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## The Future of Health Economics: The Potential of Behavioral and Experimental Economics

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# The Future of Health Economics: The Potential of Behavioral and Experimental Economics

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# **The future of health economics: the potential of behavioral and experimental economics**

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**Abstract:** The health care systems in the Nordic countries are facing key challenges. While the possibilities and willingness to expand health care resources are limited, the demand for health care are increasing due to continuous development of new medical technologies, changing demographics, increasing income level and greater expectations from patients. Consequently, health care organizations are increasingly required to take economic restrictions into account and there is an urgent need to improve the efficiency in the health care sector. A reasonable question to ask is if health economics of today is prepared and equipped to support in meeting these challenges. This article argues that behavioral and experimental economics are promising fields to consider when closing vital knowledge gaps. The aim of this paper is two-fold: introduce the fields of behavioral and experimental economics, and thereafter identify and characterize health economic issues where these two fields have a particularly promising application potential. We also address the advantages of applying a pluralistic view on health economics. Based on the analysis in this, and similar articles, on the development of health economics, we anticipate a dynamic future of health economics.

**Keywords;** Health economics; Behavioral economics; Experimental economics; Pluralism

**JEL-codes:** B40; C90; D03; I10

## 1 Introduction

The health care system in Sweden, as in many other countries, is facing various challenges. A main challenge is that demand for health care is increasing due to e.g., the continuous development of new medical technologies, changing demographics, increasing, as well as more diversified, real income, and expectations from patients. At the same time the possibilities and willingness to expand health care resources through increased taxes and mandatory insurances, are limited. Consequently, health care organizations are increasingly required to take economic restrictions into account, and, thus, there is an urgent need for finding ways of improving the efficiency in the health care sector.

But is health economics of today prepared and equipped to meet these challenges? About a decade ago, health economists and economic methodologists argued that health economics had an impressive period since the 1960s, and was in a methodological sound status. In the introduction to the *Handbook of Health Economics*, Culyer and Newhouse (2000, p. 1) argued that: "By almost any criterion, health economics has been a remarkably successful subdiscipline." At the time health economics was viewed as an applied field of economics, basically an application of neoclassical welfare economics, and in close connection to the medical sciences as well as medical technology. Blaug (1998, p. S66) performed a methodological analysis on health economics reaching the conclusion that "there has been steady theoretical and empirical progress in health economics ever since 1970". Blaug noticed however that much of health economic research was dependent on the settings of the USA. Fuchs (2000) agreed that health economics had a remarkable development but argued also in favor of a better understanding of economic behavior, especially the incorporation of behavioral economical perspectives.

In the *Nordic Journal of Health Economics*, we have lately witnessed several articles suggesting an expansion, or re-focus of today's health economics especially in relation to the

Nordic health care model. For example, Pedersen (2012) argues in favor of better accounting for institutions concerning the issue of health care systems. According to the author there is a need for a wider perspective covering non-market methods and resource allocation by what is denoted the "public mechanism".<sup>1</sup> Mooney et al. (2013) argues in a similar way on non-market methods but in favor of applying a communitarian perspective. Their idea is to view community participation as a process and strive for the maximization of the community's interests.

These suggested directions for the future development of health economics are all important. However, in line with Fuchs (2000), this article focuses on improving our understanding of health economic decision-making by considering methods, theories and results from behavioral and experimental economics. In relation to other subdisciplines of economics, such as financial economics and game theory, behavioral and experimental economics has not yet had a major breakthrough in health economics. The recommendation of Fuchs has not yet been fulfilled in today's health economics and there is still a lack of focus on the behavior of the involved agents, especially doctors and patients.

The aim of this article is twofold. The first is to introduce the fields of behavioral and experimental economics. It is often argued that behavioral economics and/or performing economic experiments provide a better (more realistic) account of individual economic decision-making compared to neoclassical economics. The second aim is to identify and

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<sup>1</sup> Interestingly for this paper, Pedersen do not believe in the application of behavioral economics will result in a new paradigm for health economics. It is however not clear what Pedersen means with "paradigm" but as will be clear later in this article we believe in behavioral economics to the degree of viewing it as a complementary research program of its own.

characterize the potential of applying these two fields to health economic settings. Applying economic analysis to the issue of what motives and guides medical decision making will have a great potential to result in valuable input for improving the efficiency of public health care system in Sweden and other countries. This article focuses on decision-making of doctors, an area where we believe not much theoretical progress has occurred since McGuire's (2000) review more than a decade ago.

Access to health care are fundamental for social welfare but we lack knowledge about public health care system, for example, of the kind found in the Nordic countries (Gerdtham 2012). In particular we know little about the motives behind doctor behavior in these non-market systems. Doctors have been studied in market-oriented health care systems. It has been documented that doctors change their behavior when financial incentives change and that doctors manipulate patients' demand (McGuire 2000). However, much less is known about doctors in publicly oriented systems. The doctor is the key decision-maker in health care.<sup>2</sup> In many ways, the doctor ultimately determines the health outcome for the patient as well as health care costs. Thus, understanding doctor behavior and how it interacts with other agents as well as the organizational structure is fundamental in an analysis of what is produced, how it is produced and by whom, and who gets access to it. The dominating neoclassical approach focuses, among other things, on the doctor's ability to exploit their information advantage for personal gain. Health care providers are regarded as profit maximizers with only their own gains to the eyes (McGuire 2000). Although it is reasonable to believe that health care providers and organizations are affected by some degree of self-interest and financial incentives, it is obviously incorrect to assume that this is the only motivation. Decisions are in general guided by multiple motives and there are several cases in which financial motives are

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<sup>2</sup> Related to this issue is the recent study by Trottmann et al. (2012) on cost sharing on medical services being more effective when it is applied on the supply-side.

crowded out by cultural, moral, and career-related motives (Gneezy et al. 2011). These aspects are typically addressed in behavioral and experimental economics.

