examined in a bivariate as well as in a multivariate manner. As first step, we applied Wilcoxon rank sum tests to detect changes in waiting times. We obtained results for overall waiting times as well as for subgroups, with the objective of identifying the main driver of the results.

Next, we carried out a multivariate analysis. The outcome variable is the logarithm of waiting time, defined as the number of working days between the phone call and the received appointment. Considered factors of interest are the insurance status, the kind of the treatment and their interaction term. The models are estimated by an ordinary least square regression. Additionally, we re-estimated the models as balanced panel, only considering practices, which could be included in both years. The third model estimates the probability of obtaining an appointment with a waiting time longer than 4 weeks or, in other terms, 20 working days.

4. Results

In total, 397 appointments were made, which accounts to a high overall inclusion rate of 77.4% (see Table 1). Most important exclusion restrictions were unattainability of the praxis (even after 6 calls), refusal of fixed appointments, vacation and the acceptance of only private patients.⁷ These reasons account for over 80 percent of exclusions.

Overall waiting times stayed quite stable over time (see Table 2). On average, in 2014, a patient had to wait 20 days for an appointment and 19 days in 2016. Bivariate analysis indicates sizeable differences in waiting times by insurance type. SHI patients face high waiting times that remain stable over time – with the average waiting time rising from 28 working days in 2014 to 31 working days in 2016. In contrast, privately insured patients' waiting time decreased significantly from 14 days in 2014 to 8 days

⁷ We exclude latter because we were not able to compare PHI and SHI waiting times for these practices.

in 2016. In relative terms, in 2014, SHI policy holders waited on average twice as long for an appointment compared to PHI holders and in 2016 they waited almost four times longer than a PHI policy holder. The differences between PHI and SHI policy holders were significant in both years.

We found a strong variation in waiting times between treatments. In 2014, the longest waiting times were found for pulmonary function tests with an average waiting time of 46 working days in 2014 (SHI 54.4 days; PHI 26.0 days), which only slightly decreased to 45 days in 2016 (SHI 70.2 days; PHI 21.3 days). In contrast, an appointment for a hearing exam only required a waiting time of 8 days in 2014 (SHI 10.0 days; PHI 5.4 days), which fell to 6 days in 2016 (SHI 8.4 days; PHI 2.9). For all treatments waiting times for PHI-patients decreased between 2014 and 2016 (significantly for hearing test, MRT of the knee and gastroscopy) , whereas for SHI-patients the pattern was heterogeneous with increasing waiting times for eye examination, allergy test and pulmonary function test and decreasing waiting times for hearing test and gastroscopy. For SHI holders all changes were statistically insignificant. In 2016, differences in waiting times between SHI and PHI policy holders were significant for all treatments.

[Insert table 2]

Table 3 presents the results of multivariate analysis. The dependent variable in panel A is the logarithmized waiting time and the full model controls for the different treatment types (not shown in Table 3). Of special interest in this model is the effect of the interaction term “Year 2016 # SHI”. This coefficient shows whether waiting time differences between SHI and PHI policy holders changed between 2014 and 2016, respectively how the waiting time gap between both groups changed before vs. after the reform. The results show that the gap between SHI and PHI patients in waiting times increased significantly after the reform.⁸ Moreover, in line with the previous analysis, the analysis of the full sample (1) shows that SHI patients experience significantly higher waiting time than PHI patient shown by the positive SHI coefficient.

⁸ Considering the negative value of the time trend, the combined effect of time trend and interaction term shows that waiting times for SHI policy holders stayed stable whereas private patients experienced decreasing waiting times.

Additionally, a second specification is included, that models the probability of obtaining an appointment with a waiting time longer than 4 weeks (respectively 20 working days). The model is estimated as a Linear probability model (LPM), however the application of Logit and Probit estimations yield similar results.

The probability of having to wait for 4 weeks or more decreases significantly in 2016, but was generally higher for SHI patients. The interaction term fails to be significant here. However, this can be explained by the fact that the mean waiting time for SHI patients in 2014 is already well beyond the critical value of 20 working days. Hence, any further increase will not be captured by the model.

