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UNIVERSITÄT DUISBURG ESSEN

#529

Imprint

Ruhr Economic Papers

Published by

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

Technische Universität Dortmund, Department of Economic and Social Sciences
Vogelpothsweg 87, 44227 Dortmund, Germany

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Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI)
Hohenzollernstr. 1-3, 45128 Essen, Germany

Editors

Editorial Office

Ruhr Economic Papers #529

Responsible Editor: Volker Clausen

ISSN 1864-4872 (online) – ISBN 978-3-86788-606-2

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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.

http://dx.doi.org/10.4419/86788606
ISSN 1864-4872 (online)
ISBN 978-3-86788-606-2

Jeannette Brosig-Koch, Nadja Kairies-Schwarz, and Johanna Kokot[1]

Sorting into Physician Payment Schemes – A Laboratory Experiment

Abstract

Most common physician payment schemes include some form of traditional capitation or feefor-service payment. While health economics research often focuses on direct incentive effects of these payments, we demonstrate that the opportunity to sort into one's preferred payment scheme may also significantly affect medical treatment. Our study is based on an experiment testing individual sorting into fee-for-service and capitation payment under controlled laboratory conditions. A sequential design allows differentiating between sorting and incentive effects. We find a strong preference for fee-for-service payment, independent of subjects' prior experience with one of the two payment schemes. Our behavioral classification reveals that subjects who select into capitation deviate less from patient-optimal treatment than those who prefer fee-for-service payment. Moreover, comparing subjects' behavior before and after introducing the choice option, we find that subjects preferring fee-for-service become even less patient-oriented after this introduction. As a result, the opportunity to choose a payment scheme does not improve, but - if at all - worsens patient treatment in our experiment. Our findings stress the importance of acknowledging potential sorting and incentive effects in the analysis of physician payment schemes.

JEL Classification: C91, D84, E03

Keywords: physician incentives; fee-for-service; capitation; payment choice; sorting effects; laboratory experiment

December 2014

1 All University of Duisburg-Essen, CHINCH. – We are grateful for valuable comments and suggestions received from Heike Hennig-Schmidt, Burkhard Hehenkamp, Daniel Wiesen, as well as from participants at the European Conference on Health Economics ECHE in Dublin 2014, the Conference of the German Association for Health Economists in Munich 2014, and the ESA World Meetings in Zurich 2013. We thank Emanuel Castillo and Michael Menzel for their programming assistance. Financial support by DFG (German Research Foundation, grant: BR 2346/2-1/2) is gratefully acknowledged. *– All correspondence to Jeannette Brosig-Koch, University of Duisburg-Essen, Faculty of Economics and Business Administration, Health Economics Research Center CINCH, Universitätsstr. 12, 45117 Essen, Germany, email: jeannette.brosig-koch@ibes.uni-due.de*

1. Introduction

In recent years, several countries have implemented different forms of payment schemes to increase the quality of care. Most of them contain the traditional payment schemes of capitation (CAP) and fee-for-service (FFS), being characterized by diametrical incentives. While capitation is a fixed payment containing incentives to underprovide, paying a fee for each service provided can induce overprovision. Most of empirical research focuses on analyzing the incentive effects associated with different payments on physician performance (for a survey see McGuire, 2000). This is also the case for recent experimental research in this field (see, e.g., Hennig-Schmidt et al., 2011, or Green, 2014). In line with Lazear (2000), who explains the change of productivity observed after introducing a productivity-based remuneration by both, sorting and incentives effects, we argue that these two effects might also play a role for behavioral responses to physician payment reforms. Based on a controlled laboratory experiment, this study provides support for the idea that the opportunity to sort into FFS or CAP can significantly affect behavior.

Physicians can self-select into their preferred scheme through various channels. Among others, they can select the payment scheme by choosing their location, e.g., the country, state, or province they practice in. The Canadian Institute for Health Information (2008) finds, for instance, that physicians are even more mobile than the general population. In particular, about 20 percent of physicians in their sample consisting of two cohorts, one for the years from 1987 to 1993 and one for 1994 to 2001, moved inter-provincially at least once. Moreover, physicians can select their payment by choosing among differently remunerated patients. In the US, physicians, for example, may choose between working for an HMO usually offering CAP payments or a traditional practice with FFS. In Germany, physicians can opt between privately insured patients being remunerated by FFS, or statutorily insured ones being remunerated by CAP. Finally, some countries directly offer a menu of contracts and allow physicians to select a scheme rather than specifying a single contract. Such menus of contracts are already in place for physicians in provinces across Canada. Here physicians can choose among traditional FFS and an alternative payment mode.

Despite the various ways to self-select into a preferred payment mode, the evidence on physician preferences for certain types of payment schemes is scarce. To the best of our knowledge, the only empirical evidence stems from the introduction of contract menus in Canada. While several studies investigate either the incentive effect of a reform from a single contract to a menu of contracts on output (Dumont et al., 2008; Fortin et al., 2010), or the selection effect (Kantarevic and Kralj, 2013; Rudoler, et al. 2014), only Devlin and Sarma (2008) aim at disentangling the incentive effect from the selection effect. Using the 2004 National Physician cross-sectional survey for family physicians across Canada, they report that a change from a traditional FFS to a choice between FFS and alternative payment schemes (i.e., different types of mixed payments and salary) leads to a positive selection effect and a large negative incentive effect measured by patient visits per week. As treatment decisions observed in the field might be influenced by a variety of factors other than that controlled in these studies, making causal inferences is rather difficult here, though.

