

Behavioral Economics and Health: A Discussion

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## 1. Introduction

There are few, if any, sectors in the economy where the growing paradigm generally termed "behavioral economics" seems to be as relevant and important as the market for health services. Starting with Arrow (1963) many economists have recognized the fact that in the health services and health insurance market, (on the basis of their behavior) consumers and providers cannot reasonably be described as rational agents acting to maximize their expected utility or profit. Furthermore, motives and considerations such as altruism, trust and norms, often outside the economists' usual playground, appear to play an important role in the agents' decision making process. Most of these researchers, however, have implemented their own, often ad-hoc, assumptions about how agents behave in these markets and very few have actually relied on models developed and results obtained in related behavioral fields such as psychology, sociology and especially the more recently emerging field of behavioral economics. It is perhaps for this reason that in spite of the voluminous research addressing this issue and the tremendous effort it has involved, many economists feel that we have not yet come up with a good model (or models) and understanding of one of the most important activities in healthcare – the doctor-patient interaction (see McGuire 2000, for a thorough discussion on this issue).

There is no doubt in my mind that bridging between these two almost parallel lines of research –behavioral economics and health economics – may advance us in the right direction if we wish to get a better understanding of the relationship between doctors and patients. The paper "Behavioral Economics and Health Economics", by Richard Frank, that appears in this volume is an excellent start in laying down the foundations for that bridge. Frank (2004) identifies the main domains in the healthcare market in which agents do not seem to behave according to the "cognitive paradigm" and, more importantly in my opinion, he points out some "regularities" in the, so to speak, "boundedly rational" behavior of these agents. Frank goes on to raise many interesting ideas of how models and ideas developed by behavioral economists and other researchers might be applied to get a better understanding of how patients and doctors act and interact, and he even suggests possible explanations for some of the puzzling phenomena that have been observed in this market.

In what follows I briefly present my understanding of some the main aspects of the doctor-patient interaction where behavioral economics seems very relevant and potentially very useful. This discussion is based mainly on Frank's (2004) paper as well as some other readings. In the first part of this essay, I present the main dimensions on which providers and patients decide and act in the market for healthcare, in the second part I highlight some of the main observations regarding how agents behave in this market, in the third part I bring the two groups of agents, doctors and patients, together and briefly discuss the phenomenon that many economists view as the main symptom of the market failure in healthcare: small area variations. The last part is devoted to some thoughts regarding the implications of behavioral health economics for the efficiency of markets and welfare in general.

## 2. What Do Agents Decide on?

Consumers (often referred to as patients) in the healthcare market face a wide set of decisions and actions. Grouping some of these decisions together we can say that consumers in the healthcare market make decisions with respect to:

- Their health insurance coverage.
- Whether or not to seek care.
- Which provider to go to.
- What to tell the provider.
- Whether or not to comply with the provider's recommendations.
- Whether or not to seek a second opinion.

Providers of healthcare make decisions with respect to:

- Which diagnostic procedures to perform.
- Which treatments to recommend and perform.
- What to tell the patient.

## 3. How Do Agents Decide?

Healthcare is an extremely complicated product. Each case is different and may involve multiple decisions with multiple uncertainties. New data and evidence about the effectiveness of different procedures keep arising alongside new technologies. It is no surprise, therefore, that both consumers and producers find decision making in such an environment very difficult and frustrating and that they often find themselves following a decision making procedure that might seem suboptimal to an outside observer (A recommended reading for most of the issues discussed here is McCall (1996)).

Casual observation and much empirical evidence have demonstrated that patients often form their beliefs and make their decision on the basis of:

- Small samples (e.g., a young woman decides to have a mammography just because a friend has been diagnosed with breast cancer).
- Uncontrolled experiments (e.g., people who suffer from back pain choose to have acupuncture because many people have taken this treatment before and seem to be doing better).
- Extreme cases (e.g., a pregnant woman decides to have amniocentesis after a neighbor has had her baby diagnosed with Down's syndrome).
- Trust (the patient simply follows the doctor's advice, often saying: "you are the doctor").
- Fear of breaking the trust (patients do not seek a second opinion because they don't want to upset their doctor).
- Instinct and "faith" ("this medication really works for me").

