Research Paper

Payment scheme self-selection in the credence goods market: An experimental study

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A B S T R A C T

Given heterogeneity in expert behavior across payment schemes in credence goods markets, it is important to understand the consequences of payment scheme selection on market outcomes. To study the effect that expert payment selection has on customer well-being, we recruited subjects to participate in a real-effort credence goods laboratory game. Experts were either randomly assigned or faced with the choice of three payment schemes: *fee-for-service*, *salary,* and *capitation*. We found that when experts selected *fee-for-service* payment customers experience significantly worse outcomes than when experts were randomly assigned to *fee-for-service*. In contrast, whether experts selected or were randomly assigned to *salary* payment, customer outcomes did not change.

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1. Introduction

The characteristic trait of a credence goods market is that customers are never aware of whether the services they were provided were of the type or quality that they needed; they only observe their marginal utility of receiving those services. On the contrary, the service providers, i.e., experts, have better information regarding both assessment and appropriate action, presenting them with a nearly ideal environment to place their interests ahead of their customers' (Emons, 1997). For example, physicians have better information regarding the necessary treatments for their patients both before (considering reported symptoms) and after (accounting for examination and test results) an appointment. Given this informational asymmetry, traditional solutions for aligning customer and expert's preferences, such as punishment and reward incentives, monitoring, liability, verifiability, and reputation, may not be available or effective (Dulleck and Kerschbamer, 2006; Hennig-Schmidt et al., 2011; Brosig-Koch et al., 2013; Green, 2014). Customer well-being may therefore be largely determined by experts' intrinsic motivations. Therefore, a better understanding of how payment schemes interact with intrinsic motivation could lead to significant advances in contract design in credence goods markets.

There is growing evidence that experts deviate from profit-maximizing strategies in credence goods environment (Hennig-Schmidt et al., 2011; Brosig-Koch et al., 2013; Green, 2014; Brosig-Koch et al., 2016; Mimra et al., 2016). Green (2014) and Selten et al. (2011) both showed that experts were motivated by payment scheme structure as well as by how their actions impacted their customers. In their experimental studies, experts deviated from the profit-maximizing strategy to improve their customers' well-being. More importantly, the deviation from profit-maximizing behavior varied across

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payment schemes. These findings encourage future studies to test external validity and robustness across different credence goods environments. For instance, in these experiments experts were randomly assigned to a payment scheme whereas in naturally-occurring credence markets, experts have opportunities to select a position based on payment scheme and personal preferences. That is, the behaviors observed under a particular payment scheme may not only be dependent on intrinsic motivations and the payment scheme itself, but also by the inability to select among payment schemes. Our study places subjects in a credence goods environment in order to examine how expert sorting by payment scheme impacts market outcomes.

Experiments on sorting have found that self-selection by payment scheme interacts with experts' skills and performance (Cadsby et al., 2007, Dohmen and Falk, 2011, Macpherson et al., 2014). More specifically, workers who were given the opportunity to select their payment scheme in a labor market were more productive with piece rate than flat rate (as expected), but another interpretation of this result is that piece rate payment can attract more productive workers (Lazear, 1996). The key difference between past self-selection literature and our experiment is the introduction of the credence goods market.[1] This market allows for intrinsic motivations and information asymmetries that may have a significant impact on expert actions. Furthermore, credence goods markets have a particularly important impact on social welfare of our society. The healthcare industry, one of our largest credence markets, accounted for 17.4% of the United States' GDP in 2014 (Hartman et al., 2015). Hence, even small market failures, such as the overprovision of services, would result in large losses in customer welfare.

To elicit the effects of expert payment selection in a credence goods market, we used a proofreading task that was imbedded in a two treatment, two by three experimental design. Treatment 1 varied the assignment mechanism (*self-selection* or *random*), while Treatment 2 varied the payment scheme (*salary, capitation*, or *fee-for-service)*. Under each payment scheme, experts faced a moral dilemma or tradeoff between maximizing earnings and delivering customer-centered service. Under salary, experts faced a tradeoff between minimizing their efforts (making fewer proofreading edits) and increasing the well-being of their customers. In contrast, under fee-for-service, experts could maximize their payment by providing as many edits as possible, irrespective of their correctness or appropriateness. Finally, in capitation experts faced a tradeoff between maximizing the number of customers serviced and maximizing the quality of service delivered to each customer. In this way, we can observe both the expert's preference between the three moral dilemmas, and the strength of that moral dilemma as manifested by their subsequent actions.

We find several relevant results. First, selection of fee-for-service and salary dominated capitation in frequency of choice. Second, on average we found significant change in the customers' well-being when comparing expert's behavior in random assignment with those in the self-selection treatment. Disaggregating by payment scheme, we see this is caused by significant differences in expert actions under the fee-for-service payment scheme across assignment type. More specifically, experts who selected fee-for-service provided significantly more edits (services) than those who were randomly assigned. This increase included a significant number of harmful edits made by these experts, while the number of beneficial edits remained constant. In comparison, experts who selected salary payment did not change the number of edits (beneficial or harmful) relative to those who were randomly assigned salary payment. Given these results, customers in this environment could expect to be better off when matched with salaried experts. If the findings are robust to different parameters and environments such as the health care industry, it would mean that a patient would benefit from knowing both her physician's payment scheme and how her physician's position was obtained (i.e., through selection and matching mechanisms). Further, our experiment reveals the importance of incorporating self-selection into credence goods models, as it affected expert's actions and thereby customer well-being under the two most preferred payment schemes, fee-for-service and salary.

2. The experiment

2.1. Experimental task

Our experimental task was first introduced in Green (2014) to study the effect of various physician payment schemes on physician performance. An advantage of the design is that it can be readily interpreted as a representation of the relationship between any expert and customer. Therefore, we have broadened the interpretation of Green's dual-principal agent game to all credence goods markets and adopted the credence terminology throughout our paper.

As in Green (2014), our experiment was implemented in two phases. In phase I, subjects were recruited to play the roles of customers. The customers proofread 10 unique essays in 50 min. Each essay had 10 spelling and/or typographical errors. At the start of the session, the customers were endowed with $25. For each error the customers failed to identify, $0.25 was taken away from their initial endowment. Customers were paid according to their performance; however they were not informed which errors they had correctly identified and which errors remained uncorrected. After all customers completed phase I, an average of 2 essays from each customer were selected for proofreading by the experts in phase II. The customers' lack of expertise in proofreading allowed us to endogenously generate a demand for the credence good: customers needed expert proofreading services to recover some of their endowment.

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[1] To the best of our knowledge, this is the first study to investigate effects of self-selection by payment scheme in a credence goods market with a real effort task (see Brosig-Koch et al., 2013 for a chosen effort task).