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Xesfingi, Sofia and Vozikis, Athanasios

University of Piraeus

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# What shapes patient's satisfaction in countries' health care system?☆

Sofia Xesfingi<sup>a,\*</sup> and Athanasios Vozikis<sup>a</sup>

<sup>a</sup>Department of Economics, University of Piraeus, Piraeus, 18435, Greece

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## Abstract

Patient satisfaction is an important measure of health care quality as it offers information on the provider's success at meeting clients' expectations and is a key determinant of patients' perspective behavioral intention. This paper studies the relationship between patient's satisfaction of healthcare system and a set of socio-economic and health provision indicators. We first construct an index of patient's satisfaction and then, at a second stage, this index is related to economic and health provision variables. Our empirical analysis relies on 31 countries and for four years. Our findings support a strong positive association between citizens' satisfaction and public health expenditures, number of physicians and nurses, and the age of the patient, while there is a negative evidence for private health spending and number of hospital beds.

*Keywords:* patient's satisfaction, health care provision, public health, private health, healthcare quality.

JEL: I11, I15, I18

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\*Corresponding author.

Email addresses: [xesfingi@gmail.com](mailto:xesfingi@gmail.com) (Sofia Xesfingi), [avozik@unipi.gr](mailto:avozik@unipi.gr) (Athanasios Vozikis)

Tel: 2104142280, Fax: 2104142301

## 1. Introduction

Quality of care is a dominant concept in quality assurance and quality improvement programs in the health sector. The importance of quality in the health sector has been recognized recently, but it has been accelerated over the past years through the development of quality insurance, quality improvement programs and patients' agendas (Raftopoulos, 2005). While quality of care, rather than price, is the main concern in healthcare (Cheng *et al.*, 2006), the service provider's technical competence, as well as the immediate results from many treatments, is very difficult for a patient to evaluate (Asubonteng *et al.*, 1996).

It has been proposed that we can measure the quality of health care by observing its structure, its processes and its outcomes (Donabedian, 1988). Whereas the aims of effectiveness and safety of health care are nearly universal, societies and cultures around the world differ more in how much they emphasize the additional aims of patient-centeredness, timeliness, efficiency and equity. Health care measures –including process measures– are developed for varied audiences who may wish to use them for health care purchasing, utilization, or performance improvement (Rubin *et al.*, 2001). For all these purposes it is imperative that are meaningful, scientifically sound, generalizable, and interpretable (McGlynn, 1998).

Patient satisfaction is an important measure of healthcare quality as it offers information on the provider's success at meeting the expectations of most relevance to the client (Huang *et al.*, 2004) and a key determinant of patients' perspective behavioral intention (Al-Refaie, 2011). Patient satisfaction is correlated with important outcomes, such as superior compliance, decreased utilization of medical services, less malpractice litigation and better prognosis (Huang *et al.*, 2004). The absence of a solid conceptual basis and consistent measurement tool for consumer satisfaction has led, over the past ten years, to a proliferation of surveys that focus exclusively on patient experience, i.e., aspects of the care experience such as waiting times, the quality of basic amenities, and communication with healthcare providers, all of which help identify tangible priorities for quality improvement (Bleich *et al.*, 2009). Some researchers have suggested that defining quality improvement from patients' perspective provides better value for their money with improved safety, accessibility, equity, and comprehensiveness of care and from a provider's point of view, quality improvement may be more efficient, providing more effective

services to a greater number of consumers with a reasonable level of satisfaction, enough for customer retention (Patwardhan and Spencer, 2012).

The purpose of this paper is first, to map the degree of the citizen's satisfaction in relevance with the health system of their country during the years 2007, 2008, 2009 and 2012 in a panel of 31 countries, and second, to assess the impact of socio-economic and health care provision factors on the degree of patient's satisfaction.

The contribution of this study is twofold. First, the hospital performance is transformed into a satisfaction index based on the citizen's perceptions about their country healthcare system. The latter, consists the first attempt in the literature. Second, the degree of patient's satisfaction is examined along with a set of socio-economic and health care provision indicators. This is the first time in the literature as the majority of relevant studies explore only some indicators and for a limited number of countries and years.

A handful of studies have attempted to relate patient's health status to factors such as the performance of health care system (Bleich *et al.*, 2009) or other demographic and economic factors (Mummalaneni and Gopalakrishna, 1995; Gordo, 2006; Popescu *et al.*, 2007).<sup>1</sup>

More specifically, Bleich *et al.* (2009) find that about a quarter of the variation of patient's satisfaction is attributed to health care system itself and to patient expectations, health status, type of care and immunization coverage for 21 EU countries for the year 2003. Furthermore, the study of Mummalaneni and Gopalakrishna (1995) examines socio-demographic factors such as age, gender, occupation, employment status, education and income and reveals that income is the only socio-demographic factor found to have an influence on patient satisfaction. In addition, Gordo (2006) examines data from the German Socio-Economic Panel and finds a strong association between long-term unemployment and patient satisfaction, while a weak association is documented for the short-term unemployment and patient satisfaction depending on the gender. Lastly, the study of Popescu *et al.* (2007) investigates health status in relation to expenditures on health along with health care provisions (hospital beds and physicians per person) and find a strong relationship between reporting a good or bad health status and health expenditures and provisions.<sup>2</sup>

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<sup>1</sup> For a comprehensive review on patient satisfaction, see Pascoe (1983) and Naidu (2009).

