

THE IMPACT OF CORRUPTION ON THE PERFORMANCE MANAGEMENT OF EUROPEAN HEALTH SYSTEMS

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Abstract

This paper presents an analysis of the corruption and its effects on health system performance. Through an detailed analysis there were been identified the components of the corruption, the factors that influence it, the elements that reveal the hidden corruption, the aspects that help to reduce or combat it. It has been discovered the level of the corruption in the european area and also for the health system in Romania. The research methodology consisted in applying the unifactorial regression model and also in the multifactorial regression model. I did correlations between the selected variables: the corruption perception index, GDP per capita, the effective employment of the population, life expectancy at birth, out of pockets, public health expenditure. For this research paper I had used data provided by Transparency International and the World Bank. The results obtained confirmed the assumptions: the increased number of active population, the increased level of life expectancy, the increased public expenditure, determines a low level of corruption. Also they were identified and limits for some of the variables chosen.

Keywords: corruption, health, management, performance.

1. INTRODUCTION

The quality of medical care provided depends on the quality of health management system. (Potcovaru, Gimeata, Trifu, 2015) To observe the quality of management in the healthcare system and the level of health performance, we should analyze the results obtained through the indicators used. The performance of health system it is influenced by the medical research, by the correct use of the health resources, by the level of population education, by the level of GDP used for healthcare. (Stoica, 2012) The health system performance may be affected by the disinterested behavior of the medical staff or by an unethical attitude that generates corrupt practices. We also could speak about an abuse of power and skills. (Yang, Hwang, 2006) The corruption it is influenced by the lack of the equipment in hospitals (Farcasanu, 2010) Corruption generates low levels of health indicators (Pashev, 2007) low levels of the quality of health services, negative experiences reported by patients in relation to the medical system (Pashev, 2007) Corruption affects the results of the medical system, especially the life expectancy at birth and the infant mortality rate, considered to be the most reliable indicators that indicate the standard

of living of a country (Nadpara, Samanta, 2015) We could speak about hidden corruption when we hide the real value of the indicators and when we present only the mean values. Also corruption could be generated by monopoly prices, false certificates of health, fees for doctor s prescriptions, paying for drugs during the hospitalization and for the supplies. Another type of hidden corruption may be considered the use of hospital diagnostic equipment for patients that receive a recommendation for this at the individual offices of physicians. (Pashev, 2007) Other type of hidden corruption it is formed by non-existent patients, false laboratory tests for them (Sahin, Ozbek, Guran, Tosun, 2009) fraudulent services of the providers in health, false treatments, false records (Qi Liu, Vasarhelyi, 2013) lack of ethics and morality, and the dissolution of the idea of gratitude (Rădulescu, Miu, Gheorghe, 2008) unknown procedures for organ transplantation (Haque, 2010) fraudulent medical claims with negative effect in all respects. (Margret, Sreenivasan, 2013) Informal payments blocks the normal function of health system (Ensor, 2004), determine deep inequalities between social classes (Haque, 2010) and generates negative effects for the beneficiaries of the medical system. The patients maintain the phenomenon and the corrupt practices. (Stepurko, Pavlova, Groot, 2013) Corruption affects the implementation of hospital reorganization, the competition among health care providers. (Stoica, 2012) The corruption is more obvious at the administrative level and it is translated through a low quality of hospital care and through the lack of the state involvement to increase the performance of the health services. (Pashev, 2007) Corruption determines a low level of performance for medical outcomes. Also the medical research is affected by corruption and generates false information, false results and risky clinical trials for persons involved. (Nadpara, Samanta, 2015) Corruption means the lack of drugs production at the national level, the dependence for imported drugs (Stoica, 2012), bribes in grants to purchase medical supplies (Vian, Nordberg, 2008) and the lack of medical personnel. (Boboc, 2009) Corruption it is influenced by the authorities interested in reforming of the health system (Andrei, Matei, Oancea, 2009), There is a strong correlation between the level of the corruption perception and the level of the out of pocket (Boboc, 2009) The corruption it is influenced by all vulnerable persons that interact with the medical system: patients, physicians, providers, ministers, hospital administrators. (Yang, Hwang, 2006) Corruption means defrauding the medical system, wrong codification for different medical procedures or quantities of goods and medical services, falsified medical records, schemes for laundering money, software to defraud the billing (Torphe, Deslich, Sikula, Coustasse, 2012) with the mention that the most common method for healthcare fraud it is in the billing system at international level, including the US states. (Savedoff, 2007) The development of the corruption phenomenon determines the development of the underground economy through the fraudulent practices. (Condeea

