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Doctor–patient differences in risk and time preferences: A field experiment

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ABSTRACT

We conduct a framed field experiment among patients and doctors to test whether the two groups have similar risk and time preferences. We elicit risk and time preferences using multiple price list tests and their adaptations to the healthcare context. Risk and time preferences are compared in terms of switching points in the tests and the structurally estimated behavioural parameters. We find that doctors and patients significantly differ in their time preferences: doctors discount future outcomes less heavily than patients. We find no evidence that doctors and patients systematically differ in their risk preferences in the healthcare domain.

1. Introduction

The doctor–patient interaction is generally modelled as an agency relationship (Iizuka, 2007; McGuire, 2000; Stavropoulou, 2012). Due to information asymmetry, the doctor acts as an agent making decisions on behalf of the patient. In a perfect agency model, doctors' decisions should reflect patients' preferences. In the case of health decisions patients' risk preferences – the desire for taking a gamble – and time preferences – the degree to which the present is valued more than the future – are of particular interest (Bradford et al., 2014; Bradford, 2010; Cairns and Van der Pol, 1997; Dolan and Gudex, 1995; Gafni and Torrance, 1984; Gurmankin et al., 2002; van der Pol and Cairns, 2001, 2002, 2008; Van Der Pol, 2011; Van Der Pol and Cairns, 1999). The agency relationship may not be perfect as doctors cannot easily observe or interpret patients' preferences (Fagerlin et al., 2011; Say and Thomson, 2003; Ubel et al., 2011). If doctors make decisions on the basis of their own rather than patients' preferences, it is important to understand whether the two parties have similar preferences for risk and time.

The importance of risk and time preferences in medical decision-making has been extensively discussed in the medical literature. From screening tests (Edwards et al., 2006) and general practice (Edwards et al., 2005) to specialist visits for cardiovascular conditions (Waldron et al., 2010), almost every doctor–patient consultation involves a discussion of the trade-offs between risks and benefits of treatments over time before a treatment decision is made (Zikmund-Fisher et al., 2004). Evidence suggests that doctors' risk and time preferences affect treatment decisions (Allison et al., 1998; Fiscella et al., 2000; Franks et al., 2000; Holtgrave et al., 1991); and that patients' risk and time preferences have an impact on the uptake of vaccinations, preventive care, and medical tests (Axon et al., 2009; Bradford, 2010; Bradford et al., 2010; Chapman and Coups, 1999; Picone et al., 2004) and on treatment adherence (Brandt and Dickinson, 2013; Chapman et al., 2001). This means that if doctors and patients vary in terms of risk and time preferences and doctors

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cannot readily observe these differences, doctors may recommend treatments that are not optimal given patients' risk and time preferences, which may result in lower treatment adherence. Treatment adherence is of major concern and has been shown to vary across individuals (WHO, 2003). Some of this variation may be due to differences in risk and time preferences between doctors and patients. Better matching of doctors to patients may therefore improve health outcomes through better treatment allocation and adherence.

Although the medical literature provides broad evidence on the key role of doctor–patient communication on healthcare decisions (Bjerrum et al., 2002; Dudley, 2001; Fagerlin et al., 2005a, 2005b, 2005c; Kipp et al., 2013; Ortendahl and Fries, 2006; Peele et al., 2005), there is little evidence on whether patients and their doctors have similar or different risk and time preferences. This gap in the evidence is largely due to the lack of primary data that directly measure, in a quantitatively comparable way, risk and time preferences across patients and doctors.

Moreover, there is now broad evidence that risk and time preferences are largely domain-specific (Attema, 2012; Barseghyan et al., 2011; Blais and Weber, 2006; Bleichrodt and Johannesson, 2001; Bleichrodt et al., 1997; Butler et al., 2012; Cairns, 1994; Chapman, 1996; Chapman and Elstein, 1995; Cubitt and Read, 2007; Einav et al., 2010; Finucane et al., 2000; Galizzi et al., 2016; Hanoch et al., 2006; Hardisty and Weber, 2009; Hershey and Schoemaker, 1980; Jackson et al., 1972; MacCrimmon and Wehrung, 1990; Prosser and Wittenberg, 2007; Viscusi and Evans, 1990; Weber et al., 2002). Even within the same health domain, preferences vary across different contexts (Bradford et al., 2014; Butler et al., 2012; Harrison et al., 2005a; Szrek et al., 2012; van der Pol and Ruggeri, 2008). It is possible, therefore, that doctors' and patients' healthcare decisions are explained not only by their risk and time preferences for monetary outcomes, but also (and perhaps more closely) by risk and time preferences for healthcare outcomes. No secondary data, however, currently exist that directly elicit health-related risk and time preferences for patients and doctors (Bradford, 2010).