<sup>2</sup> A relevant study, that of Zhao *et al.* (2011), examines instead the willingness to pay (WTP) per Quality-Adjusted Life Year for a sample of chronic prostatitis patients. The WTP is associated with

Our findings document the significant role of number of physicians and nurses provided in the health care system. Public spending on health plays prominent role on patient's satisfaction, while the elderly appear to exhibit higher satisfaction from countries' health care system. Finally, private spending on health and the number of hospital beds are negatively associated with patient's satisfaction.

The remaining of this paper is organized as follows: Section 2 presents our framework of analysis, data and model. Section 3 discusses our findings. Finally, Section 4 concludes.

## **2. Framework of analysis**

### **Data**

This empirical analysis covers 34 countries: 28 EU Member States, Albania, FYROM, Iceland, Norway, Serbia and Switzerland. The dependent variable, the satisfaction index, is defined as the citizen's satisfaction of their country's health system, for the years 2007, 2008, 2009 and 2012. Information for the years 2010 and 2011 was not available. For the construction of the satisfaction index, data for the corresponding years were used from the Euro Health Consumer Powerhouse, where citizens from 31 different countries are invited to evaluate their country's health system through personal interviews and an active feedback from national healthcare agencies and institutions is provided as well. The latter is based on the evaluation of seven components, namely "Patient Rights and Information (PRI)", "Accessibility (ACC)", "Outcomes (OUT)", "Range (RAN)", "Pharmaceuticals (PHA)", "Prevention (PRE)" and "E-Health (E-HEA)". The subcategories of each component were graded on a three-grade scale and then multiplied by the weight coefficients. Consequently, the maximum score attainable for a national healthcare system is 1000 and the lowest possible score is 333. A country's satisfaction index is a dummy and takes the value of 1 if its satisfaction index value is above the sample average; otherwise is 0.

Figure 1 shows the distribution of each one of seven components of the satisfaction index.

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demographic factors of patients such as age, gender, education, marital status and with economic factors such as employment and level of income.

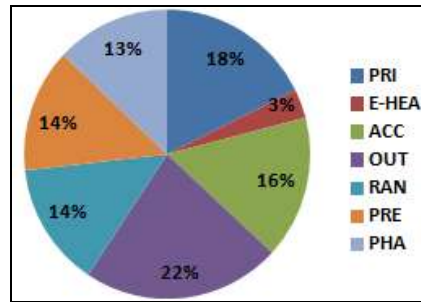


Figure 1: Share of the components of the satisfaction index.

A number of (macro)economic indicators were employed, such as Gross Domestic Product (GDP) per capita, Health Expenditures as a percentage of GDP, Public Health Expenditures as a percentage of GDP, Private Health Expenditures as a percentage of GDP, Unemployment rate, and Population Aging (percentage of the total population above the age of 65 years), obtained from World Bank. Furthermore, we also include some health care provision indicators, namely Number of Physicians per 1,000 habitants, Number of Nurses per 1,000 habitants and Number of Hospital Beds per 1,000 habitants, from Eurostat.

Table 1 presents the summary statistics of all variables.

Table 1: Summary statistics of socio-economic and health provision indicators.

Variable	Obs	Mean	Std. Dev.	Min	Max
Satisfaction	124	0.492	0.502	0	1
GDP per capita	124	29,661.5	19,201.05	4,339.468	87,716.73
Dummy	124	0.468	0.501	0	1
Health Expenditures (%GDP)	124	8.711	1.733	5.101	12.437
Public Health Expenditures	124	6.428	1.623	2.578	9.927
Private Health Expenditures	124	2.241	0.82	0.846	4.329
Unemployment	124	7.651	3.894	2.3	25
Population Aging (% total)	124	16.095	2.351	11.008	21.101
Physicians/1,000 habitants	106	325.004	59.593	212.128	482.381
Nurses/1,000 habitants	88	860.299	379.19	398	1,660.356
Hospital Beds/1,000	122	91.879	142.614	1.059	677.799

As Table 1 shows, countries in our sample spend about 8.6% of their GDP on health. Specifically, public health expenditures are three times larger than private ones. Moreover, 1.5 nurse, 0.003 physicians and 0.05 hospital beds, on average correspond per patient.