While there is no controlled laboratory evidence on self-selection in health economics, several non-health related laboratory experiments investigate self-selection and its effects on productivity and efficiency (see, e.g. Cadsby et al., 2007; Eriksson and Villeval, 2008; Teyssier, 2008; Bartling et al., 2009; Dohmen and Falk, 2011; Fehrenbacher and Pedell, 2012; Larkin and Leider, 2012; Macpherson et al., 2014). Dohmen and Falk (2011), for instance, introduce a sequential design in which they elicit productivity levels for a real effort task at first and, then, give participants the choice between a fixed and a variable scheme. They find that output is higher in variable payment schemes compared to the fixed payment scheme, and that the difference is to a large extent driven by productivity sorting. However, it is not clear how the results from non-health related environments translate to the specifics of physician-patient relationships.

This study provides a controlled laboratory experiment that investigates the effects of introducing an option to select between CAP and FFS on provision behavior. The environment of the laboratory allows identifying causal relationships as we can introduce the option to choose between physician payment schemes in a controlled way. In particular, we can design payment schemes and patient health benefits in a way that they are directly comparable. Our study aims at answering the following three research questions. What kind of payment scheme do subjects prefer, FFS or CAP? Are there any sorting effects? How does introducing an opportunity to choose between CAP and FFS affect provision behavior?

Our design of the physician-patient relationship builds on the experimental design used by Brosig-Koch et al. (2013a, b). Subjects decide in the role of physicians about the quantity of medical treatment. Outside the lab, real patients' health is affected by these decisions. To test for sorting effects, we use a sequential design similar to Dohmen and Falk (2011). In part 1, treatment decisions are paid according to a predetermined scheme, either FFS or CAP. This allows identifying individual treatment behavior given either one of the payment schemes and comparing incentive effects on a between-subject level. In part 2, subjects have to treat the same patient population again, but are given the opportunity to sort into one of the two schemes. Given their ex-ante choice, we can thus determine behavioral types and analyze sorting effects on a within-subject level.

We observe a vast majority of subjects preferring FFS over CAP. This observation does not depend on subjects' prior experience with one of the two schemes and is not due to different benefit and profit opportunities (which are fully symmetric in the two schemes). Moreover, we identify sorting effects. Subjects who prefer FFS payment deviate more from the patient optimal quantity in part 1 than those who prefer CAP, and they become even less patient-oriented after their payment choice. Finally, we find that replacing a predetermined FFS or CAP payment scheme by an opportunity to select one of the two schemes does not improve, but – if at all – worsens patient treatment in our experiment.

The paper is organized as follows. The experimental design is described in section 2. In section 3 we present the results of our data analyses. We conclude in section 4.

2. Experimental Design

In order to study the effects of introducing an option to select a payment scheme, the experiment consists of two parts.

2.1 Part 1: No Payment Choice

In part 1, we confront subjects with a predetermined payment scheme, that is, either CAP *or* FFS. At this point of time subjects have no information about the content of part 2 (but know that there will be a second part). The decision situation used in part 1 of the experiment is similar to the basic design in Brosig-Koch et al. (2013a, b). Each subject i decides in the role of a physician on the quantity of medical services $q = \{0, 1, \dots, 10\}$. The chosen quantity determines the subject's profit π_{kl}^{i} (see below) and the patient's health benefit B_{kl}. Subjects are subsequently confronted with nine different patients varying in their illnesses $k \in [A, B, C]$ and the severity of theses illnesses $l \in [x, y, z]$.[1] Illnesses and severities imply a systematic variation of the shape of the patient health benefit: An illness determines the level of (a global) maximum benefit $B_{kl}(q^*)$ with $B_{Al}(q^*) = 7$, $B_{Bl}(q^*) = 10$, and $B_{Cl}(q^*) = 14$ as well as the slope θ_{kl} of the patient benefit with $\theta_{Al} = \theta_{Bl} = |1|$ and $\theta_{Cl} = |2|$.[2] The severity of an illness determines the patient optimal quantity q_l^* with $q_x^* = 3$, $q_y^* = 5$, and $q_z^* = 7$. The complete set of parameter values is included in Appendix A. The monetary equivalent of the patient benefit resulting from a subject's quantity choice is transferred to real patients with eye cataract outside the laboratory (see the description in section 2.2).