The article is organized as follows: we will start by introducing behavioral and experimental economics. We then point out particularly promising directions for health economics to develop in the future in relation to behavioral and experimental economics. We comment on methodological motives for our results, especially the pluralistic point of view, and finally offer a conclusion.

## **2 Introducing behavioral and experimental economics**

This article distinguishes between behavioral and experimental economics although they are often viewed as one and the same. Basically, behavioral economics is a theoretical approach and often its adherents are performing economic experiments in their empirical work. But not all behavioral economists are performing experiments, and experiments can also be performed by neoclassical economists. Some experimental economists are also quite critical to behavioral economic approaches, see e.g., Smith (1991). This latter fact motivates our choice to distinguish between the two fields.

### **2.1 Behavioral economics**

In the last 30 years we have experienced a dynamic development in order to theoretically capture economic behavior. Back then, the neoclassical approach was dominating. It is still an important approach but parts of it are overshadowed by the development of behavioral economics. This latter approach can be described as the incorporation of methods and theories from (cognitive) psychology when especially addressing the economic decision-making. Despite heated debates between neoclassical and behavioral economists, as argued in Hansen (2012) much of actual research performed can as a matter of fact be viewed as complementary. Both address "behavior"; obviously they apply different theoretical

approaches but in the end they often also target different parts of the economic reality. That is, they target different kinds of "behavior". For behavioral economists individual behavioral is often of main interest. For neoclassical economists that often focus on aggregate outcome levels such as e.g., markets, the assumption of a utility maximizing individual is mainly used as a stepping stone.

The neoclassical theory on economic behavior is, as expressed by DellaVigna (2009, p. 315) "simple and powerful". At the same time it has also got its limitations, often related to the assumptions made. According to DellaVigna (p. 315) some of these assumptions can be expressed as:

Individuals make choices so as to maximize a utility function, using the information available, and processing this information appropriately. Individuals' preferences are assumed to be time-consistent, affected only by own payoffs, and independent on the framing of the decision.

The strategy of behavioral economists is basically to de-idealize these statements. DellaVigna distinguish three major deviations from (standard) neoclassical models that can also serve as the directions of behavioral economics of today:

- non-standard preferences
- non-standard beliefs
- non-standard decision making

To begin with, preferences are much more complex than assumed by neoclassical economics. For example, they tend to be time inconsistent as shown by e.g., George Loewenstein in his work on intertemporal choices. Our preferences also tend to be reference-dependent and we value gains and losses differently in relation to the reference point (also known as loss



aversion). This is captured in the well-known Prospect Theory by Kahneman and Tversky (1979) and extended in Tversky and Kahneman (1992). One consequence of reference-dependence is known as the endowment effect. It basically says that you value a good higher if it is among your possessions. Besides reference-dependence and loss aversion, characteristic of prospect theory is also diminishing sensitivity and probability weighting where we tend to overweigh small probabilities. Finally regarding non-standard preferences, as also mentioned earlier, we are not purely self-interested. We take into account also the interests of others (although not necessary to the advantage of these people) and this is denoted as the social preference approach. This is mainly developed by Ernst Fehr, see e.g., Fehr and Gächter (2000), as well as James Andreoni and Matthew Rabin.

Regarding beliefs, they tend not to be correct on average as assumed in the neoclassical approach. We are all, more or less, overconfident, not only about our abilities but also regarding time (being too optimistic, also known as the planning fallacy). It is often we adhere to what is known as the law of small numbers (that is, we conclude from too small samples). Finally there is also the projection bias meaning that we tend to expect our future preferences to be close to the present ones. This is particularly an issue to those empirical methods asking questions about hypothetical future states (regarding e.g., happiness) and the participants likely reactions.

Non-standard decision making means basically that we do not make decisions as assumed by neoclassical economics (that is, solve complex maximization problems). To begin with, the way the different choice alternatives are presented matters, commonly known as framing. To the neoclassical approach framing should not matter but it is not hard to imagine examples where it does (e.g., the whole business of marketing implies that presentation is vital). Related to framing is that we are also affected by persuasion, social pressure and emotions. Another result regarding our actual decision making, if not the most important, is that we use different

heuristics, that is, rules-of-thumb, both when we search information and when we decide. This idea goes back to the work by Herbert Simon on bounded rationality (1955; 1956) where reference-dependence also plays a vital part. Given our cognitive limitation compared to what is assumed in neoclassical economics, we must devote limited attention to our choice problems. A plethora of different heuristics has been presented (the well-known concept of satisficing can be viewed as one example) - some of them successful as emphasized by Gerd Gigerenzer in e.g., Gigerenzer et al. (1999); others not resulting in biases of different kinds as covered in the "heuristics and biases"-program by Kahneman and Tversky, see e.g., Gilovich et al. (2002).