2013) Useful for analysing the corruption enlargement is the Global Corruption Barometer and the estimates of Corruption Perception Index. (Condrea 2013)

2. OVERALL ANALYSIS OF DOCUMENTS

The World Health Organization (WHO), Regional Office of Europe, divides corruption into four types: taking of bribery, theft, bureaucratic or political corruption, misinformation for personal gains. Corruption affects the economic development, this is why there should be regulations and serious punishments for those generating it. (Nadpara, Samanata, 2015) In a study made by the European Commission, corruption is identified by bribery in the provision of treatments for the sick persons, bribery in obtaining medical consumables, abuse of power. The waiting lists that are not public also contribute to these. (Nadpara, Samanata, 2015) Three of the eight UN Objectives of Development of the Millennium are directly related to health, even though the Transparency International Global Report over Corruption proves that the achievement of those objectives may be affected by the frequency of corruption in the health system, which is translated by repeatedly paying for the same treatment. Corrupt practices have appeared mainly in Central and Eastern Europe, due to the communist ruling. (Yang, Hwang, 2006) For a correct analysis of the corruption level of one State, also see the impact of general factors such as: low economic level of development, low GDP, high unemployment, high inflation, etc. (Boboc, 2009) but also of specific factors, like: low public expenditures for health, high number of medical staff, uselessly high number of surgical interventions, high unemployment, low level of economic development, low number of beds, low number of hospitals, all these determining a high level of corruption. (Boboc, 2009)

2.1. *The phenomenon of corruption at the international level*

According to the Eurobarometer, the commonest corrupt practices are encountered in the following sectors: banking, financial, educational, fiscal, social, political and judicial, and the highest level of these practices is registered in the medical system. (European Commission, 2014) At the European level, the countries that have generated this percentage and had the greatest ratio were: Sweden (80%), Denmark (79%), and Finland (76%), while Romania (40%). (European Commission, 2014) Also, the highest level related to bribery is registered in the same medical system (2% at EU level), followed by police and private companies, with 1%. The greatest ratio in the 2% is registered by Lithuania 29%, followed by Romania 25% and Poland 15%, where the participants in the study stated they had been victims of corruption. (European Commission, 2014) Corruption is even more obvious in the countries that have gone through communist practices, especially in Central and Eastern European countries. (Chesrecheş, Ungureanu, Rus, Baba, 2011) According to certain studies performed over 15 years in

more than 30 countries, it has been analyzed how corruption is affecting the quality of life, and how it determines the decrease of hope at birth and increases infant mortality. (Nadpara, Samanta, 2015) In 2011, according to the Index of perception of corruption, Romania occupied position 78 out of the 183 countries at world level, and position 25 of 27 at European Union level, followed by Greece and Bulgaria. (Condrea 2013)

2.2. Analysis of the national corruption level in the interval between 1996-2015

The Romanian medical system was perceived as corrupt in 2012, according to the studies made by various researchers. (Petrescu, Ioncica, 2012) Also, according to some studies, the bribery given to health professionals reaches the amount of 360 million \$ per year (Ionescu, 2006). (Sahin, Ozbek, Guran, Tosun, 2009) Another factor determining the growth of corrupt practices in Romania consisted in the decision of the International Monetary Fund, in 2011, which determined the Government to close over 60 public hospitals, thus limiting the access to certain medical services, and affecting their stability and continuity. Moreover, private hospitals have been built, with FUNASS financing, with negative effects over the financing for the public ones. (Societatea Academica din Romania, 2013) Add to all this CNAS' lack of reaction before the incorrect reporting, artificially increasing the performance of public hospitals. In 2009, CNAS settled for hospitals almost 45 million Euro through several bureaucratic artifices. (Societatea Academica din Romania, 2013) In Romania, even though there has been a decrease of the number of rulings for corruption cases in 2014, the negative aspect consisted in the fact that the punishments were not very serious, 80% of the persons involved receiving a punishment by suspension, according to the report of the European Commission. (European Commission, 2015) According to the information registered by the Global Corruption Barometer, in 2010, 87% of the participants in the study believed that the corruption level in Romania has been growing lately. (Minsterul Justitiei, 2011) As regards the research and combat of corruption at national level, ever since 1996, a series of initiatives has been initiated, strategic documents and over 150 legislative acts against corruption have been published. Corruption supports the underground economy of Romania and it is difficult to measure. (Condrea, 2013) In Romania, the corruption phenomenon is inevitable to occur in time and to evolve. The future doctors barely succeed in covering their basic needs. Beside corruption, another negative factor is the one emphasized in the "Special Eurobarometer 411" 2014, which shows that 78% of the respondents in Romania believe that the "quality of nursing in their country is worse than in other member States". (Potcovaru, Gimeata, Trifu, 2015) In the Study "Bribery Barometer" made by St. Damian Association, it is shown that 26.2% of the respondents believe that the health system is the main sector where corruption is high. In a study made by the Agency for Governmental Strategies,