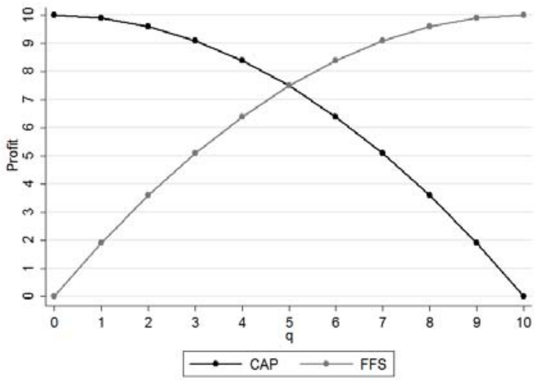
Physician remuneration in CAP is a lump-sum payment per patient of 10, i.e. $R_{CAP} = 10$. In FFS physicians are paid a fee per service they provide, i.e. $R_{FFS}(q) = 2q$. Physician costs depend on the quantity of medical services they provide for a patient and are assumed to be $c(q) = 0.1 \cdot q^2$ for both remuneration schemes.[3] Accordingly, physician i's profit per patient is $\pi^i(q) = 10 - 0.1 \cdot q^2$ in CAP and $\pi^i(q) = 2q - 0.1 \cdot q^2$ in FFS (both profits are independent of illness k and severity l). As illustrated in Figure 1, profit functions are designed in a way that they are fully symmetric. That is, the maximum profit a physician can achieve is the same in both payment schemes, i.e. $\hat{\pi}_{kl}^{CAP} = \hat{\pi}_{kl}^{FFS} = 10$. Moreover, marginal changes of profits are identical in CAP and FFS. The only difference between the two schemes is the physician profit maximizing quantity of medical services $\hat{q}$, which is 0 for CAP and 10 for FFS. As patient health benefits are also fully symmetric, we are able to directly compare physician incentives in the different payment conditions.

[1] Note that x corresponds to moderate, y corresponds to intermediate, and z corresponds to severe.

[2] A concave patient benefit function has been widely assumed in theoretical papers; see e.g., Ellis and McGuire, 1986, Ma, 1994, Choné and Ma, 2010.

[3] Convex cost functions are assumed in several theoretical models describing physician behavior (e.g., Ma, 1994 and Choné and Ma, 2010).

Figure 1: Profit functions in the payment schemes CAP and FFS



2.2 Part 2: Payment Choice

In part 2 of the experiment subjects are given the opportunity to choose one of the two payment schemes FFS or CAP. Conditions only differ regarding subjects' experience with the payment schemes. In condition F-CF (C-CF) subjects are confronted with FFS (CAP) in part 1. In our control condition CF, subjects have no experience with either one of the two schemes (i.e., they did not participate in part 1; see Table 1). After reading the description of the two payment schemes in part 2,[4] subjects are asked to choose one of the two schemes. To obtain treatment decisions in both, the preferred and the rejected scheme, we applied the strategy method (Selten, 1967).[5] That is, subjects are informed that, by stating their choice, they increase the probability of the preferred payment scheme being payoff-relevant for them from 1/3 to 2/3. After stating their contract choice, subjects make their treatment decisions for both schemes not knowing which of the two will be selected.

Table 1: Treatments

	Payment Scheme	
Treatment	Part 1	Part 2
F-CF	FFS	CAP/FFS
C-CF	CAP	CAP/FFS
CF	-	CAP/FFS

In order to keep the two parts of the experiments comparable with each other, we use the same profit functions and the same patient benefits (i.e., the same population of nine patients) as in part 1. As health benefits and profit functions are fully symmetric, physicians can realize identical profits and patient benefits under both schemes. Accordingly, the choice of a payment scheme solely reflects the individual preference for this scheme.

[4] Instructions, control questions, and an example of the decision screen are included in Appendix B.
[5] It also allows for between-subject comparisons of behavior revealed under a certain payment scheme in part 1 and part 2.

After completion of part 2, a lottery determines the payoff relevant payment scheme. In addition and in order to avoid income effects, only one of the nine treatment decisions in each part is randomly chosen to be relevant for the subject's payoff and the patient benefit. Subjects are informed about their payoff and the associated patient benefit for part 1 and part 2 only after completion of part 2. After the experiment, subjects privately received their payment and were dismissed.

The monetary value of patient benefits for the two randomly chosen treatment decisions, aggregated across all subjects, was transferred to the *Christoffel-Blindenmission*. To verify this transfer, we applied a procedure similar to Hennig-Schmidt et al. (2011) and Eckel and Grossman (1996). After the experiment, a subject who had been randomly chosen beforehand acted as monitor and verified that a correct transfer order on the aggregated benefit in the respective session was written to the university's financial department. The monitor and experimenter then walked together to the nearest mailbox and deposited the order in a sealed envelope. The monitor was paid an additional Euro 5.

2.3 Experimental Protocol

The experiment was conducted at the "Essen Laboratory for Experimental Economics" (elfe) at the University of Duisburg-Essen, Germany. By using the online recruiting system ORSEE (Greiner, 2004) we recruited 90 participants which were all students from the University of Duisburg-Essen.[6] In total, 35 and 34 subjects participated in conditions F-CF and C-CF, respectively, and 21 subjects participated in the control condition CF. Out of the 90 participants, 47 were female and 43 were male. The experiment was computerized using the software z-Tree (Fischbacher, 2007). A session lasted on average about 85 minutes. All monetary amounts were given in the experimental currency Taler, the exchange rate being 1 Taler = Euro 0.08. The average payoff for subjects was Euro 13.00. The average amount transferred to patients was about Euro 10.30. Overall, Euro 930 were transferred to the *Christoffel-Blindenmission*. Due to cataract surgery costs of, on average, Euro 30, 31 real patients could be treated.