Similarly, providers of healthcare often form their beliefs and take actions on the basis of:

- Small samples (e.g., the doctor stops prescribing a particular medication just because it didn't seem to help one or a few of her patients).
- Uncontrolled experiments (e.g., a doctor might prefer one treatment over another just because more of her own or her colleagues' patients seem to be doing better on it).
- Extreme cases (the death of a patient, for example, may have a dramatic effect on the doctor's decisions in future cases that look similar).
- Stereotypes (e.g., the doctor believes that certain groups of patients tend not comply with a physician's recommendations).
- Common practice (the doctor does not actually "make a cognitive decision" for each new case she treats but rather follows some "standard operating procedure" common among her peers or colleagues or even simply something that she has adopted and became familiar with).
- The need to "do something" (sometimes, even when there is really no solution to the patient's problem, the doctor feels that she just cannot send the patient home without a recommendation or prescription).
- The patient's expectations (e.g., sometimes doctors prescribe antibiotics just because this is what the patients asked for, not because it is supposed to work in their case).
- Even though deciding on the optimal treatment almost always involves solving a "decision tree", agents (i.e., doctors and patients) often prefer to think about it "one step at a time" (i.e., they do not apply backward induction).

Overall, it seems that agents in the healthcare market adopt different decision making procedures and modes of behavior, depending on the circumstances. I think that health economists have done far too little in trying to understand how exactly the agents' decision making procedure is determined in the different situations and how it can be affected. This is precisely where ideas from behavioral economics might be most helpful.

There are many different hypotheses that might be useful in understanding doctors' and patients' behavior. Among them:

- Costs of collecting the information.
- Costs of processing the information.
- Rapid technological innovation (see Newhouse 2002).
- Distorted incentives (see Newhouse 2002).
- Loss aversion.
- Availability heuristic (see Tversky and Kahneman 1973).
- Anxiety (see Koszegi 2003).
- Case-based decision (see Gilboa and Schmeidler 2004).
- Statistical discrimination (see Balsa and McGuire 2003).

Though these hypotheses ought to be analyzed and tested, they provide at least a starting point for a theory that will better explain the doctor-patient interaction.

#### **4. The Main Symptom: Small Area Variations**

Even without a full understanding of the reasons behind the agents' behavior, we can talk about some of its consequences. Perhaps the most notable phenomenon in the healthcare market and the one that many health economists view as the strongest evidence for market failure in that market is the phenomenon called "small area variations (SAV)". Numerous researchers have found and documented major differences in the rates of various medical procedures performed and/or outcomes across populations of patients with similar characteristics. This phenomenon is referred to as small area variations. The table below presents the highest and lowest rates of performance (per ten thousand people) in different geographical areas, for different medical procedures.

<b>Procedure</b>	<b>Highest Rate</b>	<b>Lowest Rate</b>
Injection of hemorrhoids	17	0 .7
Knee replacement	20	3
Carotid endarterectomy	23	6
Bypass surgery	23	7
Heart catheterization	51	22
Hip replacement	24	8
Appendix removal	5	2
Hernia repair	53	38

If we think that (*ceteris paribus*) there exists a particular level of medical severity or need, below which a certain medical procedure should not be performed and above which it should be performed (for example the level of severity at which marginal social benefit equals marginal social costs), then SAV is a strong indication that in some situations a procedure may be over performed and in some other situations it is under performed.

Indeed, many researchers have studied the question of over use and under use of medical services and have found both. Some examples of medical procedures for which excess use has been documented are presented below (the figures in parentheses show the proportion of use found inappropriate, or equivocal, according to a group of medical experts).

- Hospitalization (23% inappropriate, 27% for women and 18% for men)
- Blood transfusion (41% inappropriate)
- Hysterectomy (35% inappropriate)
- Bypass surgery (30% equivocal, 4% inappropriate)
- Pacemakers (36% questionable, 20% definitely unnecessary)
- Endoscopy (only 72% were found to be appropriate)

Some other examples where excess use has been reported are: angioplasty, cataract operations, back surgery and prescribing antibiotics.

Perhaps the most extreme and troublesome example of excess use is the rapidly growing multibillion dollar market for services and products that have no scientific basis for their claims and for which there is sometimes even scientific evidence

showing that they don't do what they claim they do. Many of these treatments are what we often call "alternative" medicine.