"Health system in Romania", 8% of the respondents declared that they have been directly asked by the medical staff to pay additional amounts of money for medical care. The second study made by the same governmental agency for strategies, "Barometer of Public Policies" shows that, out of 68% of those using medical services, 40% made unofficial payments. (Chesrecheş, Ungureanu, Rus, Baba, 2011) In Romania, Law No. 95/2006 makes no reference to the effects of informal payments over the entire system, and their value cannot be identified, even though, according to information provided by the management of an important national medical institution, it is specified that, in Romania, such payments amount to 500 mil. Euro/year. (Chesrecheş, Ungureanu, Rus, Baba, 2011) The European Commission signals that the measures to fight against corruption have not been correctly implemented. (Condrea, 2013) Another aspect that may generate corruption consists in the very large amounts destined to private hospitals to the detriment of public ones, from this point of view, 10 private hospitals equaling one. (Societatea Academica din Romania, 2013)

2.3. Analysis of the causes generating corrupt practices in the public health system – essential findings

- Lack of efficient governing, lack of public liability; (Nordberg, Vian, 2008)
- -Vulnerability of the manner to make public procurements in the medical system; (Nordberg, Vian, 2008)
- -Growing of abusive practices, as well as waste of resources; (Nordberg, Vian, 2008)
- Lack of competition in the public health system; (Stoica, 2012)
- Lack of scientific research and innovation; (Stoica, 2012)
- Lack of sanctions and regulations to eliminate corrupt practices; (Chesrecheş, Ungureanu, Rus, Baba, 2011)
- The wish and need of public clerks to gain additional proceedings; (Condrea, 2013)
- Acceptance of the phenomenon and participation in it, but also the features of the system that allow the perpetuation of these corrupt practices; (Sahin, Ozbek, Guran, Tosun, 2009)
- Inefficiency of the applied management identified by long waiting intervals for patients, but also by unsatisfactory work conditions and issues in the supply system; (Sahin, Ozbek, Guran, Tosun, 2009)

- Performance of useless medical and surgical procedures, lack of fairness in interpreting the diagnosis and in the application of the corresponding treatment. (Savedoff, 2007)

2.4. Analysis of elements that may identify and eliminate the corrupt medical practices

Corruption causes fraud in the medical system, and fraud, in general, means deceit and forgery. In this regards, the following may be of help;

- IT programs specialized in identifying certain errors and fake features associated with the information provided by the medical system, respectively the use of a Data cleaning process-with rules to store and delete information from documents use of SQL interrogation, use of devices similar to bar code readers to identify medicine with false contents, application of data mining; (Margret, Sreenivasan, 2013)
- Method to track the deviated funds (Quatitative Service Delivery Survey (QSDS)), but also Public Expenditures Tracking Surveys (PETS). The first one notices the efficiency of fund use, the second one, called PETS, tracks the differences between current health expenditures and the allocated funds. PETS indentifies the organizational levels where corruption may occur. Another way to control the tax flow may consist in a network of electronic cash registers; (Boboc, 2009)
- The use of „Corruption and Integrity Evaluation Instruments in Institutios -USAID” comparisons between product prices and medical services (Nordberg, Vian, 2008)
- Periodical analysis of CPI – Corruption perception index, that shows a classification for 150 countries about the way in which corruption is perceived, but also the Global Corruption Barometer (GCB), together with Bribery Payers’ Index (BPI); (Condrea, 2013)
- Analysis of how public expenditures are made out of the existing public funds; (Sahin, Ozbek, Guran, Tosun, 2009)
- Analysis of studies made by World Bank referring to the level of corruption in several countries; (Sahin, Ozbek, Guran, Tosun, 2009)
- Analysis of the prices for drugs and analysis of the Reference system adopted in 10 States of the European Union;