3. Results

3.1 Treatment Behavior with CAP and FFS

We first focus on treatment behavior in part 1 in which subjects were confronted with a predetermined payment scheme. Profit maximizing subjects are expected to choose always zero medical services with CAP and ten medical services with FFS payment. In line with previous experimental research on the incentive effects of CAP and FFS (e.g., Hennig-Schmidt et al., 2011; Brosig-Koch et al. 2013a,b; Keser et al., 2013; Green, 2014), we find that subjects significantly overprovide with FFS (by, on average, 2.19 medical services; p=0.000) and underprovide with CAP (by, on average, 2.04 medical services; p=0.000), though less than theoreti-

[6] The students are from different fields of study. We did not specifically recruit medical students here as Brosig-Koch et al. (2013b) report similar responses by medical and non-medical students to CAP and FFS incentives. Though their study was based on different subjects, their non-medical students were recruited from a similar subject pool as the one used in our study.

cally predicted assuming strict profit-maximization (p=0.000, one-sample Wilcoxon test).[7] To make the effects of CAP and FFS directly comparable, we define treatment quality based on the deviation of the chosen quantity of medical treatment from the patient optimal quantity.[8] According to this definition a smaller deviation implies a more patient-oriented decision and, thus, a higher quality. Comparing average treatment qualities between FFS and CAP, we find no significant difference (p=0.536, two-tailed Mann-Whitney-U test).[9] Apparently, overprovision in FFS and underprovision in CAP are equally pronounced. In the following, we pool over the two payment schemes when referring to treatment quality in part 1.

3.2 Payment Choice and Sorting Effects

In part 2, we observe that about 75 percent of subjects choose FFS instead of CAP, despite the fact that both payment schemes provide identical outcome opportunities. There are no significant differences regarding this percentage between the three conditions (79 percent in C-CF, 74 percent in F-CF, and 76 percent in CF; p>0.613, Pearson chi-square test). That is, subjects' payment choice does not depend on their previous experience with the payment schemes.[10]

Given our sequential design, we are able to identify the ex-ante behavioral pattern of subjects preferring CAP and FFS, respectively, and, thus, to isolate sorting effects. Subjects who choose FFS deviate significantly more from the patient optimal treatment level in part 1 than those who choose CAP (2.29 versus 1.60; p=0.034, two-tailed Mann-Whitney-U test).

As subjects have to make their decisions in part 2 for both, the preferred and the non-preferred payment scheme, we can compare behavior between subjects preferring CAP and subjects preferring FFS in these two payment schemes in part 2.[11] The results are illustrated in Figure 2. In line with our previous findings on sorting, subjects who prefer FFS are, on average, not only less patient-oriented in their preferred payment scheme FFS, but also less patient-oriented in their non-preferred scheme CAP in part 2 than those who prefer CAP (p=0.081 and p=0.030, two-tailed Mann-Whitney-U test). As a result, subjects who choose CAP provide, on average, a higher treatment quality in the preferred scheme in part 2 than those who choose FFS (outer left black vs. outer right grey bar in Figure 2; p=0.012, two-tailed Mann-Whitney-U test).

[7] Similar to Brosig-Koch et al. (2013a, b) we find that underprovision in CAP and overprovision in FFS varies across patient characteristics. There are significant differences regarding treatment decisions between illness B and C (p<0.026), but no significant differences between illnesses A and B (p>0.329, two-tailed Wilcoxon test). Also the patient's severity significantly affects treatment behavior (p<0.000, two-tailed Wilcoxon test). As our focus is on sorting effects given a heterogeneous patient population, in the following we report results based on data pooled over the nine patient types.

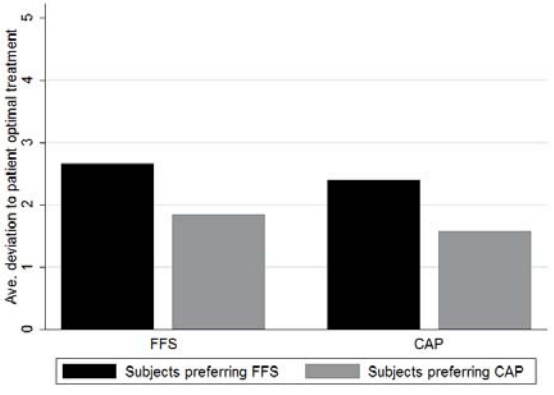
[8] Note that we use the absolute value of each deviation here as 39 out of the 2241 treatment decisions are inferior (i.e., they result in a decrease of both, the patient benefit and the subject's profit).

[9] There is also no significant difference between CAP and FFS when comparing decisions for each of the nine patients separately (p>0.299, two-tailed Mann-Whitney-U test).

[10] Note that we also do not find significant gender differences regarding payment choice (p=0.326, Pearson chi-square test).

[11] Since we find no significant influence of the payment scheme implemented in part 1 on treatment quality chosen in part 2, the following analyses are based on data pooled over all three conditions (p≥0.652, two-tailed Mann-Whitney-U test).

Figure 2: Average deviation to the patient optimal quantity in part 2



3.3 Effect of Payment Choice

Comparing subjects' treatment quality between the two parts, we find that subjects choosing FFS are even less patient-oriented in their preferred scheme FFS in part 2 than in part 1 (p=0.011, two-tailed Wilcoxon test). In contrast, subjects choosing CAP do not significantly change their treatment quality from part 1 to their preferred scheme in part 2 (p=0.676, two-tailed Wilcoxon test). That is, subjects who prefer CAP seem to be relatively stable in their behavior.

