Impact of macroeconomic and healthcare provision factors on patient satisfaction

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This article examines how macroeconomic and healthcare provision factors affect patient satisfaction. In line with the specialized literature, we have formulated two hypothesis statements that were tested on a sample of 31 countries, using 2012, 2013 and 2014 data. OLS regression models were used for testing different explanatory variables and their impact on patient satisfaction. The main findings of the study clearly illustrate a positive and strong relationship between patient satisfaction and healthcare provision, namely practising physicians and the number of nurses, and macroeconomic factors such as public healthcare expenditure and GDP per capita. Furthermore, we notice a negative but strong correlation with healthcare infrastructure (available hospital beds) and private healthcare expenditure.

Keywords: GDP, healthcare provision and expenditure, macroeconomic factors, patient satisfaction.

HEALTHCARE systems and the quality of medical services are important priorities for individuals for protection against illness and disease. An essential element of human welfare is good health, which presents itself as a key element of human capital that in turn determines the growth level of a country[1,2]. In order to achieve a higher quality of medical care and a more equitable system within a short time-frame we need to increase progress, reduce disparities with respect to certain services[3] and improve efficiency by minimizing costs that do not contribute to the achievement of health-system objectives[4,5]. However, measuring quality in the healthcare system is difficult due to industry characteristics such as 'intangibility, heterogeneity and simultaneity', because unlike tangible goods (i.e. manufactured goods) which 'can be sampled and tested for standard throughout the production process, in the healthcare system the quality depends on the service process, along with client and provider interactions'[6]. Patient satisfaction with care is an important factor for measuring the quality of the healthcare system as it offers insights on the provider's success in fulfilling the client's expectation(s)[7,8]. This article examines the degree of patient satisfaction with care based on several macroeconomic and health provision factors.

A total of 31 countries were examined between the period 2012 and 2014. Although evaluating patients 'satisfaction regarding the quality of the care system has several methodological limitations that need to be acknowledged'[9], it provides useful insights regarding care in different countries.

Literature review

Papanikolaou and Zygiaris[10] and Ramez[11] measured service quality using the SERVQUAL Model which contains 22 pairs of Likert-scale questions projected to measure the patient expectation and perception of a service. Their analysis is based on the hypothesis that the quality of a service is the gap between the patients' expectation and perception with regard to five quality dimensions: reliability, responsiveness, tangible, assurance and empathy. A positive value for the gap indicates that the patients' expectations are satisfied or even exceeded, while a negative score means the opposite.

Padma *et al.*[12] using a seven-point Likert questionnaire survey analysed the connection between service quality and patient satisfaction in state and private hospitals in India. The study revealed eight dimensions that have been used to measure the healthcare service quality: 'infrastructure, personnel quality, process of clinical care, administrative procedures, safety indicators, hospital image, social responsibility and trustworthiness of the hospital'[12]. Boshoff and Gary[13] analysed the influence of some specific service dimensions on patience satisfaction. Their findings revealed that medical personnel like nursing staff had the strongest influence on consumers satisfaction. Swan *et al.*[14], on the other hand, found that

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hospital infrastructure, mainly appearance of the room and cleanliness of the hospital affected the patient's perception and degree of satisfaction with the service[14]. Lovdal and Peerson[15] reported the importance of physicians and other medical personnel as major determinants of patient satisfaction. Specific service dimensions seem to be important and good predictors for patient satisfaction. Therefore, in the present study we emphasize that patient satisfaction is more likely to be influenced by specific healthcare service provisions such as number of physicians, nursing staff and available hospital beds, while taking into consideration other macroeconomic variables as well.

The study by Mummalaneni and Gopalakrishna[16] included socio-demographic factors, namely age, gender, occupation, employment, level of education and income. Their findings showed that among the analysed factors, income strongly influenced patient satisfaction. Other studies reported the significant role of healthcare expenditure on satisfaction level of consumers. Kringos et al.[17] found that although stronger primary care involved higher overall health expenditure, it was associated with 'better population health, reduced rates of unnecessary hospital days and lower level of socio-economic inequality'. On the other hand, some studies revealed no significant correlation between GDP per capita, healthcare expenditure and patient satisfaction[18]. In order to bridge this gap, we examine if income level and healthcare expenditure have an important role in influencing the level of patient satisfaction.