- Use of the questionnaire designed with the Microsoft FrontPage Html software, respectively create an online platform to identify or notify corrupt practices and to determine certain levels of importance for corruption; (Sahin, Ozbek, Guran, Tosun, 2009)
- Use of supervision methods such as KNN method, use of the Bayesian network, use of the logistic regression, of neuronal networks and of the decision tree method, and also use of hybrid methods like: SOM&Neuronal Network or Clustering&Decision Tree; (Qi Liu, Vasarhelyi, 2013)
- Use of Quantitative Service Delivery Surveys (QSDS) and PETS, both centered on identifying medicals fraud practices, but also on analyzing data in the Global Corruption Report; moreover, supervise the management of the public hospital; (Savedoff, 2007)
- Use of electronic payment systems & technologies for health care service institutions.
- Use of the Electronic Health Record-HER, which contains varied information about patients, correlated with other information in the medical system; (Olson, 2015)
- Use of simple regression (OLS Regression with Eviews), which may help establish certain hypotheses referring to the determinants of corruption; (Boboc, 2009)
- Detailed analysis of the correlation of indexes provided by Transparency International Global Corruption Barometer, but also of the data provided by Health Consumer Powerhouse, mainly referring to the paid bribery, perception of corruption, ECHI and out of pocket expenditures on health care; afterwards, analysis of the minimum, maximum, median, standard of deviation, and analysis of resulting remarks; (Boboc, 2009)
- Use of surveys, by the Proxy method, by the method of identification of potential bribery payers and of those accepting bribery (Boboc, 2009) but also by perception enquiries, which many times is concealed and impossible to measure with precision. (Nadpara, Samanta, 2015)
- Use of IT programs of encoding of medical processes and procedures, patient data, data related to the used resources, so that certain practices based on medical fraud are identified and prevented, together with studying the invoices issued for non-provided services, upcoding of services, excessive services, useless services, kickbacks, duplicate claims. (Olson, 2015)

3. OBJECTIVES OF THE RESEARCH PAPER

The general objective of the research paper is to know to what extent corruption may affect the level of performance of the health systems in the European area. The first specific objective of the paper is to know to what extent the results obtained by various authors confirm the research hypotheses determined by them, respectively the relation between CPI-Corruption Perception Index and various health indexes. The second research objective is to identify what type of correlations are set between the independent variables selected for analysis, such as GDP per inhabitant, the number of employed persons out of the total of actual population, life expectancy at birth, out-of-pocket expenditures of the population, public health expenditures and, respectively, the dependent variable - Corruption Perception Index, for the 28 member States of the European Union. The third objective of the research paper is to identify certain measures to prevent or reduce the corruption level caught in the analysis in order to increase the quality of the results obtained in the health system and implicitly to increase performance at management level for the health system.

4. METHODOLOGY OF RESEARCH

The purpose of this analysis is to show the correlation between the corruption perception index and a series of selected indicators, such as: GDP/inhabitant, number of employed persons out of the total of actual population, life expectancy at birth, out-of-pocket expenditures of the population, public health expenditures, by means of econometric models. The corruption perception index is calculated according to the methodology of Transparency International, and the other indexes are already calculated according to World Bank methodology. As manner of analysis, I used the unifactorial regression model and the multifactorial regression model. The dependent variable was the corruption perception index by the Transparency International, the global coalition against corruption (The Corruption Perception Index, 2015) and the independent variables were processed from World Bank data: GDP/inhabitant, number of employed persons out of the total of actual population, life expectancy at birth, out-of-pocket expenditures of the population, public health expenditures. For the dependent variable, the value of 2015 was used, and for independent variables, the values of 2013 were used. The reason for their use is to notice the effects of the previous years over the corruption reflected in 2015 by CPI. For the analysis, the most recent available data has been used. (TheWorld Bank Data, 2013)In order to select the chosen sample, the EU member states were determined, which were selected out of more than one hundred countries analyzed by World Bank. The analysis over EU has been made because there are States with a low level of corruption that may subsequently provide a positive model to reduce its level,

as well as countries under development currently registering a high corruption level. To make the analysis, a first stage consists in generating the descriptive statistic level, by means of the Eviews econometric program. This table helps identifying the medium, minimum and maximum values of each variable, and the obtained values have been interpreted. A second stage consisted in grounding the correlation matrix of the used variables. For this purpose, the variables were correlated at the significance thresholds of 1%, 5% and 10%. After analyzing the chosen variable correlation matrix, a last stage consisted in the fundamentation of the econometric model. This has the form found in equation (1).