To test the aggregate effects of introducing the opportunity to select a payment scheme, we compare average treatment quality chosen with a predetermined payment scheme (FFS or CAP) in part 1 with average treatment quality chosen with the preferred schemes in part 2. Given FFS payment, introducing a choice option has no significant effect on the deviation from the patient optimal treatment (p=0.570, two-tailed Wilcoxon test) while, given CAP payment, providing an opportunity to choose the payment scheme significantly reduces treatment quality (p=0.009, two-tailed Wilcoxon test). These results suggest that providing a payment choice between CAP and FFS does not necessarily improve medical treatment.

4. Conclusion

In this study we use a controlled laboratory experiment to test the effects associated with the opportunity to choose a physician payment scheme. Our focus is on CAP and FFS payment as these schemes are frequently implemented in health care. Although payment schemes are designed such that they provide symmetric profit opportunities, we find that the vast majority of subjects prefer FFS payment. This observation does not depend on subjects' prior experience with a payment scheme. Moreover, subjects who sort into FFS payment are less patient-oriented than those who sort into CAP. In addition, subjects who sort into FFS are less patient-oriented in their preferred scheme than without a payment choice. As a result, we find that providing an opportunity to choose between FFS and CAP payment does not improve, but can even significantly worsen medical treatment of patients.

Our findings suggest that it is important to consider the influence of potential competing incentives when evaluating the effectiveness of physician payment schemes in health care. For example, policy makers should be aware of potential sorting effects that are associated with making physicians' payment contingent on the organization they choose to work for (e.g., in the US physicians who work for an HMO receive CAP payment while those who work for a traditional practice receive FFS payment). Similar is true when physicians' payment depends on the insurance type of patients (e.g., in Germany treating patients with private insurance results in FFS payment while treating patients with statutory insurance results in CAP payment). However, further laboratory and field research is needed to test the specific implications of these policy measures. Moreover, while this study focuses on the choice between FFS and CAP payment, it is an open question whether our results apply also to the choice between other forms of physician incentives. Answering this question is an interesting field for future research.

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Appendix A: Parameter Table

Treatment	Variable	Quantity (q) 0	1	2	3	4	5	6	7	8	9	10
C-CF	R^{I}_{kl}	10	10	10	10	10	10	10	10	10	10	10
	$R^{II\,CAP}_{kl}$	10	10	10	10	10	10	10	10	10	10	10
	$R^{II\,FFS}_{kl}$	0	2	4	6	8	10	12	14	16	18	20
F-CF	R^{I}_{kl}	0	2	4	6	8	10	12	14	16	18	20
	$R^{II\,CAP}_{kl}$	10	10	10	10	10	10	10	10	10	10	10
	$R^{II\,FFS}_{kl}$	0	2	4	6	8	10	12	14	16	18	20
all	c_{kl}	0	0.1	0.4	0.9	1.6	2.5	3.6	4.9	6.4	8.1	10
C-CF	π^{I}_{kl}	10	9.9	9.6	9.1	8.4	7.5	6.4	5.1	3.6	1.9	0
	$\pi^{II\,CAP}_{kl}$	10	9.9	9.6	9.1	8.4	7.5	6.4	5.1	3.6	1.9	0
	$\pi^{II\,FFS}_{kl}$	0	1.9	3.6	5.1	6.4	7.5	8.4	9.1	9.6	9.9	10
F-CF	π^{I}_{kl}	0	1.9	3.6	5.1	6.4	7.5	8.4	9.1	9.6	9.9	10
	$\pi^{II\,CAP}_{kl}$	10	9.9	9.6	9.1	8.4	7.5	6.4	5.1	3.6	1.9	0
	$\pi^{II\,FFS}_{kl}$	0	1.9	3.6	5.1	6.4	7.5	8.4	9.1	9.6	9.9	10
all	B_{Ax}	4	5	6	7	6	5	4	3	2	1	0
	B_{Ay}	2	3	4	5	6	7	6	5	4	3	2
	B_{Az}	0	1	2	3	4	5	6	7	6	5	4
	B_{Bx}	7	8	9	10	9	8	7	6	5	4	3
	B_{By}	5	6	7	8	9	10	9	8	7	6	5
	B_{Bz}	3	4	5	6	7	8	9	10	9	8	7
	B_{Cx}	8	10	12	14	12	10	8	6	4	2	0
	B_{Cy}	4	6	8	10	12	14	12	10	8	6	4
	B_{Cz}	0	2	4	6	8	10	12	14	12	10	8

Appendix B: Instructions + Comprehension Questions

Welcome to the Experiment!

Preface

You are participating in an economic experiment on decision behavior. You and the other participants will be asked to make decisions for which you can earn money. Your payoff depends on the decisions you make. At the end of the experiment, your payoff will be converted to Euro and paid to you in cash. During the experiment, all amounts are presented in the experimental currency Taler. 10 Taler equals 8 Euro.

The experiment will take about 90 minutes and consists of two parts. You will receive detailed instructions before each part. Note that none of your decisions in either part have any influence on the other part of the experiment.