Compared to the other subdisciplines of economics, especially financial economics, health economics is still at the initial level of applying theoretical approaches and empirical results from behavioral economics. Take for example the *Oxford Handbook of Health Economics* by Glied and Smith (2011). In this book "behavioral economics" is only briefly mentioned in a chapter on addiction.<sup>3</sup> The situation is better in the *Handbook in Economics, Health Economics vol 2* by Pauly et al. (2012) where several chapters deals with behavioral economical theories and results, especially Chandra et al. (2012) on the variations in treatment choices. It is also interesting to note that the former Director of the Office of Management and Budget of the USA, Peter Orszag (2008), on several occasions emphasized the need for a behavioral economic perspective on health care, especially regarding understanding and improving the decision making of both doctors and patients. In a review article of medical decision making, Chapman (2009, p. 600) states in the conclusion that "[i]t appears that the study of decision processes is not just an academic exercise - decision phenomena such as risk

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<sup>3</sup> In this article we will not really address behavioral and experimental economic perspectives on addiction and risky behavior. This is however nicely covered in Cawley and Ruhm (2012) and Kenkel and Sindelar (2011).

preferences, time preferences, and biases have been shown to be related to real-world medical decisions and health behaviors."

A few interesting attempts have been made so far to improve this interaction between behavioral and health economics. Frank (2007) presents promising future directions for the application of behavioral economics to health care issues, though most of them are to be classified as modifications of the neoclassical approach reviewed in McGuire (2000). Frank mentions, among other things, the need to account for professional norms and stereotyping heuristics. In a comment to Frank, Glazer (2007) lists the following non-standard beliefs of doctors: small samples, uncontrolled experiments, extreme cases, stereotypes, common practice, the need to "do something", and the patient's expectations.

As mentioned by Frank (2007) and Frank and Zeckhauser (2008) the decision environment facing the doctor is far from optimal meaning that many important decisions must be made given both extreme time pressure and serious uncertainties of different kinds. Since most decisions still are correct, or close to it, it indicates that the doctors have developed efficient decision procedures. Unpacking how these decisions are made and their economic consequences, is a key challenge for future research. Some initial steps have however been made. According to Frank and Zeckhauser the doctors have managed the four "costs of customization" - communication, cognition, coordination and capability - mainly by developing professional norms. A consequence of such professional norms is that they can be strongly influenced by professional leaders, and therefore of local nature. In the end this may result in geographical clusters of different behaviors referred to as "small area variations", mentioned by e.g., Glazer (2007). Professional norms can be viewed as examples of heuristics that are used by doctors (as well as all others) in their decision making.

Doctors also display non-standard beliefs. Alexander and Christakis (2008) performed a survey on Chicago doctors showing that they are too optimistic in their prediction of patient survival, especially in their communication with the patient and its relatives. The authors interestingly managed to incorporate their survey in the administrative material a doctor must fill in when diagnosing the patient. Gigerenzer et al. (2008) focus on the difficulties patients, medical journalists and doctors have in understanding and communicating probabilities. People in general are what Gigerenzer et al. calls statistical illiteracy, but the consequences are serious if the doctor cannot communicate the pros and cons with different treatments. The authors suggest using frequencies instead of probabilities, in the communication with patients.<sup>4</sup>

Let us finally in this description mention three recent developments in behavioral economics and their health economic consequences. Conflict Of Interests (COI) in health care settings has been addressed by George Loewenstein. A common example is the conflict between professional interest and financial incentives in the US (Dana and Loewenstein, 2003). Such conflicts are often accompanied by an unconscious self-serving bias. This goes against the view of COI being the result of a deliberate choice meaning that even small gifts might be influential. The difficulty is that at the moment we don't really know how to counteract this kind of unconscious self-serving bias. According to Dana and Lowenstein, the policies that we use today are based on it being a deliberate choice and their efficiency is consequently doubtful.

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<sup>4</sup> It is interesting to note the similarity between the suggestion of Gigerenzer et al. (2008) and the number-needed-to treat (NNT) often used in the communication of results from clinical research between doctors, see e.g., Laupacis et al. (1988).

One way to affect health behavior related to behavioral economics is to use what is known as “nudges” by Thaler and Sunstein (2008). The idea is that better knowledge about people’s decision-making enables policy to make small changes in the decision situation, i.e., push (or nudge) people in a certain direction in their decision-making, in order to achieve more preferable outcomes (for individuals and society). Typical examples of health-related nudges are serving alcohol in smaller glasses and making carrots the default side order instead of crisps.

A middle ground between the behavioral and neoclassical view of individual decision-making is offered in what is known as the dual process approach (Stanovich and West (2000)). Two systems are at work when we decide: the intuitive (system 1) and the analytical (system 2). The idea is that in our everyday decisions the intuitive system are at work and at more uncommon, strategic situations, the analytical system sets in. Unfortunately the latter is not always the case. For example, biases might occur when system 1 is used although the decision task instead demands more analytical reasoning. Croskerry (2009) present a model of dual process of doctors’ decision-making. This model basically covers all steps from patient presentation to diagnosis and the extent to which intuitive and analytical reasoning operates at the different stages. According to Croskerry, pattern recognition is the connection between the two kinds of reasoning. This development is in an initial phase.

## **2.2 Experimental economics**

Considering experiments from a general point of view, health economics has an interesting history with the well-known RAND health insurance experiment performed more than three decades ago.<sup>5</sup> But what is known as “experimental economics”, is however more or less an adaptation of the experimental method of psychology. These days a plethora of different kinds of experiments are performed by experimental economists such as laboratory, internet and

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<sup>5</sup> See e.g., the recent Aron-Dine et al. (2013).

field experiments. As illuminated in e.g., Harrison and List (2005) each kind of experiment has its advantages and disadvantages. In a laboratory experiment you have a good degree of control of the experimental situation, but there is also the risk of creating uncontrolled artificiality of the decision situation resulting in a loss internal and/or external validity. It might also be hard to recruit participants besides students. With internet experiments you can easily recruit a larger amount of participants that are more representative of the general population. At the same time the degree of control is lower and you can never be certain of which person that is actually participating in the experiment. Field experiments of course increase the external validity since they are closer to reality. But it can be hard to come up with situations where a successful field experiment can be performed and the data collection process can be quite difficult. Compared to the experimental tradition in psychology, experimental economists have a very negative view on deception and favor using monetary incentives. The methodological discussion in experimental economics is vibrant as covered in e.g., Guala (2005) and Bardsley et al. (2010).