## Model

The likelihood of a certain patient being satisfied of a country's health care system can be described by a probit model defined as follows:

$$\text{Prob}(Y = 1|X_i) = F(X_i\beta),$$

where the endogenous variable  $Y$  is the degree of patient's satisfaction and takes the value 1, if the patient is satisfied with his/her country's health care system, and 0 otherwise;  $F$  is the standard logistic cumulative distribution function and  $X_i$  is a set of covariates defined as:

$$\begin{aligned} X_i\beta &= \beta_0 + \beta_1 \text{GDPcapita}_i + \beta_2 \text{HealthExpenditures}_i + \beta_3 \text{Unemployment}_i + \\ &\beta_4 \text{PopulationAging}_i + \beta_5 \text{Physicians}_i + \beta_6 \text{Nurses}_i + \beta_7 \text{HospitalBeds}_i + \varepsilon_i, \\ \varepsilon_i &\sim \text{Logistic}(0,1) \end{aligned}$$

where *GDPcapita* is gross domestic product (GDP) per capita, *HealthExpenditures* is public and private expenditures on health (%GDP), *Unemployment* is the unemployment rate, *PopulationAging* is the people above the age of 65 years old (%total population), *Physicians* is the number of physicians per 1,000 habitants, *Nurses* is the number of nurses per 1,000 habitants and *HospitalBeds* is the number of hospital beds per 1,000 habitants. The first four variables capture socio-economic conditions, whereas the remaining three proxy healthcare provision.

The selection of the variables in  $X_i$  set can be justified by relevant studies. More specifically, many studies have analyzed the relationship between GDP per capita and the health spending. These studies led to the extremely robust conclusion that even after statistical control for many other factors, the effect of GDP per capita (income) on expenditure is clearly positive and significant (Gerdtham & Jönsson, 2000). As citizens of each country are getting older, we expect them to spend more money for their health status. Therefore, it seems natural to conclude that a nation's per capita health spending will rise significantly as the average age of its population rises and that cross-national variations in health spending per capita are driven significantly by cross-national variations in the percentage of the population that is

age sixty-five and older (Reinhardt *et al.*, 2002). According to Kotzian (2009), a citizen's satisfaction with the health care system might be influenced by other economic factors and properties of the health care system. As pointed out in the same article, the health care system might work well, but the distribution of the financial burden of its financing might be considered unfair by the citizens. Public health expenditures play an important role for the citizens' satisfaction. Strong primary care has on better population health, fewer health disparities and lower rates of unnecessary hospitalizations (Kringos *et al.*, 2013b). Some countries are wealthy enough and they can afford to gear their governance, healthcare workforce, and funding arrangements towards expensive specialized care to satisfy public expectations (Kringos *et al.*, 2013a).

When it comes to health care provision, the literature finds that patient-to-nurse workloads were significantly associated with patients' ratings and recommendation of the hospital to others, and with their satisfaction with the receipt of discharge information (Kutney-Lee *et al.*, 2009). Furthermore, Kotzian (2009) suggested that a relatively low level of physicians per capita indicates a relative shortage of medical staff, and this might lower the satisfaction in the sense that there is not enough personnel to deliver beyond-health outputs. In the study of Ghose and Adhish (2011), it was observed that patients' satisfaction was greatly influenced by timing of admission, medical research and development, pharmacy, pantry services, nursing care and doctor's care. More specifically, a very high percentage of the patients were satisfied with the physician services like availability of the doctor, doctor's care and the treatment given by them.

### **3. Results**

Table 2 presents the odds ratios for all specifications. The odd ratios can be interpreted as follows: if the odd ratios  $>1$ , then the probability of a patient being satisfied, i.e.  $Y_{it}=1$ , increases, while decreases if odd ratios  $<1$ . Column (1) presents estimates of the baseline model, where health expenditures are aggregated into public and private spending. Column (2) splits the health expenditures into two categories, public and private health expenditures. For robustness purposes, columns (3) and (4), re-estimate specifications (1) and (2), but this time countries are classified as "high-income" and "low-income". In doing so, a new variable,



*Dummy*, is defined as follows: if a country's GDP per capita is above sample average, then *Dummy* is one; otherwise is zero.