Methodology, hypotheses development and data collection

Methods and hypotheses development

The main research question addressed here is: what macroeconomic factors and healthcare provisions may influence patient level of satisfaction?

The research objectives for responding to these issues are: (i) determining the overall patient satisfaction; (ii) determination of the healthcare provision and macroeconomic factors.

The working hypotheses we propose in this study is as follows:

- H1: The satisfaction with the healthcare system is closely related with specific service provisions such as physicians, nursing staff and hospital beds.
- H2: Income level and healthcare expenditure play a prominent role regarding patient satisfaction.

We used cross-country analysis to compare patient satisfaction in different countries. The dependent variable measures the patient's satisfaction with the healthcare system of the country. Public statistics, patient questionnaire-based survey and output data from independent researchers were used in our variable construction. Patient satisfaction with the healthcare system of the country was built using the following sub-disciplines: patient rights and information, accessibility/waiting time for treatment, outcomes, range and reach of services ('generosity'), prevention and pharmaceuticals. The respondents' answers were evaluated on a three-point Likert scale ranging from 'good' to 'not so good'.

For each of the sub-disciplines, developed by Euro Health Consumer Powerhouse[19], the score was calculated for each country.

Additional indicators were added in the analysis as independent variables: number of practising physicians per 100,000 inhabitants, hospital beds per 100,000 inhabitants and number of nurses per 100,000 inhabitants. Socio-economic variables were also taken into account, namely GDP per capita and healthcare expenditure as percentage of GDP (private, public and total).

We apply correlation analyses in order to underline the relationship between the variables included in the model. In this study, multivariate linear modelling has been used, with SPSS 21.0 and Gretl software.

Data collection and sample

We have collected research output data from 31 countries, namely UE28, Ireland, Norway and Switzerland for 2012, 2013 and 2014. However, for some countries we could not obtain data regarding the number of physicians or nursing staff; therefore we excluded them from our analyses. Thus 27 countries and a total of 81 observations were considered for the study. Table 1 describes the variables used in this study.

The research findings presented here have been derived from the data provided in the Euro Health Consumer Powerhouse–Euro Health Consumer Index (EHCI). We also included healthcare expenditure and GDP per capita, with data being provided by the World Bank (Figure 1)[20]. Furthermore, for the healthcare service indicators (number of physicians, nursing staff and available hospital beds per 100,00 habitants), we have used data from Eurostat (Figure 2)[21].

Results and interpretation

Table 2 presents the values for Pearson coefficient and significance level. The data show that there is significant correlation between patient satisfaction, number of nurses, physicians per 100,000 habitants, available beds per 100,000 habitants and macroeconomic indicators such GDP per capita and healthcare expenditure (public, private and total). From the two groups, two key factors have the strongest correlation with patient satisfaction: number of nurses (0.660) and public expenditure.

Table 1. Description of the variables used

Variable name	Abbreviation	Mean	Standard deviation	N
Patient satisfaction	ECHI	687.6795	116.98701	81
Physicians/100,000 inhabitants	pys	334.1217	91.54603	81
Nurses/100,000 inhabitants	nur	874.5379	452.29748	81
Available beds/100,000 inhabitants	beds	506.7881	175.36914	81
Healthcare expenditure private (%GDP)	hexpp	2.1819	.82643	81
Healthcare expenditure public (%GDP)	hexppp	14.5601	3.45741	81
Healthcare expenditure total (%GDP)	hexp	8.5161	1.80628	81
GDP_per capita	gdp_cap	106.6410	46.41903	81

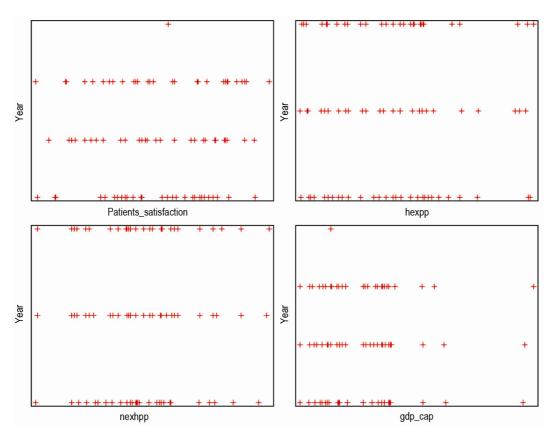Source: Prepared by the authors.