Performing economic experiments is not a well-established method among today's health economists. The related area of stated preference is however popular. The interaction between this area and experimental and behavioral economics is however not straightforward. The relation between WTP-studies (i.e., contingent valuation) and experimental economics is usually weak. As mentioned in e.g., Kling et al. (2012), most WTP-studies are to be viewed as using survey-based methods. These studies do not display the degree of control of the decision situation of the participants that we normally assign to economic experiments.<sup>6</sup>

Experiments can however be used to study the relation between hypothetical and real

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<sup>6</sup> In a typical WTP-study they focus on the views of the participants, in the form of a stated hypothetical willingness to pay, on a certain matter. The actual decision-making of the participants is not in focus and therefore a controlled decision situation is not needed.

willingness to pay, i.e., what is known as hypothetical bias, see e.g., Blumenschein et al. (2001) and Kling et al. (2012). It must be mentioned that most behavioral economists are quite critical to WTP-studies, see e.g., Kahneman and Knetsch (1992). For example, the endowment effect we have mentioned earlier can be used to explain why WTP and WTA differs (you put a higher value on what you own). In fact, the endowment effect can be viewed as general critique to valuations studies using hypothetical questions. We however agree with Kling et al. (2012) that a well-thought and well-performed WTP can be informative and important, especially in health economics.<sup>7</sup> Interestingly, Kling et al. also addresses the behavioral economic dilemma of stated preference methods. If the outcome of a study displays behavioral economic tendencies, the problem is then that we don't know if it is connected to the data collection process or a failure of the underlying neoclassical theoretical assumptions on individual preferences; or both. There is, on the other hand, a tendency of stated preference economists to only believe in the former and not take into account the later possibility.

A popular stated preference method in health economics nowadays is discrete choice experiments (DCE). In this case there is a focus on the attributes connected to a choice situation of a certain kind. Choice sets are carefully designed and after testing them on respondents conclusions are drawn on the priorities, and (indirectly) valuations, of the different attributes. DCE are often performed by mail or on the internet. Compared to WTP-studies, DCE is a more structured and experiment-alike method. But the connection between DCE and experimental economics is not obvious. As far as we know there is very little direct interaction between DCE-economists and experimental economists. In a recent review of DCE by De Bekker-Grob et al. (2012), the discussion on experimental design is mainly

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<sup>7</sup> Mooney et al. (2013, p. 120) however mentions that health economists has been slow to respond to the critique of WTP-studies compared to e.g., environmental economists.

about how to structure appropriate choice sets. Issues like degree of control, artificiality of the decision situation, incentives structure etc., typical to experimental economics, are not really addressed.<sup>8</sup> Bringing DCE and experimental economics (as well as behavioral economics) closer is an interesting track for the future.

Just as there are different kinds of experiments, they can be used to study different kinds of economic phenomena. You can study the decision-making of individuals as well as the functioning of (experimental) markets and institutions. In some cases the main purpose is to examine the assumptions of theories and not to directly address any actual economic phenomena.

So far, a couple of economic experiments have been performed in health economics. For example, testing the assumptions of welfare economics has a clear impact on health economics and two of us have been involved in this practice, see Johannesson and Gerdtham (1995), and Andersson and Lyttkens (1999). There are also examples of examining assumptions directly related to health economic theory. An active research area in health economics today is social inequality in health. Much effort is devoted to develop and examine indexes to measure this kind of inequality. Most popular is the concentration index which measures the health inequality in relation to an individual's social rank in a population. As illuminated in Wagstaff (2002), Erreygers (2009), Allanson et al. (2010), Pietri et al. (2011), Erreygers and van Ourti (2011), and Kjellsson and Gerdtham (2013) there is currently no consensus regarding how to measure changes in social inequality in health and the concentration index can show different values on measured inequality due to choice of

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<sup>8</sup> Concerning the cognitive burden of the participants, there is a debate among DCE-economists about how many choice sets the respondents can manage, see e.g., Bech et al. (2011) that up to 17 sets is acceptable.



weighting scheme used in the index. Bleichrodt et al. (2012) examined experimentally how people perceive and rank health changes at different parts of the income distribution. One of their main results is that decreases in the spread of income and health were viewed as socially desirable while, on the other hand, decreases in their correlation were not. That is, the subjects of their study did not express clear preferences against coupling poor health with low income.

Performing economic experiments on doctors is rare. An alternative is to use medical students as participants. For example, Henning-Schmidt et al (2011) performed an experiment on payment systems and in their laboratory experiment medical students were asked to make decisions as doctors on medical services given different payment structures.<sup>9</sup> There was however no patients participating (real or students) but an incentive was given in the form of the benefits in that artificial patients were transferred to a charity fund related to health care. Henning-Schmidt et al. report that the decisions of the participants were affected by the payment structure. For example, under capitation there were 33% less medical services applied than under fee-for-service (being no surprise from a theoretical point of view). The authors are well aware of the limitations of their experiment.<sup>10</sup> They also mention that laboratory experiments in health economics is in its infancy, but have the potential to result in vital information (p. 639) "as a 'wind tunnel' before institutional changes are implemented, e.g., during a health care reform".<sup>11</sup> Both Henning-Schmidt et al. and Bleichrodt et al. (2012)

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<sup>9</sup> In relation to this article, it is interesting to note that Henning-Schmidt et al. mentions that they are following the research agenda proposed by Fuchs (2000).