Table 2: Logit estimates (odds ratio) of different model specifications  
(dependent variable is *patient's satisfaction*)

<b>Variables</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
<i>GDPcapita</i>	1.00005 (0.00005)	1.00004 (0.0001)		
<i>Dummy</i> (for income level)			4.909 (7.797)	1.681 (4.981)
<i>HealthExpenditures</i>	1.384 (0.619)		1.456 (0.613)	
<i>PublicExpenditures</i>		35.184** (59.060)		34.797** (58.427)
<i>PrivateExpenditures</i>		0.013* (0.031)		0.011* (0.027)
<i>Unemployment</i>	0.939 (0.107)	0.801 (0.206)	0.963 (0.113)	0.826 (0.2)
<i>PopulationAging</i>	4.403** (2.722)	89.652** (163.124)	4.021** (2.519)	85.65** (154.497)
<i>Physicians</i>	1.018* (0.011)	1.069** (0.036)	1.017* (0.106)	1.066* (0.036)
<i>Nurses</i>	1.012** (0.005)	1.026* (0.138)	1.013** (0.005)	1.028** (0.014)
<i>HospitalBeds</i>	0.987* (0.007)	0.957** (0.018)	0.986** (0.007)	0.957** (0.018)
Observations	85	85	85	85
Likelihood Ratio ( $X^2$ )	78.62	99.05	78.38	98.89
Pseudo-R <sup>2</sup>	0.667	0.841	0.665	0.839

Note: Numbers in parentheses are standard errors; (\*\*), (\*\*), (\*) indicate significance at 1%, 5%, and 10% respectively.

In specification (1), where one does not account for different type of health expenditures, i.e., public vs. private, the logit estimates are consistent with the theory and carry the right sign. Among the socio-economic variables, *GDPcapita*, *HealthExpenditures*, *Unemployment* and *PopulationAging*, only the latter appears to be statistically significant. More specifically, if population aging increases, the probability of a patient being satisfied increases by 340.3% [(4.403-1)\*100]. This is in line with other studies showing that elderly patients are more likely to express

satisfaction with their health care than other sections of the patient population (Owens and Batchelor, 1996). As Table 2 shows, all health care provision variables are statistically significant. Particularly, if the number of physicians per 1,000 habitants increases, the satisfaction level also increases by 1.8%. Similar effect has an increase of the number of nurses per 1,000 habitants (the probability of a patient being satisfied increases by 1.2%). These findings are consistent with the studies of Kutney-Lee *et al.* (2009) and Kotzian (2009). In contrast, if the number of hospital beds increases, the probability of a patient being satisfied with the health care system decreases by 1.3%. This finding may reflect the unsolved issue of overcapacity which is documented in several studies, such as Kosnik (2006) and Fidler *et al.* (2007).

In column (2), once we decompose aggregated health expenditures into public and private, findings appear somewhat different. Particularly, public health spending appears to be positively and statistically associated with patient's satisfaction, that is, if public health expenditures increase, the probability of a patient being satisfied increases tremendously about 3,500 times. The public spending on health has a large impact on patient's satisfaction simply because health services are perceived to be provided free of charge by the state. The latter is more important for countries which are less wealthy. The important role of public health spending is also documented in numerous studies (Kotzian, 2009; Kringos *et al.*, 2013a). In contrast, private health spending appears to be negatively correlated with patient's satisfaction as an increase of private health expenditures decreases patient's satisfaction by 98.7%. The negative relation between private health spending and patient's satisfaction seems reasonable if one takes into consideration that citizens of all countries although contribute to public health expenditures, through taxation, they pay out of their pockets to receive (better) private health care when public health care fails. This is also consistent with other studies findings (Reinhardt *et al.*, 2002).

In order to capture the income differences across countries, the *Dummy* variable is introduced in the model in column (3). The estimates of the baseline model still carry the right sign while the statistical significance pertains. Independent of country's income level, we find that the same set of variables associates in shaping patient's satisfaction degree.

Finally, as column (4) indicates, if a citizen's income is high, the probability of

being satisfied with the country's health system is about 3,400 times higher compared to a patient's satisfaction from a low-income country. This dramatic difference between "high-income" vs. "low-income" countries reflects the different perceptions existing, since wealthier countries are able to keep their patients more satisfied than poor ones.

With respect to the overall performance of our specifications, correlations between *patient's satisfaction* ( $Y_{it}$ ) and *predicted patient's satisfaction* ( $\hat{Y}_{it}$ ) range for 84.5% to 92% (at 5% level of significance), indicating that the fitness of our specifications is satisfactory. The likelihood ratios from the diagnostics (bottom of Table 2), further confirm the goodness of the fit of our model.

#### **4. Conclusions**

This paper studied the relationship between patient's satisfaction of a country's health care system and a set of socio-economic and health provision indicators.

Our findings based on 31 countries and four years, support that there is a strong association between citizens' satisfaction level and health provision indicators, such as number of hospital beds, nurses and physicians per 1,000 habitants, with the latter being the most important contributor. Among the socio-economic variables, public health expenditures greatly shape and positive relate to patient's satisfaction, while private spending on health relates negatively. Finally, the elder a patient is, the more satisfied with a country's health care system appears to be.

A policy implication of our findings is that the role of government on health spending is highly important for a patient's satisfaction of a health care system. Future research should control also for the type and quality of public as well as spending in health.

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