Part I

Please read the following instructions carefully. We will approach you in about five minutes to answer any questions you may have. If you have questions at any time during the experiment, please raise your hand and we will come to you.

Part one of the experiment consists of 9 rounds of decision situations.

Decision Situations

In each round you take on the role of a physician and decide on medical treatment for a patient. That is, you determine the quantity of medical services you wish to provide to the patient for a given illness and a given severity of this illness.

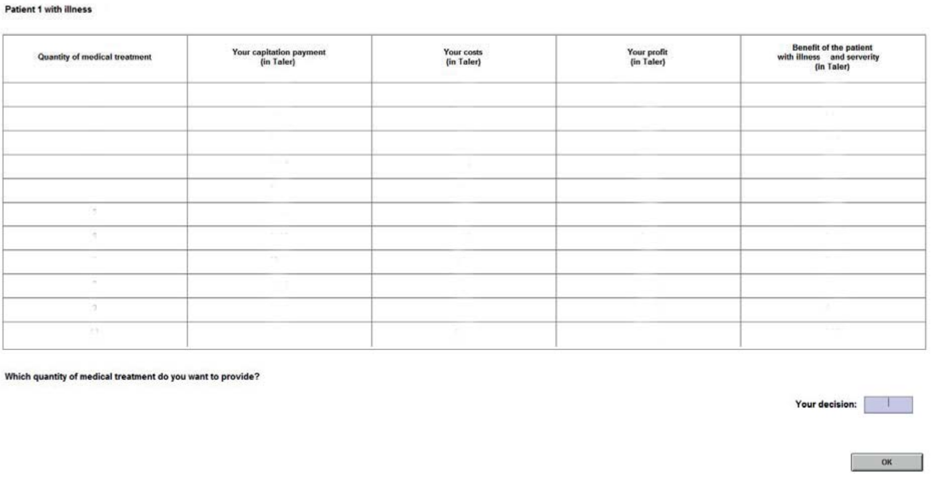
Every patient is characterized by one of three illnesses (A, B, C), each of which can occur in three different degrees of severity (x, y, z). In each consecutive decision round you will face one patient who is characterized by one of the 9 possible combinations of illnesses and degrees of severity (in random order). Your decision is to provide each of these 9 patients with a quantity of 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 medical services.

Profit

In each round you receive a fee-for-service (capitation) remuneration for treating the patient. Your remuneration increases with the amount of medical treatment (is irrespective of the amount of medical treatment) you provide. You also incur costs for treating the patient, which likewise depend on the quantity of services you provide. Your profit for each decision is calculated by subtracting these costs from the fee-for-service (capitation) remuneration.

Every quantity of medical service yields a particular benefit for the patient – contingent on his illness and severity. Hence, in choosing the medical services you provide, you determine not only your own profit but also the patient’s benefit.

In each round you will receive detailed information on your screen (see below) for the respective patient the illness, your amount of fee-for-service (capitation) remuneration - for each possible amount of medical treatment - your costs, profit as well as the benefit for the patient with the corresponding illness and severity.


Patient 1 with illness

Quantity of medical treatment	Your capitation payment (in Taler)	Your costs (in Taler)	Your profit (in Taler)	Benefit of the patient with illness and servority (in Taler)

Which quantity of medical treatment do you want to provide?

Your decision:

OK

<u>Payment</u>

At the end of the experiment one of the 9 rounds of part one will be chosen at random. Your profit in this round will be paid to you in cash.

For this part of the experiment, no patients are physically present in the laboratory. Yet, the patient benefit does accrue to a real patient: The amount resulting from your decision will be transferred to the Christoffel Blindenmission Deutschland e.V., 64625 Bensheim, an organization which funds the treatment of patients with eye cataract.

The transfer of money to the Christoffel Blindenmission Deutschland e.V. will be carried out after the experiment by the experimenter and one participant. The participant completes a money transfer form, filling in the total patient benefit (in Euro) resulting from the decisions made by all participants in the randomly chosen situation. This form prompts the payment of the designated amount to the Christoffel Blindenmission Deutschland e.V. by the University of Duisburg-Essen's finance department. The form is then sealed in a postpaid envelope and posted in the nearest mailbox by the participant and the experimenter.

After the entire experiment is completed, one participant is chosen at random to oversee the money transfer to the Christoffel Blindenmission Deutschland e.V. The participant receives an additional compensation of 5 Euro for this task. The participant certifies that the process has been completed as described here by signing a statement which can be inspected by all participants at the office of the Chair of Quantitative Economic Policy. A receipt of the bank transfer to the Christoffel Blindenmission Deutschland e.V. may also be viewed here.

<u>Comprehension Questions</u>

Prior to the decision rounds we kindly ask you to answer a few comprehension questions. They are intended to help you familiarize yourself with the decision situations. If you have any questions about this, please raise your hand. Part one of the experiment will begin once all participants have answered the comprehension questions correctly.

Part II

Please read the following instructions carefully. We will approach you in about five minutes to answer any questions you may have. If you have questions at any time during the experiment, please raise your hand and we will come to you.

Part two of the experiment also consists of 9 rounds of decision situations.

Decision Situations

As in part one of the experiment, you take on the role of a physician in each round and decide on medical treatment for a patient. That is, you determine the quantity of medical services you wish to provide to the patient for a given illness and a given severity of this illness.