<sup>10</sup> According to Henning-Schmidt et al. (p. 643): "We are aware that the present experiment only allows us to draw qualitative conclusions and not to assess actual behaviour in real clinical setting."

<sup>11</sup> A similar experimental setting is used by Godager et al. (2013) in a recent experimental study on how performance disclosure affects doctors medical decisions.

are examples of economic experiments that are not dependent on theoretical perspectives from behavioral economic.

### **3 Promising directions of health economics**

As we have indicated in our introductions to behavioral and experimental economics, there have been some interesting attempts to introduce these fields in health economics. We however believe that they can be applied to a much higher degree. Therefore we will take the opportunity to characterize areas where we believe the application potentiality is particularly promising. Once again we will distinguish behavioral and experimental economics, although they will have many parts in common. The structure is straightforward: we start with the strengths of behavioral and experimental economics and then discuss which health economic issues that can benefit from these new research perspectives.

Common to all the areas that we mention, more or less, is that we currently seriously lack appropriate data to progress our analysis on the decision-making of doctors. We will therefore also address the need for development of appropriate data bases.

#### **3.1 Behavioral health economics**

As we have mentioned earlier, the major advantage of behavioral economics is that it can better account for the decision-making of individuals (and in some cases also of groups). There are several kinds of individuals of interest in health economics. We focus on doctors, but we also mention the decision-making of other health care related professionals as well as patients and their relatives.

The decision-making of doctors is a challenging but an underdeveloped research area. To our knowledge not much has happen since McGuire's (2000) well-known review on "physician agency". In a recent review by Chandra et al. (2012) on treatment choices of doctors, the variations are still largely unexplained when applying available (neoclassical) models and the

authors suggest turning to what they call "situational factors", an area that coincides largely with behavioral economics. In the case of doctors' decision-making, there are several phenomena of interest. We will distinguish between issues related to the diagnosis phase, and those related to the decision environment.<sup>12</sup>

Let us start with the procedure of deciding on a diagnosis, and similar decision-making, and their related health economic issues. As we have mentioned, according to Chandra et al. (2012) today's neoclassical models cannot account for the variations in treatment choices and behavioral economics can offer valuable insights. The application of behavioral economics in this area deals basically at finding out what kind of heuristics that are used by doctors when deciding upon a diagnosis and what consequences that will have, especially biases. The interaction between professional norms and heuristics should in particular be examined.

Examining what heuristics that are used by doctors is a difficult task. However, much can be gained by looking at what has been performed in the related field of medical decision-making.<sup>13</sup> Among several interesting results, André et al. (2002) used focus groups to show that Swedish doctors use heuristics in their profession. However, they do not specify any heuristics or reason about their medical or economical implications. Bornstein and Emler (2001) illuminate different kinds of biases that might occur if heuristics are used

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<sup>12</sup> The presented structure will, unintentionally, to large extent coincide with the one presented in Eisenberg (1979), a classical article on medical decision-making.

<sup>13</sup> Behavioral economics and the field of medical decision-making are obviously related. But the latter don't always incorporate economical perspectives. The two fields are interacting more and more and in 2011 the theme for the annual conference of SMDM (Society for Medical Decision Making) was "From Evidence to Decision Making: Role of Behavioral Economics in Medicine".

inappropriately in medical decision-making. The mentioned biases are much in line with the work by Kahneman and Tversky (representativeness, availability, framing etc.) and the authors are only arguing about the potential existence and don't report any data themselves. They don't take the whole decision-making process of doctors into account, but focus on deciding upon a diagnosis and choosing a course of treatment where the former is further divided in the steps of gathering evidence, interpretation of evidence and probability assessment. This is however an interesting characterization on that part of the decision-making process. An interesting approach would be to combine this characterization by Bornstein and Emler (2001) with the reference-dependent approach of Tversky and Kahneman (1992) and the dual process model by Croskerry (2009). Regarding reference-dependence, in a recent review of prospect theory in economics, Barberis (2012, p. 190) mentions that health economics is one of the areas of economics these days where prospect theory "has the potential to offer useful insights".

A doctor's attitude to patients (and their relatives) is dependent on whatever heuristic that is applied. To what extent one's attitude is a deliberate choice is an open question, but an attitude can obviously result in outcomes that are viewed as unfair. In this case it is likely that professional norms play an important role. Equity in health care is one of the most vibrant research areas in health economics nowadays as captured in Fleurbaey and Schokkaert (2012).<sup>14</sup> We have earlier briefly mentioned the procedure of creating indexes (and we are going to return to it in the next part), but another important line of study concerns identifying and explaining inequalities in health. Most analysis in this field focus on associations between health inequality and underlying factors such as income, education and labor market factors,

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<sup>14</sup> Fleurbaey and Schokkaert (p. 1085) also favors turning to behavioral economics when refining the underlying theory "in order to accommodate the most common departures from rationality that have been revealed in the behavioral literature".

without considering causal effects, with Gerdtham et al. (2012) as one of few exceptions, in which twin data is used in order to controlling for unobserved endowments at the twin-pair level. Fleurbaey and Schokkaert (2012) take a special look at the literature on racial disparities in health care. The data is mostly from the USA and ethnical discrimination has been remarkably little examined in Sweden and the other Nordic countries. Other kinds of discrimination vital to study are with respect to age, gender and social class. By finding out what heuristics that are at work (probably related to stereotyping), and their capacity to result in unfair outcomes, we are in much better situation to develop guidelines and policies aimed at avoiding this kind of discrimination. It must be emphasized, as also mentioned by Fleurbaey and Schokkaert, that this is a complicated issue since in some situations it is medically motivated to decide on different diagnoses and treatments based on age, gender and ethnicity. What we want to examine in this area is then medically unmotivated discrimination.