$$CPI_i = \alpha_0 + \alpha_1 \times pop_i + \alpha_2 \times life\ Exp_i + \alpha_3 \times out\ of\ pocket_i + \alpha_4 \times public\ health\ Expenditures_i + \varepsilon_i \quad (1)$$

Where

CPI is the corruption perception index, the dependent variable, calculated by the model accepted by Transparency International EU Office and the independent variables are from World Bank, where:

* *pop* is the share of active population in total population

* *life Exp* indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life (World Bank, databank, 2016)

* *out of packet* is any direct outlay by households, including gratuities and in-kind payments, to health practitioners and suppliers of pharmaceuticals, therapeutic appliances, and other goods and services whose primary intent is to contribute to the restoration or enhancement of the health status of individuals or population groups. It is a part of private health expenditure. (The World Bank Data, 2013)

* *public health Expenditures* is consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds. Total health expenditure is the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation. (World Bank, databank, 2016)

α_0 is the model constant

$\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are the coefficients of the independent variables

i is the index related to each country

ε is the error term of the model

To repeat the analysis, I departed from the following research hypotheses:

H1. The bigger the active population weight, the smaller the corruption level.

H2. The bigger the life expectancy, the smaller the corruption level.

H3. The bigger the public health expenditures (as GDP percentage), the smaller the corruption level.

H4. The bigger the weight of out-of-pocket expenditures, the bigger the corruption level.

5. RESULTS

The purpose of this analysis is to show the correlation between the corruption perception index and: GDP/inhabitant, number of employed persons out of the total of actual population, life expectancy at birth, out-of-pocket expenditures of the population, public health expenditures.

The first stage showed the descriptive statistics of the analyzed variables, which is found in Table 1.

TABEL 1 - DESCRIPTIVE STATISTIC

Element	CPI	Employed Persons	Life Exp	Out of pocket	Public health expenditure	Gdp per capita
Mean	65.35714	49.01474	76.22075	74.98793	72.90199	33680.73
Median	61.5	50.13418	77.9	76.28005	75.51179	25527.37
Maximum	91	53.54733	79.9	97.62246	85.35522	113726.6
Minimum	41	42.29206	68.7	32.93913	46.33187	7656.639
Std. Dev.	15.2126	3.40571	3.583747	18.17768	8.906413	22619.58
Skewness	0.208373	-0.45324	-0.80877	-0.69314	-0.91801	1.602509
Kurtosis	1.831057	1.855518	2.157994	2.567919	3.915406	6.478304

Source: Made by the autho

In Table 1, the average value of the corruption perception index (the dependent variable analyzed) at European level is of 65.35. The maximum values are 91, and the minimum values are 41. The same interpretations are for the other independent variables. Std. Dev represents the standard deviation of every variable. Skewness shows whether the variable moves to the right or to the left. The normal value is around 0. Kurtosis shows how flat the variable is. The normal value is around 3. The data for CPI out of the descriptive statistics were generated after calculating the values in figure 1. Out of the data provided by Transparency International, the CPI of the 28 member States of the European Union was selected (Figure 1) where the values are included on scale from 100 to 0, according to the values set by

Transparency International, where 100 represents those countries where CPI has the lowest value of corruption, and 0 refers to countries where CPI has the highest level. It must be mentioned that CPI is achieved for 168 countries in the world, with the help of more than 12 different data sources and of 11 internationally known organizations, that have caught the corruption perception index. Also, average, median, maximum and minimum values have been generated for the other independent variables selected in this case from the data provided by World Bank, for 2013. For the independent variables, the VLOOKUP function was used, in order to select only those indicators that are representative for the 28 states of the European Union. I have inserted the selection made by graphics for only one indicator, and the processing manner is identical with the one used for CPI of the 28 EU States.