In this article we attempt to fill this gap by explicitly investigating whether patients and their matched doctors in natural clinical settings have similar risk and time preferences for healthcare outcomes. As a robustness check, we also measure risk and time preferences in a closely comparable financial context. To the best of our knowledge, ours is the first attempt to systematically look at differences and similarities of risk and time preferences across doctors and patients in a real healthcare setting.

We conduct a 'framed field experiment' based on Harrison and List (2004) (an 'extra-lab' experiment according to Charness et al., 2013b). Field experiments are increasingly employed in exploring preferences (Andersen et al., 2008a, 2008b, 2014; Charness et al., 2013a; Harrison et al., 2007; Sutter et al., 2011), and in comparing them across different groups of subjects (Croson and Gneezy, 2009; Harrison et al., 2009; Masclet et al., 2009). In our field experiment we measure patients' and doctors' risk and time preferences by adapting the multiple price list (MPL) tests proposed by Holt and Laury (2002) and Tanaka et al. (2010), respectively, to the healthcare context (Galizzi et al., 2016). In order to address any issue that can potentially arise from framing and domain-specificity in preference elicitation, we also measure patients' and doctors' risk and time preferences using the same MPL tests but in a closely comparable financial context.

We have three main results. First, there is a significant difference in time preferences between patients and their matched doctors, with doctors discounting future health gains and financial outcomes less heavily than patients. Second, we find no systematic difference in risk preferences in the healthcare domain between patients and doctors: in our sample both patients and their matched doctors are mildly, but significantly, risk averse. Third, doctors and patients have significantly different risk preferences in the finance domain: whilst doctors are risk averse, patients are risk neutral.

The rest of the article is organised as follows. Section 2 contains a brief description of the methods whilst Section 3 reports the main results. Section 4 discusses the main findings in the context of the literature, whilst the last section briefly concludes.

2. Methods

2.1. Study design

We conducted a field experiment among patients and doctors in a university hospital in Athens (Laiko Hospital), Greece, in four waves between September 2010 and November 2011.[1] Patients were asked to complete a questionnaire (Online Appendix A1) whilst they were waiting in the outpatients' clinics to see their doctors. The questionnaire was completed in the presence of a research assistant who explained the questions and was available for assistance during the completion of the questionnaire. The patients' doctors were also invited to take part in the study by completing a similar questionnaire. The outpatient clinics were pathology, cardiology, gynaecology, haematology, surgery, endocrinology, orthopaedics, urology, gastroenterology, nephrology, rheumatology, ophthalmology, and otolaryngology. Patients who attend the outpatient clinics are seen by the first available doctor. They are therefore randomly assigned to their doctors. We obtained questionnaire data for 300 patients and 67 doctors. Not all patients could be matched to the doctor they saw for two reasons. First, patients did not know beforehand which doctor they would see, and some patients refused to answer further questions when leaving the clinic. Second, some doctors did not complete the questionnaire. A total of 144 patients (48% of patients) could be matched to their doctors.

The study was approved by the hospital's Research Ethics Board on 6 August 2010 (protocol number ES 462).

2.2. Questionnaire and variables

The questionnaire included a number of socio-demographic questions, such as the respondents' age (*Age*), gender (*Female*), marital status (*Married*), education level (*Educ*), perception of their current financial situation (*FinConstr*), and whether they have children or not (*Children*). Patients were also asked about their health status, both by reporting their self-assessed health (*SAH*) and whether or not they had a chronic condition (*Chronic*). A full description of the variables in the questionnaire can be found in Appendix A.

2.2.1. Risk preferences

Risk preferences were measured using an adaptation of the Holt and Laury (2002) MPL test to the healthcare context (Galizzi et al., 2016). The MPL method is one of the most widely used incentive-compatible tests in experimental economics to measure risk preferences for monetary outcomes (Charness et al., 2013a). Subjects are presented with a series of choices between two lotteries (A and B). The payoffs in the lotteries remain constant but the probability associated with each payoff changes. Lottery A is associated with a higher expected pay-off in the first few choices but this switches to lottery B in the later choices.

The MPL was adapted by presenting the lotteries as different healthcare treatments with payoffs defined as days of full health (Table 1). A risk-neutral individual should switch from the 'safe'

[1] Round 1 of data collection started in September 2010, lasted 5 weeks and included 91 patients. Round 2 started in January 2011, lasted 4 weeks and included 34 patients. Round 3 started in April 2011, lasted 5 weeks and included 56 patients. Round 4 started in October 2011, lasted 4 weeks and included 119 patients. It should be noted that the survey was conducted at a time of great economic crisis. The potential implications are discussed in detail in Galizzi et al. (2016).