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Using artefactual field and lab experiments to investigate how fee-for-service and capitation affect medical service provision[☆]

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ABSTRACT

We analyze how physicians, medical students, and non-medical students respond to financial incentives from fee-for-service and capitation. We employ a series of artefactual field and conventional lab experiments framed in a physician decision-making context. Physicians, participating in the field, and medical and non-medical students, participating in lab experiments, respond to the incentives in a consistent way: Significantly more medical services are provided under fee-for-service compared to capitation. The intensity by which subjects respond to incentives, however, differs by subject pool. Our findings are robust regarding subjects' gender, age, and personality traits.

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1. Introduction

Laboratory experiments have only recently entered the field of health economics.¹ A stream of experimental research in health economics focuses on payment systems for physicians, which is important in light of increasing health care expenditures (e.g., Baicker and Goldman, 2011).² For example, Hennig-Schmidt et al. (2011) find that fee-for-service (FFS) incentivizes too many medical services and capitation (CAP) too few. Brosig-Koch et al. (2015) show that mixed payment systems mitigate the incentive effects from FFS and CAP as predicted by Ellis and McGuire's (1986) seminal model. Lagarde and Blaauw (2014a), in addition to CAP and FFS, introduce a salary payment. Pay-for-performance systems are analyzed by Brosig-Koch et al. (2013), Keser and Schnitzler (2013), Lagarde and Blaauw (2014b), and Green (2014).

All of these experiments are conventional lab experiments according to the taxonomy of Harrison and List (2004), in that they either use a standard student subject pool or medical students, or both subject pools.³ Harrison and List (2004) and Levitt and List (2009) convincingly make the point that lab experiments in isolation have limited relevance for predicting field behavior, but if combined with field (experimental) data they permit more compelling inferences.

We find this methodological caveat particularly important for a young but rapidly developing research field like experimental health economics, and we therefore address these concerns in the present paper. Our contribution to the literature lies in systematically comparing how different subject pools (i.e., real physicians, medical students, and non-medical students) respond to FFS and CAP, both of which are common forms for paying physicians (see, e.g., McGuire, 2000). We gradually approach the field by starting with a conventional lab experiment using a standard subject pool of non-medical students. We then proceed by having prospective physicians, i.e., medical students, participate in our experiment. Finally, we bring the lab to the field by introducing an artefactual field experiment to analyze how real physicians respond to FFS and CAP. Here, we completely mimic the lab setting in the field.

Even though artefactual field experiments are commonplace, for example, in public economics, environmental economics, finance, industrial organization, and game theory (see, e.g., Levitt and List, 2009; List, 2011; Voors et al., 2011), to the best of our knowledge, we are the first to conduct an artefactual field experiment with physicians to analyze behavioral responses to FFS and CAP. Our paper, therefore, marks a first important step in providing external validity to findings from the lab.

In both the lab and the field, we use a framed setting in which subjects decide in the role of physicians on the provision of medical services. A subject's quantity choice determines his or her own profit and a patient's health benefit. Decisions are incentivized by monetary rewards determined by the respective payment method. Real patients' health outside the lab is affected by these decisions. We randomly assign subjects to the two payment schemes, thereby excluding selection biases.

Behavioral data show that all subject pools respond to financial incentives in a similar and consistent way. In particular, significantly more medical services are provided under FFS compared to CAP. This is in line with findings from earlier lab experiments (e.g., Hennig-Schmidt et al., 2011) and field studies (e.g., Gaynor and Pauly, 1990). Our main result is robust with regard to subjects' demographics and personality traits. Moreover, we find that the extent to which subjects respond to financial incentives differs by subject pools with physicians responding less than students.

The remainder of the paper is organized as follows. In Section 2, we describe the experimental design and procedure. Section 3 presents the results, and Section 4 concludes.

2. Experimental design and procedure

2.1. Basic setup and decision situation

Overall, 137 non-medical students (FFS: 68, CAP: 69) and 76 medical students (FFS: 38, CAP: 38) took part in our lab experiments. In the artefactual field experiments, 29 physicians participated (FFS: 13, CAP: 16). Each subject was randomly assigned to only one of the two payment conditions. Our 3×2 design allows us to compare behavior of the three subject groups and between payment conditions.⁴

In FFS, subjects receive a fee of $p = 2$ Taler—our experimental currency—for each service provided to a patient. In CAP, subjects are paid a lump-sum of $L = 10$ Taler irrespective of the quantity of medical services provided. The conversion rate is 1 Taler = EUR 0.8 in the lab experiment and 1 Taler = EUR 3.4 in the artefactual field experiment. Compared to the lab, the payment in the field experiment was increased by a factor of 4.25 to provide adequate incentives for the physicians.⁵

¹ The only exception that we are aware of is the experiment by Fan et al. (1998), who analyze physician payment systems under a global budget.

² Other experiments investigate, for example, health insurance choice (Schram and Sonnemans, 2011), health care financing (e.g., Buckley et al., 2012), or the salience of the Hippocratic Oath (Kesternich et al., 2014).

³ Except for Green (2014), the experiments are framed in a medical context insofar as participants make decisions in the role of physicians. The rationale is to avoid the experimenter's lack of "control for the context that subjects might themselves impose on the abstract experimental task" (Harrison and List, 2004, p. 1028).

⁴ Notice that the general experimental design follows Brosig-Koch et al. (2015).

⁵ The amount physicians could earn in the experiment was set such that it reflects the average net hourly wage of a physician in Germany, bearing in mind potential differences, for example, across physicians' specialization and seniority. We set this factor after consultation with Dr. Harald Herholz of the Association of Statutory Health Insurance Physicians in Hesse (Germany), who has been involved in budget negotiations for physicians' remuneration.

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