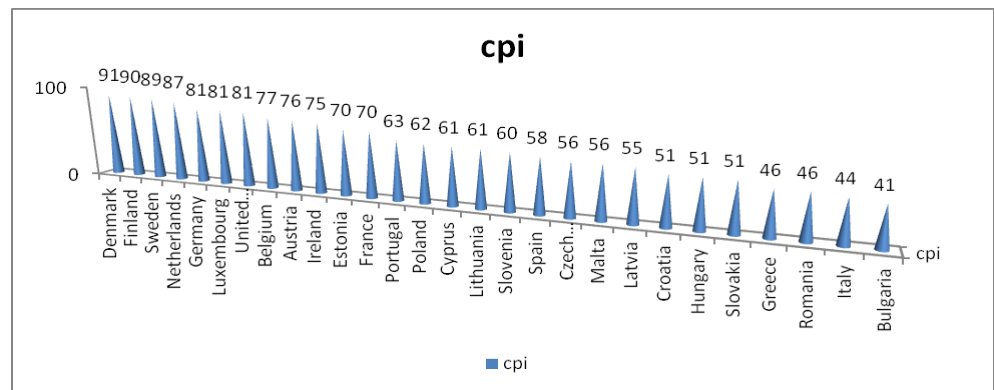


FIGURE 1 - CORRUPTION PERCEPTION INDEX 2015, FOR 28 MEMBER STATES OF EUROPEAN UNION
 Source: Selection made by the author from data provided by Transparency International, Corruption Perception Index 2015

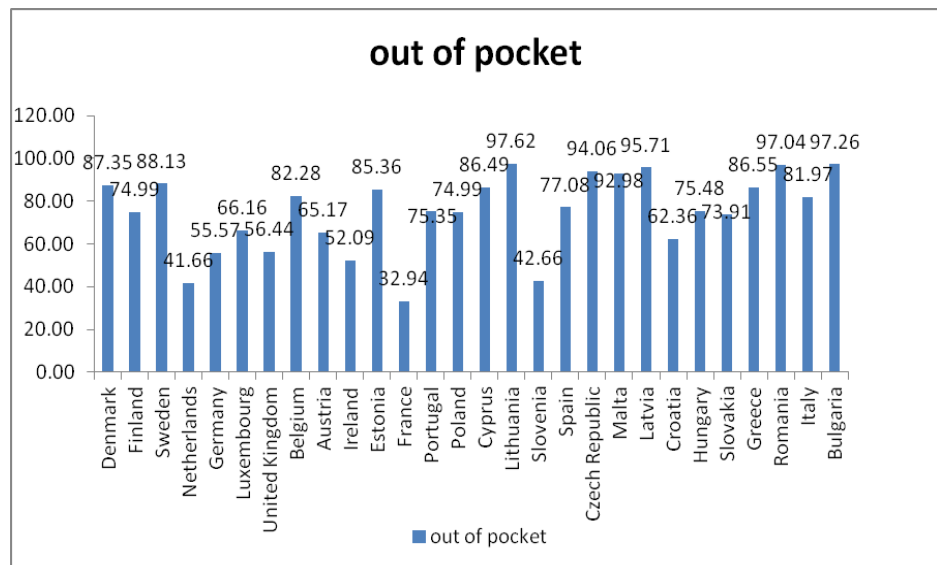


FIGURE 2 - OUT OF POCKET FOR THE 28 COUNTRIES, MEMBERS OF THE EUROPEAN UNION
 Source: Selection made by the author with data proprocessed from those provided by World Bank

As already specified, a second stage consists in the achievement of the correlation matrix. This is emphasized in Table 2.

TABLE 2 - CORRELATION MATRIX

Probability	CPI	POP	GDP Per Cap	LIFE EXP	OUT OF POCKET	PUBLIC HEALTH EXP
Cpi	1					
Pop	0.5103***	1				
GDP Per Cap	0.7476***	0.1593	1			
Life Exp	0.5226***	-0.0131	0.6715***	1		
Out Of Pocket	-0.3909**	-0.0059	-0.3617*	-0.4802***	1	
Public Health Exp	0.4631**	0.0188	0.4781**	0.3279*	-0.2698	1

Source: Made by the author

Where ***, **, * shows the significance threshold at 1%, at 5% and at 10%.