Heuristics can also affect the communication between doctor and patient. In the case of communicating probabilities, biases and/or misunderstandings can easily occur. As we have mentioned, Gigerenzer et al. (2008) argues that most of us are to be viewed as statistically illiterate. When the probabilities express the risks attached with a certain treatment, we face serious outcomes. Especially in the case of elderly patients, with multiple needs, the risk structure is also likely to be more complicated. Also the role of relatives regarding helping with interpretations, is worth examining. How to efficiently communicate risk with patients is of high priority. As we have mentioned earlier, Gigerenzer et al. suggests that the use of frequencies instead of probabilities is more efficient. It is also important to examine what kind of inequalities that can occur at inefficient ways to communicate risk.

Finally, as hinted above, it is also interesting to examine to what extent guidelines can be used to prevent biases, especially in relation to unwarranted inequalities. In this case we mean guidelines that are close to decision algorithms. That is, these guidelines are that well

developed that typically patients are classified as high or low risk just by asking a few questions on e.g., age, gender, weight, blood pressure etc. These guidelines are related to the behavioral economic approach of nudge. They are quite frequently used in the USA as illuminated in e.g., Aberegg and Terry (2004) and Wegworth et al. (2009)). As far as we know no study or evaluation has been made of the efficient use of guidelines in Sweden. It should be analyzed to what extent they can be used to improve doctors' decision-making.

Turning to the decision environment a doctor is facing, their interactions with other agents is an important area. They interact with other health care professionals (other doctors, nurses, administrators etc.), often in the form of work teams, but also with patients and their relatives. We will now focus on work teams, and return to patients and relatives in the part on diagnosis.

Multidisciplinary teamwork is a necessity in modern health care organizations but little is still known about the underlying mechanisms of such teamwork (Bosch et al 2009). The motives of the participants/professions in the work teams are therefore not well understood. A preferable method to examine mechanisms and individual motives in this initial phase, is surveys, see e.g., Abernethy and Stoelwinder (1994), but also economic experiments are appropriate. The role of the disciplinary residence of the participants is an interesting object to study as well as the interaction between doctors with different fields of specialization (Anell 2004). With behavioral economic perspectives we are likely to better account for the different motives of the participants (career-related, cultural, moral, disciplinary based, financial etc.) in teamwork, and thereby gain a chance to structure them more efficiently in relation to both economical and health care outcomes. Also the setting of teamwork seems to make a difference and should be accounted for in theory and experiments. Anecdotal evidence suggests that teamwork can be quite efficient in the temporary organization that establishes when a patient is admitted to emergency rooms. In other cases, e.g. teamwork around frail

elderly people in outpatient settings, it is more difficult to establish the necessary communication, coordination and control needed to provide good quality care.

Another agent of interest is the administrators and especially from the perspective of the organization of hospitals. The agents in hospital organization is often viewed from a neoclassical perspective, see Barros and Olivella (2011). There is a point in complementing this picture with perspectives from behavioral economics, especially concerning the motives and decision-making of the agents of the organization (as well as their interaction). It must be mentioned that behavioral economic perspectives on organizations is not a well developed field at the moment. Jan (2003) however suggest that decision-makers of health care organizations in the form of executives and politicians face a complex reality. Decisions to reorganize activities or to change the resource allocation usually meet strong resistance from the medical professions that loose out. Such resistance results in high personal costs for decision-makers, whereas there is no monetary gain. This may cause a natural resistance for politicians and executives to involve in too difficult decisions, resulting in a bias towards status quo and that only marginal changes in the resource allocation can be managed.

A related issue concerns doctors reactions to different payment systems. As indicated in recent review articles such as McClellan (2011) and Christianson and Conrad (2011), there is no superior payment system as far as we know and they all have their advantages and disadvantages. The available data is not that impressive and mostly in the form of aggregate data before and after a change has occurred in the payment system. It is often easy to specify the financial incentive of a payment system. However, doctors are also affected by other kinds of motives, some of them are salient, and the interaction between different kinds of motives can be a complicated matter. Behavioral economics, accompanied by appropriate economic market experiments, have the capacity to clarify this picture of the different motives that are present at a certain payment system, and how it affects the decision-making of doctors. One

particularly promising field of research are the effects of pay-for-performance mechanisms. As suggested by Bevilacqua and Singh (2009) pay-for-performance may be a Pandora's box that incentivize emotional responses based on fear and greed rather than what is efficient and rational from a general perspective. The same mechanisms may also crowd out professional norms in an unwanted way (Frey 1997). Again, policies in the field may strongly benefit from studies taking doctors behavior into account.

Continuing to look at doctors' motives and their decision-making, another promising field is Conflicts-of-Interests (COI) that we mentioned earlier. The examination of COI adjusted to Swedish conditions should be considered. For example, to what extent is it possible for the national and regional priority committees or the pharmaceutical industry to affect the decision-making of doctors? COI can also be used in a wider perspective. A COI of increasing importance is that between the relatives of the patient and the health care providers. The allocation of the costs of treatment between these parties is often subject of bargaining. With an ageing population, increasing demands for cure and especially care has to be accommodated. Home care is also more and more common nowadays. It is likely that an increasing amount will be pushed towards the informal care sector (i.e., relatives), but also that there will be resistance, probably with important social differences. Elderly as a group can also affect the decision-making of doctors regarding e.g., prescription behavior. For example, Kann et al. (2010) shows that Norwegian GPs prescribe more drugs to the elderly when the competition between GPs is high. This kind of outcome must be further examined.