[Insert table 3]

5. Discussion and Conclusion

The main objective of this paper was to assess the impact of health insurance status on waiting time. The paper additionally sought to evaluate the effect of a 2015 reform designed to reduce waiting times by offering assistance in obtaining specialist appointments if certain requirements are met. In this context, the development of waiting times between 2014 and 2016 was assessed and checked for insurance-specific trends. Due to a similar experimental design, we were able to compare our findings to results obtained for 2006 by Lungen et al. (2008). The results illustrate the importance of insurance status in obtaining an appointment at a specialized doctor; SHI holders were required to wait significantly longer to see a specialist for an elective treatment than PHI holders. This is a well-established finding in the literature, internationally as well as in Germany. Thus, preferential treatment can be suspected.

In addition, we do not only find a considerable gap in waiting times with regard to insurance status, we also detect a widening of the gap over time. In comparison to 2006, waiting times generally increased. However, while this trend reversed between 2014 and 2016 for PHI holders, a further deterioration was found for SHI patients. In 2016, publicly insured patients had to wait nearly 4 times as long for an appointment compared to privately insured. Depending on the considered treatment, this ratio ranges between 3 times and 17 times. Although this preferential treatment raises concerns with regard to equal

access to medical care, the results are in line with theoretical expectations. Differences in remunerations create strong incentives for physicians to discriminate in favor of PHI holders. This effect is further reinforced since private patients tend to be highly time sensitive.

Besides insurance status, results vary greatly by the specialist field. While on average an appointment for a hearing test can be offered within 6 working days (in 2016), a patient will have to wait about 44 days to take a pulmonary function test.

We also evaluated the impact of a 2015 reform designed to reduce excessive waiting times. A hotline was initiated for patients unable to obtain an appointment within 4 weeks via the usual channels. However, this only applies if urgency is indicated. Since several mechanisms could be at work, theoretical considerations were not able to provide unanimous predictions. The findings show a slight reduction of waiting times between 2014 and 2016. However, this improvement is limited to private patients. In contrast, statutory health insurance holders did not experience any significant change.

It is rather unlikely that the decrease in waiting times for private patients is a direct result of the reform. The hotline is only open to patients that could not obtain an appointment within 4 weeks. Because PHI holders generally have much lower waiting times, the reform does not apply to them. However, it is possible that the reform was able to spread appointments more evenly by reducing backlog at high-demand practices. Hence, some capacities would be made available. As mentioned before, physicians have incentives to prefer private patients. Therefore, those capacities were possibly used to further prioritize PHI holders. It is beyond the scope of this paper to attribute the change in waiting times fully to the reform or disentangle reform effects from general time trends. It is possible and would be in line with anecdotal evidence that the reform had no effect on SHI waiting times, and changes must be linked to other developments within the health care sector.

The magnitude of discrimination suggests that the current system's ability to ensure equal access to medical care is limited. Further research is required to evaluate the scope of this inequity. While we could demonstrate that members of private health insurance have better access to the system, this study has nothing to say about the consequences. It remains unclear how the health status of patients is affected by asymmetric waiting times. Moreover, the region in which the study was conducted is mainly urban

and hence not representative for Germany or North Rhine-Westphalia. PHI holders are more likely to be prevalent in major cities such as Bonn, Cologne and Leverkusen than in less urban parts of Germany. However, the resulting bias remains unclear. Furthermore, this study is limited to elective treatments. The scope of discrimination in case of emergencies, if it exists, is yet to be evaluated. Finally, we are not able to judge if preferential treatment is also mirrored by different qualities of care. These points, however, are important in order to not only examine the scope of inequity in the system but also the efficiency of the system.