Figure 1. Patient satisfaction and macroeconomic indicators, 2012–2014.

Table 3 presents data for the baseline model using an OLS regression model. The data reveal that physicians and nurses represent important determinants of patient satisfaction level. Analysis of the distribution of healthcare workforce shows that Austria, Norway and Lithuania occupy the first three positions for the number of practising physicians, while Switzerland, Norway and Denmark for the number of nurses per 100,000 habitants. It is important that the quality and quantity of human resources be adequately matched to the demand for services across different healthcare systems. Indeed, physicians, nurses and other medical personnel need to permanently improve their skills/acquire new ones (for instance, better

communication and collaboration with patients, etc.). Better skilled practitioners can work more successfully with patients and may provide better outcomes. The stake is particularly important because the quality of the healthcare system is inextricably linked to human dignity, the obligation to protect, maintain and restore the health of all people, thus enabling healthy living and as a consequence increase in the productivity level. With respect to the distribution of available hospital beds, there is significant variation between the analysed countries, ranging from 255 to 823 units. On the other hand, we notice a negative but strong correlation with healthcare infrastructure (available hospital beds) and patient satisfaction.
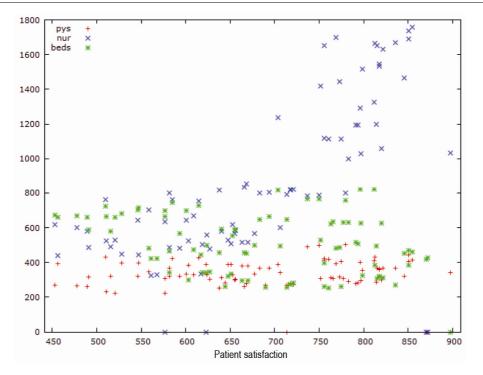
Figure 2. Patient satisfaction and healthcare provisions, 2012–2014.

Table 2. Correlation matrix among different indicators

	EHCI	phy	nur	beds	hexpp	hexppp	hexp	GDP_per capita
EHCI	1	0.488**	0.660**	–0.328**	–0.187*	0.721**	0.686**	0.707**
phy	0.488**	1	0.263**	0.299**	0.163	0.299**	0.279**	0.344**
nur	0.660**	0.263**	1	–0.183*	–0.088	0.541**	0.450**	0.577**
beds	–0.328**	0.299**	–0.183*	1	0.046	–0.201*	–0.331**	–0.295**
hexpp	–0.187*	0.163	–0.088	0.046	1	–0.159	0.280**	–0.173
hexppp	0.721**	0.299**	0.541**	–0.201*	–0.159	1	0.715**	0.516**
hexp	0.686**	0.279**	0.450**	–0.331**	0.280**	0.715**	1	0.390**
GDP_per capita	0.707**	0.344**	0.577**	–0.295**	–0.173	0.516**	0.390**	1

**Correlation is significant at the 0.01 level (one-tailed). *Correlation is significant at the 0.05 level (one-tailed). Source: Prepared by the authors.

Results also indicate that healthcare expenditure and GDP per capita play an important role regarding patient satisfaction, both indicators being positively correlated with the latter. These results are also consistent with other findings[10,22].

Although the total spending on healthcare has been rising, and consequently health status has been improving in most of the analysed countries, there are considerable variations in public and private spending. In order to shed some light on this problem, in Table 3 we divide the healthcare expenditure to two parts – public and private. The first category contains social security spending, taxing to private and public sectors, and foreign resources. The second refers to out-of-pocket expenditure and private insurance. This division is important as it underlines the role of public and private sectors in proving, health-

care, and their implication on patient satisfaction. Public healthcare expenditure is important, especially for less wealthy countries as it has an 'impact on patient satisfaction because it is perceived to be provided for free by the governments'[10]. There is a negative evidence for private health spending and patient satisfaction with care. This result is in line with other findings[22]. Individuals might be unsatisfied with the healthcare system, because in their personal opinion too much money has to be paid directly by those requiring medical services, which puts a higher burden on people who are ill[18].