Let us now look at the demand side, i.e., the patient, and this is far from a homogeneous group. Above all, the group of elderly is growing rapidly and this is a complicated group from a health care perspective, often displaying multiple conditions. Behavioral economic perspectives on patients are eminently covered in a short note by Glazer (2007). There are several parts of the decision-making of patients where behavioral economics can be at help.



First of all, the life-style of individuals in terms of dietary, smoking and drinking habits have a significant effect on their future health status. We have already mentioned options in terms of “nudging” individuals to prevent future illness like diabetes and cardio-vascular disease. In that area Volpp et al (2009) also suggest “pay-for-performance-for-patients” (P4P4P) to incentivize a changed behavior and reduce mortality caused by smoking, junk food etc. A second decision relates to if individuals should seek care or not, and if so where they should seek care. Once patients have accessed a provider, further decisions relate to what they should tell the medical personnel, what they should do with the prescribed medication, if they should comply with other forms of recommendations and/or if they should seek a second opinion. In all of these parts of the decision-making healthy life-styles, decision to access care and communication with health care personnel - it is also important to examine differences between patients regarding e.g., age, ethnicity, gender and social class.

We mentioned the role of relatives already in the part on COI. We believe that relatives play an important role in the decision-making of patients as well as in the interaction between the latter and the doctor. One interesting area is surrogate decision-making. This is an intense research area but so far it has not really been covered from (any) economic perspective. One alternative is to examine to what extent lessons from the behavioral economic approach on "taking risks on behalf of others" (Andersson et al. 2013) that have showed, among other things, that there is a lower degree of loss aversion among those taking risks on behalf of other.

### **3.2 Experimental health economics**

The main advantage of performing economic experiments is that we can better examine the decision-making of individuals (both in relation to reality and to theory) and we can also set up markets and examine their outcomes. In the earlier part on behavioral health economics we

have indicated where economic experiments should be performed. Let us now elaborate on those and other cases.

When empirically studying the decision-making of doctors (and/or medical students), a combination of surveys, DCEs and economic experiments, are preferred. Surveys, as well as interviews and the use of focus groups, can be very illuminating first step since we are moving in largely unexplored territory and need to know more on how doctors make decision and the structure of their decision environment. DCEs are rewarding when you want to know more on the priorities of doctors. For example, Pedersen et al. (2012) examine GPs knowledge of patients' preferences and reach the conclusion that it is quite poor.

Regarding economic experiments on doctors' decision-making, especially related to the procedure of deciding upon a diagnosis, it is interesting again to take a look at the experimental procedures often used in the field of medical decision-making. Above all there is the use of "videotaped patients" (played by actors) and then examining the decisions of participating medical students, asked to make decisions as doctors, regarding diagnosis, treatment and prognosis, see e.g., McKinlay et al. (1996) and Aberegg and Terry (2004). A methodological challenge when studying the decision-making of doctors experimentally is known as the Hawthorne effect, i.e., that participants change their behavior since they know that they are being examined in an experiment. This is of course hard to avoid but there are attempts to handle it statistically, see e.g., Leonard (2008).

In the case of testing, or calibrating, theories, we have already mentioned the Bleichrodt et al. (2012) experimental examination on the theoretical basis of the concentration index. More studies like this should be performed. The measurement of inequality/inequity in health and health care is a very active research field in health economics as illuminated by van Doorslaer and van Ourti (2011), especially after the publication of the well-known *Marmot Review*

(2010). In the developments of indexes we believe that the field is at that stage where taking into account new approaches can be rewarding. Today there is much focus on using register data. One of the new approaches worth considering would then be to perform experimental analyses of the theoretical underpinnings.

Similar procedures apply to testing (experimental) markets. Such research will be an important input in the research on the complicated issues of developing appropriate payment systems. Studies like Henning-Schmidt et al (2011) must be performed in a larger quantity testing possible alternatives and combinations of payment systems. A key challenge will be to make the decision environment less artificial than the one used in Henning-Schmidt et al who used imaginary patients.

In the study of work teams both surveys and DCEs can be used to study participants preferences and priorities, also from a more general perspective regarding e.g., career-related issues. Experiments can also be used to study trust between and within different professions. DCE can also assist when addressing hospital organization. Bech (2003) performed a DCE on politicians' and hospital managers' on their hospital-related priorities and were able to detect minor but still interesting disparities.

### **3.3 Developing appropriate data bases**

Appropriate data bases in order to study the decision-making of health care professionals, especially doctors, are lacking. An interesting exception is the Australian longitudinal survey of doctors called MABEL (Medicine in Australia: Balancing Employment and Life). It is supported by a large group of professional medical associations, societies, colleges and training providers. Currently 10 500 doctors are participating in annual waves of data collection by paper or online version of a questionnaire.

As described in Joyce et al. (2010) MABEL targets all Australian doctors undertaking clinical work. The surveys collect several different data such as job satisfaction, attitudes to work, a DCE examining preferences, workload and family circumstances. Yan et al. (2011) mentions that a DCE regarding job preferences was included in the first wave of MABEL. In the second wave a personality test was included as well as a 10-point scale measurement of life satisfaction. MABEL has so far been used in at least 20 journal articles, mainly concerning the work activities of Australian doctors (workforce participation, career transitions, rural workforce supply etc.) but also concerning the methodology of initiating data bases of this kind.