But excess use is not the only problem. Cases of under use have also been documented. For example, even though hypertension can lead to stroke, heart failure, renal failure and blindness, between 75 and 90 percent of patients diagnosed with this disorder fail to take their medication regularly or follow other recommendations. The area where under use seems the most common is in preventive medicine. People simply tend not to take medication if they don't feel sick.

A better understanding of providers' and consumers' decision making procedures and preferences can shed some light on the question of how much of the small area variations is indeed an inefficiency and what can be done to improve the functioning of the healthcare markets in these cases.

## **5. Two Final Thoughts**

I would like to end this discussion by raising two thoughts that I find somewhat intriguing.

### **5.1 Can markets substitute trust?**

Until recently the market for healthcare was built mainly on trust. Patients didn't search for the best available provider whenever they had a medical problem, but rather used the one with which they had become familiar. Patients usually didn't know much and in most cases didn't even try to learn much about their problem and what the available treatments were. And, finally, when their doctor made a recommendation, the patients hardly ever questioned her judgment. Things are much different today. More and more information about providers' performance is becoming public and may assist patients in choosing their provider. Medical information about various diseases and the most recent procedures to treat them is easily accessible (e.g., on the internet) and patients often demand a certain treatment from their doctor. Moreover, if they are unsatisfied with the doctor's treatment, patients are much less reluctant to ask for a second opinion or seek another doctor. The market for healthcare is becoming more and more like any other market. The advantages of this new market organization are clear: patients can make more educated and overall much better decisions as they have more information to rely on and doctors have much stronger incentives to provide high quality care since their quality is being more tightly "monitored" by the consumers and payers. One should remember, however, that given the complexity and dynamics of the healthcare product, market competition and incentive schemes, efficient as they may be, will probably not be sufficient to achieve the highest feasible quality of care and in the end it will still be the doctor's preferences and sense of responsibility that play a major role in the treatment's outcomes. Even under this new market organization, a significant part of the information regarding the suitable and relevant procedures to treat a patient will remain with the doctor, among other things, because of her professional education and experience, and the patient will still have to rely a lot on the doctor's effort and good intentions. An interesting question, I think, is whether the shift of the doctor-patient relationship from one that is mainly built on trust and where it is common knowledge that the patient expects the doctor to care for him, to a relationship that looks more like any other economic transaction, may not diminish

the doctor's sense of responsibility for the patient and, hence, her (unobservable) effort and, at the end, the quality of care she provides. Isn't it possible that the doctor's preferences will change with the change in the market environment?

The second question that I would like to raise has to do more with the normative aspects of behavioral health economics.

## 5.2 Is there a market failure in a “fools' paradise”?

Patients (and doctors) often make decisions on the basis of unfounded or even wrong beliefs. This type of behavior raises some serious questions regarding the welfare criteria to adopt in such situations. Consider the following example:

Treatment	True Probability of Success	Consumer's Beliefs about the Probability of Success
C	$\varepsilon$	$\varepsilon$
A	0.01	0.25

In this example there are two treatments one that I call C (for "conventional") and the other that I call A (for "alternative"). Based on the scientific evidence, the probability that treatment A will solve the medical problem is estimated at 0.01, whereas the probability that treatment C will solve the same problem is estimated at some  $\varepsilon > 0$ . The consumer, however, behaves as if he believes that treatment A can solve his medical problem with probability .25, whereas for treatment C, he knows the true probability  $\varepsilon$ . Everything else equal, if  $\varepsilon$  is less than .25, the patient will prefer treatment A over C. Assuming a benevolent central planner, should he inform the patient that his beliefs about treatment A are wrong? Obviously, for  $\varepsilon$  large enough he should. But how about when  $\varepsilon$  is small? For  $\varepsilon < 0.01$ , not only does the patient take the better treatment but he also lives with the belief that the probability of success of the treatment is 0.25. It seems that telling the patient that he is actually wrong about A will not make him better off (unless, of course, there are some other decisions involved). Now, how about the case where  $\varepsilon$  is greater than but close to 0.01? Will telling the patient that he is actually wrong about A necessarily make him better off in this case? The answer to this question is not at all simple and it illustrates, so I believe, one of the many difficulties economists will face in trying to address welfare aspects when the revealed preferences paradigm is no longer taken for granted

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