Table 3 also presents the same specification as the previous model, except for the introduction of a dummy, which encapsulates the income level of a country based on a dichotomous variable. All the independent variables maintain the same sign and statistical significance.

Table 3. Model specifications results

Independent variables	Dependent variable: patient satisfaction		
	Model (1) OLS regression	Model (2) OLS regression	Model (3) OLS regression
Physicians/100,000 inhabitants (pys)	0.783** (0.192)	1.078** (0.186)	1.006** (0.167)
Nurses/100,000 inhabitants (nur)	0.060** (0.017)	0.059** (.017)	0.047** (0.015)
Available beds/100,000 inhabitants (beds)	−0.135** (0.043)	−0.196** (0.039)	−0.175** (0.035)
Healthcare expenditure private (%GDP); (hexpp)		−19.728** (7.535)	−18.817** (6.827)
Healthcare expenditure public (%GDP); (hexppp)		10.094** (2.148)	6.712** (2.153)
Healthcare expenditure total (%GDP); (hexp)	20.757** (4.220)		
GDP_per capita	0.773** (0.177)	0.472** (0.180)	
Dummy			81.463**(17.375)
Intercept	321.947** (42.592)	413.442** (39.785)	481.36** (37.300)
Observations	81	81	81
R	0.893	0.904	0.920
R^2	0.783	0.817	0.846

**Correlation is significant at the 0.01 level (one-tailed). *Correlation is significant at the 0.05 level (one-tailed). Source: Prepared by the authors.

In view of these findings one is naturally compelled to advocate that both hypotheses are confirmed. Furthermore, for each of the three models we have estimated the correlation and determination coefficients, which help measure the strength, direction and proportion of fluctuation of the variables used. The results for the correlation coefficient ($r > 0.8$) describe a strong connection between patient satisfaction, healthcare provision and both macroeconomic indicators taken into consideration. R^2 values show that more than 78.3% of the variation in patient satisfaction can be explained by the linear relationships.

Conclusion

Despite the observed differences in financial status, workforce, infrastructure and resources allocated, the healthcare system plays a central role in all modern societies. Testing hypotheses 1 and 2, the results show with a probability of 95%, the existence of a positive and strong relationship between patient satisfaction and variables describing the healthcare workforce (physicians by practising medical specialty per 100,000 inhabitants, nurses per 100,000 inhabitants) and macroeconomic indicators (public healthcare expenditure and GDP per capita). We also notice a negative strong correlation with healthcare infrastructure (available hospital beds) and private healthcare expenditure.

Any healthcare system needs a diversity of resources in order to function properly. In order to sustain health services through time resources should not be wasted but used efficiently, further developed and expanded. Nowadays, health systems face multiple changes: growing demand for healthcare, increasing costs with innovative technologies, medicine and appliances, shortages and uneven distribution of the healthcare workforce; unequal access to healthcare, etc. However, we must adapt effectively to the constant changing environments and tackle significant challenges with limited resources.

Limitations and directions for future research

This study has some inherent limitations. First, there are several methodological limitations on using patient satisfaction surveys. Some of the countries analysed in this study perform constant system monitoring on patient's degree of satisfaction (e.g. Denmark, The Netherlands), while others carry out only sporadic studies (e.g. Bulgaria, Czech Republic). Also, the indicator values are adjusted based on the national specification of each country, making difficult to compare the results. Each country has its own level of expectation towards health based on its culture and socio-economic status. Despite all these factors, the level of patient satisfaction provides useful insights for improving healthcare in different countries. Second, data regarding patient satisfaction are not available for 2007, 2010 and 2011, making it difficult to use longer time-series analysis. Third, although our analysis reveals a strong correlation between patient satisfaction, macroeconomic indicators and healthcare provisions, further studies may take into consideration additional factors. Fourth, future research may provide valuable information by focusing on a country-level analysis.

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