Large data bases like MABEL is practically invaluable to a health economics of the future and especially to the application of behavioral and experimental economics. At the same time, MABEL is obviously dependent on the circumstances of the Australian health care system. Since these kinds of circumstances tend to differ quite largely between different countries, more countries should strive to develop a MABEL data base of their own. The challenge of initiating a Swedish MABEL should however not be underestimated. It needs careful preparations in the form of pre-studies and wide agreements with different governmental institutions and interest organizations.

The involvement of other Nordic countries is also worth considering. In Sweden, and in many other countries, we are accustomed to national surveys of different kinds and there are some cases where they studied the decision-making of doctors. For example, the "Hyper-Q"-survey was performed 2002-2005 in the primary healthcare in Sweden. The collected data concerned mostly patient choices and attitudes but also some primary healthcare doctors participated. Based on this survey, Jönath et al. (2008) has showed that concerning hypertensive patients, the sex of the doctor and the patient mattered to what treatment that was decided by the

doctor.<sup>15</sup> Female doctors were more successful in their treatment, especially concerning female patients. However, the authors do not address the health economic consequences of this kind of differences in treatment.

#### **4 Pluralism and health economics**

This paper has indicated our support for a pluralistic view on health economics, especially given the challenges of the future in combination with the potentiality of behavioral and experimental economics. Let us now briefly elaborate our view on pluralism.

Both Pedersen (2012) and Mooney et al. (2013), when addressing the future of health economics, uses the term "paradigm". It is not unusual for economists to use this term, quite the opposite, but it is often unclear if they use it in the initial Kuhnian (1962) manner.<sup>16</sup> A rather common methodological belief among practicing economists seems to be that economics as a scientific discipline should apply only one theoretical approach. There is then the risk that the term "paradigm" is used in a prescriptive manner (i.e., against the development of new approaches), rather than descriptively in the Kuhnian sense to reflect the historical development of a discipline. Just because the neoclassical approach has been dominating in economics, it does not follow that we need to have a dominating approach in economics. On the contrary, as illuminated in Davis (2008), dominant approaches are often followed by a pluralistic environment and the current trends in economics are no exception. At the moment we have several interesting approaches, besides the neoclassical, and most of them complements each other from the perspective of capturing different parts of the

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<sup>15</sup> According to international guidelines men and women should be treated in the same manner.

<sup>16</sup> For example, in the case of Pedersen (2012) and Mooney et al. (2013) no reference to the work by Kuhn is made (or to any other work in economic methodology).

economic reality, see e.g., Hansen (2013). It is this kind of pluralism we support and it applies not only to theory, but also empirical method and economic methodology.<sup>17</sup>

Although we have argued for the potentiality of behavioral and experimental economics it does not follow that we believe that neoclassical health economics is refuted and/or should be abandoned. In contrast we think it has done a great job with important ideas on e.g., principal-agent, risk and uncertainty, and market outcomes. But no theoretical approach can cover all parts of the (health) economic reality and all approaches will have limitations of different kinds. By applying behavioral economic perspectives we can better account for individual health related behavior of different agents of interest. In line with Hansen (2013), the behavioral and neoclassical economic approaches complements each other to a large extent also when addressing the health economic reality. Of course, if a unified theoretical approach covering just as much as behavioral and neoclassical economics was presented, we should start applying this approach. But that is not the case at the moment and might never be. What we have today is several interesting approaches that cover different subparts of the health economic reality.<sup>18</sup>

A pluralistic view can also be applied on empirical methods. There are several health economic issues where the analysis can benefit from method pluralism. For example, when

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<sup>17</sup> We will not address the more methodologically complicated issue of explanatory pluralism in this paper (see e.g., Marchionni (2007)), but it is an interesting issue to examine in relation to health economics.

<sup>18</sup> Both Blaug (1998) and Hodgson (2009) express their surprise that given the serious nature of the issues addressed in health economics, it is strange that there have been few attempts of applying alternative economic approaches.

studying health inequality measurement we have mentioned earlier, a combination of register, survey and experimental data is interesting to apply.

Finally, it is also worth considering a pluralistic view on economic methodology.<sup>19</sup> Basically, we should be open to other views on the scientific method than is typically believed in health economics (and economics in general). For example, in the study of work teams, the different agents have different disciplinary backgrounds and as we have argued earlier it is interesting to examine how this affects their possibilities to communicate and cooperate in a team. These kinds of studies are close to the methodological approach of social studies of science. In financial economics, a direction called social studies of finance (SSF) by MacKenzie (2006) has gained popularity lately. It deals basically with how agents of financial economics (mainly traders) use the results and theories of financial economics in their everyday job. This kind of research should be of interest also to health economists.

## **5 Conclusion**

Health economics has been a particularly successful subdiscipline of economics. However we are now facing serious challenges in the development of a health care system for the future. To successfully meet these challenges, health economics must consider expanding their scope and that is preferably done by taking into account new economic approaches. There have been suggestions of incorporating perspectives from institutional and communitarian economics. We believe that also behavioral and experimental economics are alternatives worth considering.

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<sup>19</sup> In this case we use the term "pluralistic" close to the term "flexible". As illuminated in Dow (2007) methodological pluralism is a complicated matter and we want to avoid favoring any form of "anything goes".

With behavioral economics we can better account for individual decision-making by doctors, nurses, administrators, patients and their relatives, and even administrators and politicians. By performing economic experiment we can better study the decision-making of individuals as well as market outcomes. However, the lack of appropriate data is serious and data bases like the MABEL adjusted to Swedish, or Nordic, conditions must be developed in the nearby future.

By a pluralistic view on health economics combined with the development of appropriate data bases, we believe health economics (as well as health economists) is facing a bright future. We look forward to participate on this continued journey.

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