Every patient is characterized by one of three illnesses (A, B, C), each of which can occur in three different degrees of severity (x, y, z). In each consecutive decision round you will face one patient who is characterized by one of the 9 possible combinations of illnesses and degrees of severity (in random order). Your decision is to provide each of these 9 patients with a quantity of 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 medical services.

Profit

At the beginning of part two of the experiment you decide on the scheme of payment. There are two payment schemes to select from:

Payment scheme A: In each round you receive a capitation remuneration for treating the patient. Your remuneration is irrespective of the amount of medical treatment you provide.

Payment scheme B: In each round you receive a fee-for-service remuneration for treating the patient. Your remuneration increases with the amount of medical treatment you provide.

With your decision for a payment scheme you increase the probability that your preferred scheme is elected for the nine decision rounds. The election of the payment scheme can be depicted as follows: Your decision can be represented by a ball, which is labeled with the payment scheme you have chosen. That ball is thrown into an urn, in which two balls are already inside - one ball for each Payment scheme. One ball out of that urn is randomly drawn and determines the payment scheme for the nine decision rounds. The random draw takes place at the end of the experiment. That is, you state your decisions for medical treatment for each payment scheme in case that these scheme is actually elected. Your payment is calculated by your decisions in the elected scheme.

You also incur costs for treating the patient, which likewise depend on the quantity of services you provide. Your profit for each decision is calculated by subtracting these costs from the sum of your fee-for-service (capitation) and capitation (fee-for-service) remuneration.

As in part one, every quantity of medical service yields a particular benefit for the patient – contingent on his illness and severity. Hence, in choosing the medical services you provide, you determine not only your own profit but also the patient's benefit.

In each round you will receive detailed information on your screen (see below) for the respective patient the illness, your amount of remuneration for payment scheme A, your amount of remuneration for payment scheme B, your costs, profit for payment scheme A, profit for payment scheme B as well as the benefit for the patient with the corresponding illness and severity.

Payment

At the end of the experiment the payment scheme (see description "profit") and one of the 9 rounds of part two will be chosen at random for each participant. Your profit in this round will be paid to you in cash, in addition to your payment from the round chosen for part one of the experiment.

After the experiment is over, please remain seated until the experimenter asks you to step forward. You will receive your payment at the front of the laboratory before exiting the room.

As in part one, no patients are physically present in the laboratory for part two of the experiment. Yet, the patient benefit does accrue to a real patient: The amount resulting from your decision will be transferred to the Christoffel Blindenmission Deutschland e.V., 64625 Bensheim, an organization which funds the treatment of patients with eye cataract.

The process for the transfer of money to the Christoffel Blindenmission Deutschland e.V. as described for part one of the experiment will be carried out by the experimenter and one participant.

Comprehension Questions

Prior to the decision rounds we kindly ask you to answer a few comprehension questions. They are intended to help you familiarize yourself with the decision situations. If you have any questions about this, please raise your hand. Part two of the experiment will begin once all participants have answered the comprehension questions correctly.

Finally, we kindly ask you to not talk to anyone about the content of this session in order to prevent influencing other participants after you. Thank you for your collaboration!

Comprehension Questions Part *I*: CAP (FFS)

Questions Tables 1-4:

1-4 a) What is the capitation (fee-for-service)?

1-4 b) What are the costs?

1-4 c) What is the profit?

1-4 d) What is the patient benefit?

Quantity of medical treatment	Capitation (Fee-for-service) (in Taler)	Costs (in Taler)	Profit (in Taler)	Benefit of the patient with illness F and severity y (in Taler)
0	20.00 (0.00)	0.00	20.00 (0.00)	15.00
1	20.00 (4.00)	0.20	19.80 (3.80)	16.00
2	20.00 (8.00)	0.80	19.20 (7.20)	17.00
3	20.00 (12.00)	1.80	18.20 (10.20)	18.00
4	20.00 (16.00)	3.20	16.80 (12.80)	19.00
5	20.00 (20.00)	5.00	15.00 (15.00)	20.00
6	20.00 (24.00)	7.20	12.80 (16.80)	19.00
7	20.00 (28.00)	9.80	10.20 (18.20)	18.00
8	20.00 (32.00)	12.80	7.20 (19.20)	17.00
9	20.00 (36.00)	16.20	3.80 (19.80)	16.00
10	20.00 (40.00)	20.00	0.00 (20.00)	15.00

1. Assume that a physician wants to provide 2 quantities of medical treatment for the patient depicted above.

2. Assume that a physician wants to provide 9 quantities of medical treatment for the patient depicted above.

Quantity of medical treatment	Capitation (Fee-for-service) (in Taler)	Costs (in Taler)	Profit (in Taler)	Benefit of the patient with illness F and severity y (in Taler)
0	20.00 (0.00)	0.00	20.00 (0.00)	10.00
1	20.00 (4.00)	0.20	19.80 (3.80)	12.00
2	20.00 (8.00)	0.80	19.20 (7.20)	14.00
3	20.00 (12.00)	1.80	18.20 (10.20)	16.00
4	20.00 (16.00)	3.20	16.80 (12.80)	18.00
5	20.00 (20.00)	5.00	15.00 (15.00)	20.00
6	20.00 (24.00)	7.20	12.80 (16.80)	22.00
7	20.00 (28.00)	9.80	10.20 (18.20)	24.00
8	20.00 (32.00)	12.80	7.20 (19.20)	22.00
9	20.00 (36.00)	16.20	3.80 (19.80)	20.00
10	20.00 (40.00)	20.00	0.00 (20.00)	18.00