References

- Asplin, B.R. et al., 2005. Insurance status and access to urgent ambulatory care follow-up appointments. *JAMA*, 294(10), pp.1248–54. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/16160133> [Accessed October 24, 2016].
- BMG - Bundesministerium für Gesundheit, 2015. Daten des Gesundheitswesens 2013. , p.167. Available at: www.bundesgesundheitsministerium.de.
- Bundestag, D. et al., 2015. Gesetz zur Stärkung der Versorgung in der gesetzlichen Krankenversicherung. , 2015(30), pp.1211–1244.
- Cullis, J.G., Jones, P.R. & Propper, C., 2000. Chapter 23 Waiting lists and medical treatment: Analysis and policies. *Handbook of Health Economics*, 1, pp.1201–1249.
- Kuchinke, B.A., Sauerland, D. & Wübker, A, 2009. The influence of insurance status on waiting times in German acute care hospitals: an empirical analysis of new data. *International Journal of Equity in Health*, 8 (44).
- Lindsay, C.M. & Feigenbaum, B., 1984. Rationing by Waiting Lists. *The American Economic Review*, 74(3), pp.404–417. Available at: http://www.jstor.org/stable/1804016?seq=1#page_scan_tab_contents.
- Lungen, M., Stollenwerk, B., Messner, P., Lauterbach, K. W., & Gerber, A., 2008. Waiting times for elective treatments according to insurance status: A randomized empirical study in Germany. *International Journal for Equity in Health*, 7(1), 1.
- Niehaus, F. 2009. Ein Vergleich der ärztlichen Vergütung nach GOÄ und EBM. Diskussionspapier des Wissenschaftlichen Instituts der PKV 7/09, Köln.
- Niehaus, F. 2013, Der überproportionale Finanzierungsbeitrag privat versicherter Patienten - Die Entwicklung von 2006 bis 2011, Diskussionspapier des Wissenschaftlichen Instituts der PKV 1/13, Köln.

- Resneck, J., Pletcher, M.J. & Lozano, N., 2004. Medicare, Medicaid, and access to dermatologists: The effect of patient insurance on appointment access and wait times. *Journal of the American Academy of Dermatology*, 50(1), pp.85–92.
- Roll, K., Stargardt, T. & Schreyögg, J., 2012. Effect of Type of Insurance and Income on Waiting Time for Outpatient Care. *The Geneva Papers on Risk and Insurance Issues and Practice*, 37(4), pp.609–632.
- Salm, M. & Wübker, A., 2016. Causes of regional variation in health-care use, Mimeo.
- Schneider, B.S. & Schneider, U., 2012. Wartezeiten auf Facharztbesuche - eine Analyse versicherungsbedingter Diskriminierung und gesundheitlicher Nachteile. *Märkte und Versorgung: [... ausgewählte Beiträge des siebten Duisburg-Ilmenau-Bayreuther Oberseminars zur Gesundheitsökonomie und Sozialpolitik (DIBOGS) ... am 27. und 28. Oktober 2011 in Hamburg]*.
- Schwierz, C., Wübker, A., Wübker, A. & B. Kuchinke 2011. Discrimination in Waiting Times by Insurance Type and its association to Financial Soundness of Hospitals. *European Journal of Health Economics*, 2011, 12 (5), pp. 405-416.
- Siciliani, L. & Hurst, J., 2005. Tackling excessive waiting times for elective surgery: a comparative analysis of policies in 12 OECD countries. *Health policy*, 72(2), pp.201–15.
- Siciliani, L., Moran, V. & Borowitz, M., 2014. Measuring and comparing health care waiting times in OECD countries. *Health Policy*, 118(3), pp.292–303.
- Siciliani, L. & Verzulli, R., 2009. Waiting times and socioeconomic status among elderly Europeans: evidence from SHARE. *Health Economics*, 18(11), pp.1295–1306.
- Sundmacher, L. et al., 2013. Waiting times in the ambulatory sector - the case of chronically ill patients. *International Journal for Equity in Health*, 12(1), p.77.
- Viberg, N., Forsberg, B. C., Borowitz, M., & Molin, R., 2013. International comparisons of waiting times in health care – Limitations and prospects. *Health Policy*, 112(1), pp.53–61.