3. Assume that a physician wants to provide 2 quantities of medical treatment for the patient depicted above.

4. Assume that a physician wants to provide 9 quantities of medical treatment for the patient depicted above.

Comprehension Questions Part *II*: CAP-FFS (FFS-CAP)

Questions Tables 1-8:

1-8 a) What is the capitation (fee-for-service)?
1-8 b) What are the costs?
1-8 c) What is the profit?
1-8 d) What is the patient benefit?

Quantity of medical treatment	Capitation (Fee-for-service) (in Taler)	Costs (in Taler)	Profit (in Taler)	Benefit of the patient with illness F and severity y (in Taler)
0	20.00 (0.00)	0.00	20.00 (0.00)	15.00
1	20.00 (4.00)	0.20	19.80 (3.80)	16.00
2	20.00 (8.00)	0.80	19.20 (7.20)	17.00
3	20.00 (12.00)	1.80	18.20 (10.20)	18.00
4	20.00 (16.00)	3.20	16.80 (12.80)	19.00
5	20.00 (20.00)	5.00	15.00 (15.00)	20.00
6	20.00 (24.00)	7.20	12.80 (16.80)	19.00
7	20.00 (28.00)	9.80	10.20 (18.20)	18.00
8	20.00 (32.00)	12.80	7.20 (19.20)	17.00
9	20.00 (36.00)	16.20	3.80 (19.80)	16.00
10	20.00 (40.00)	20.00	0.00 (20.00)	15.00

Quantity of medical treatment	Fee-for-Service (Capitation) (in Taler)	Costs (in Taler)	Profit (in Taler)	Benefit of the patient with illness F and severity y (in Taler)
0	0.00 (20.00)	0.00	0.00 (20.00)	15.00
1	4.00 (20.00)	0.20	3.80 (19.80)	16.00
2	8.00 (20.00)	0.80	7.20 (19.20)	17.00
3	12.00 (20.00)	1.80	10.20 (18.20)	18.00
4	16.00 (20.00)	3.20	12.80 (16.80)	19.00
5	20.00 (20.00)	5.00	15.00 (15.00)	20.00
6	24.00 (20.00)	7.20	16.80 (12.80)	19.00
7	28.00 (20.00)	9.80	18.20 (10.20)	18.00
8	32.00 (20.00)	12.80	19.20 (7.20)	17.00
9	36.00 (20.00)	16.20	19.80 (3.80)	16.00
10	40.00 (20.00)	20.00	20.00 (0.00)	15.00

1. Assume that a physician wants to provide 2 quantities of medical treatment for the patient depicted above.

2. Assume that a physician wants to provide 9 quantities of medical treatment for the patient depicted above.

Quantity of medi-cal treatment	Capitation (Fee-for-service) (in Taler)	Costs (in Taler)	Profit (in Taler)	Benefit of the patient with illness F and severity y (in Taler)
0	20.00 (0.00)	0.00	20.00 (0.00)	10.00
1	20.00 (4.00)	0.20	19.80 (3.80)	12.00
2	20.00 (8.00)	0.80	19.20 (7.20)	14.00
3	20.00 (12.00)	1.80	18.20 (10.20)	16.00
4	20.00 (16.00)	3.20	16.80 (12.80)	18.00
5	20.00 (20.00)	5.00	15.00 (15.00)	20.00
6	20.00 (24.00)	7.20	12.80 (16.80)	22.00
7	20.00 (28.00)	9.80	10.20 (18.20)	24.00
8	20.00 (32.00)	12.80	7.20 (19.20)	22.00
9	20.00 (36.00)	16.20	3.80 (19.80)	20.00
10	20.00 (40.00)	20.00	0.00 (20.00)	18.00

Quantity of medical treatment	Fee-for-Service (Capitation) (in Taler)	Costs (in Taler)	Profit (in Taler)	Benefit of the patient with illness F and severity y (in Taler)
0	0.00 (20.00)	0.00	0.00 (20.00)	10.00
1	4.00 (20.00)	0.20	3.80 (19.80)	12.00
2	8.00 (20.00)	0.80	7.20 (19.20)	14.00
3	12.00 (20.00)	1.80	10.20 (18.20)	16.00
4	16.00 (20.00)	3.20	12.80 (16.80)	18.00
5	20.00 (20.00)	5.00	15.00 (15.00)	20.00
6	24.00 (20.00)	7.20	16.80 (12.80)	22.00
7	28.00 (20.00)	9.80	18.20 (10.20)	24.00
8	32.00 (20.00)	12.80	19.20 (7.20)	22.00
9	36.00 (20.00)	16.20	19.80 (3.80)	20.00
10	40.00 (20.00)	20.00	20.00 (0.00)	18.00

3. Assume that a physician wants to provide 2 quantities of medical treatment for the patient depicted above.

4. Assume that a physician wants to provide 9 quantities of medical treatment for the patient depicted above.