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Table 1 : Number of practices included according Specialist field and insurance Status

Specialist fields	Treatment	Insurance Status of the caller	2014			2016		
			Contac- ted	Inclu- ded	Inc. rate (%)	Contac- ted	Inclu- ded	Inc. rate (%)
Ophthalmology	Eye examination	SHI	33	30	91	67	48	72
		PHI	33	26	79	67	45	67
Otorhino- laryngology	Hearing test	SHI	22	17	77	44	37	84
		PHI	21	15	71	44	37	84
Allergology	Allergy test	SHI	9	7	78	22	14	64
		PHI	9	9	100	22	18	82
Pulmonology	Pulmonary function test	SHI	7	7	100	11	9	82
		PHI	4	3	75	13	10	77
Diagnostic Radiology	MRT of the knee	SHI	3	3	100	14	7	50
		PHI	7	7	100	14	9	64
Gastro- enterology	Gastroscopy	SHI	7	7	100	16	12	75
		PHI	8	8	100	16	12	75
Total	All Treatments	SHI	81	71	88	174	127	73
		PHI	82	68	83	176	131	74

Remarks: MRT = Magnetic resonance tomography / SHI = statutory health insurance / PHI = private health insurance

Table 2 : Test statistic - Wilcoxon Ranksum test

Insurance status / Specialist field	Year 2014				Year 2016						
	SHI	PHI	Total 2014	P-value SHI/PHI 2014	SHI	PHI	Total 2016	P-value SHI/PHI 2016	P-value All- 2014/2016	P-value SHI 2014/2016	P-value PHI 2014/2016
Eye examination	27.4	12.7	20.3	0.140	32.8	7.6	20.3	0.000	0.498	0.624	0.124
Hearing test	10.0	5.4	7.8	0.457	8.4	2.9	5.6	0.019	0.140	0.598	0.080
Allergy test	21.7	13.7	17.2	0.244	40.7	10.5	24.2	0.003	0.493	0.709	0.166
Pulmonary function test	54.4	26.0	45.9	0.253	70.2	21.3	44.5	0.003	0.945	0.152	0.800
MRT of the knee	19.7	16.0	17.1	0.487	24.4	1.4	11.5	0.001	0.366	0.732	0.089
Gastroscopy	52.4	24.0	37.3	0.027	52.0	12.9	32.5	0.001	0.298	0.833	0.089
Total	27.5	13.5	20.5	0.002	30.7	7.8	19.0	0.000	0.021	0.899	0.002

Table 3 : Regression Results

	All Treat- ments (1)	Eye test (2)	Hearing test (3)	Allergy test (4)	Pulmonary function test (5)	MRT of the knee (6)	Gastros- copy (7)
Panel A - OLS							
Dependent Variable : Waiting time in logs							
Year 2016	-0.568*** (0.001)	-0.335 (0.192)	-0.501* (0.068)	-0.675 (0.202)	0.252 (0.832)	-1.695** (0.018)	-0.763* (0.099)
SHI	0.703*** (0.001)	0.567* (0.092)	0.345 (0.393)	0.746 (0.132)	1.933* (0.090)	0.784 (0.281)	0.915** (0.033)
Year 2016 # SHI	0.576** (0.029)	0.491 (0.238)	0.417 (0.371)	0.891 (0.199)	-0.043 (0.971)	1.767** (0.035)	0.717 (0.191)
R ²	0.221	0.129	0.115	0.262	0.461	0.619	0.454
Mean dependent variable	2.096	2.202	1.233	2.245	3.236	1.875	3.090
N	385	143	103	47	29	24	39
Panel B - LPM							
Dependent Variable : Dummy - Waiting time more than 4 weeks							
Year 2016	-0.141** (0.012)	-0.109 (0.164)	-0.067 (0.312)	-0.098 (0.620)	0.067 (0.845)	-0.429** (0.047)	-0.375 (0.103)
SHI	0.201*** (0.006)	0.203* (0.083)	0.051 (0.623)	0.095 (0.711)	0.667** (0.032)	0.238 (0.514)	0.232 (0.316)
Year 2016 # SHI	0.133 (0.135)	0.165 (0.244)	0.060 (0.606)	0.169 (0.588)	-0.067 (0.845)	0.190 (0.649)	0.435 (0.126)
R ²	0.210	0.138	0.043	0.053	0.471	0.261	0.343
Mean dependent variable	0.289	0.241	0.067	0.362	0.724	0.308	0.641
N	391	145	105	47	29	26	39
Treatment Indicators	Yes	No	No	No	No	No	No

* p<0.10, ** p<0.05, *** p<0.01; P-values in brackets.