In Table 2, it is noticed that, between the corruption perception index and GDP per inhabitant, there is a very big positive correlation of 0.74. This aspect shows that the independent variable is strictly correlated to CPI. In this case, to make the analysis interpretable, the GDP variable per inhabitant has been excluded from the analysis.

Other positive significant correlations (when a variable grows, the other variable also grows) are found between the weight of the working active population and CPI of 0.5103, between CPI and the life expectancy of 0.5225, between CPI and public health expenditures of 0.4631. In Table 2, negative correlations are also noticed between CPI and the out-of-pocket expense of 0.3909 (that is, the more the out-of-pocket expense grows, the more CPI drops, which means that the tendency is to drop to zero, signifying a high level of corruption) and between the out-of-pocket expense and the life expectancy of 0.4802. This aspect is explained as follows: according to the values set by Transparency International, the more CPI gets closer to 100, the corruption level is lower, and the more CPI gets closer to zero, it indicates a high level of corruption for a certain country.

As the number of variables is low, we considered that we may include in the analysis the variables whose correlation is around 0.5.

TABLE 3 - THE RESULTS OF THE MODEL - ECONOMETRIC MODEL ACCORDING WITH OBTAINED RESULTS

Element	Model 1	Model 2	Model 3
Constant	-194,34***	89,8894	-180,8409
Pop	2,2724***		2,3008***
Life Exp	1,5675**		1,8933***
Public Health Exp	0,5077**		
Out Of Pocket	-0,1090 (p=0,3740)	-0,3271 **	-0,1453 (p=0,2698)
R squared	64,12%	15,28%	56,38%
DW	1,36	0,67	1,27
F Test	10,27***	4,68**	10,34 ***
Normality	Near normal	Near normal	Near normal
Homoscedasticity	Yes	Yes	Yes

Source:Made by the author

Where ***, **, * shows the significance threshold at 1%, at 5% and at 10%.

Table 3 shows a positive correlation between CPI value and the weight of the active population out of the total population, between CPI value and the life expectancy and between the CPI value and the public health expenditures.

The determined coefficients are valid if their values at significance thresholds are below 1%, 5% or 10%. The null hypothesis of Test T (the test of verification of each coefficient) is that it is not significantly different from zero (actually, it is zero, which is not indicated), and the alternative hypothesis says that the value of the coefficient is significantly different from zero.

The models presented in Table 3 are valid because, for every model, the value of Test F has been checked, as well as the probability associated hereto. The null hypothesis of F test claims that all the coefficients are not significantly different from zero (they are zero), and the alternative hypothesis claims that at least one coefficient is significantly different from zero.

At European Union level, an increase by 1% of the active population determines a growth of CPI by almost 2.3 points, that is, a decrease of corruption is registered. The first research hypothesis is therefore validated. This aspect is also confirmed by the results obtained by other authors as well.

As regards the hope to live, a growth by 1 year determines the growth of the CPI value at EU level by 1.5-1.8 points. Therefore, the European corruption level will decrease as its value gets closer to 100. Consequently, the H2 hypothesis is confirmed.

In terms of public expenditures related to health, a growth of 1% of said expenditures in the GDP determines the growth of the CPI value at EU level by almost 0.5 points, which means that H3 is confirmed.

As regards the pocket expenditures, in the first model, it is noticed that the associated coefficient (-0,1090) is not statistically significant different from zero, because the probability associated thereto is of 0.3740. Therefore, the individual effect has been tested. In the second model, it is noticed that a growth by 1% of the pocket expenditures determines a decrease of the index by 0.32 points. Therefore, its value tends to be reduced, towards zero, which means that corruption will grow. Consequently, H4 hypothesis is validated.

Validation of models supposes the analysis of the R-squared value. In the first model, 64.12% show the extent to which the independent variables express the dependent variable. In the second model, the pocket expense expresses 15.28% of CPI, and in the third model, the independent variables express 56.38% of CPI.

For every model, the homoscedasticity has been tested by the White test, normality of errors and self-correlation. The results show that errors are homoscedastic, almost normal, but self-correlated (the value of the DW test should have been of around 2 to eliminate any self-correlation).

The main identified consequences of corruption are:

- Undermine the national economy;
- Change the priorities of the health system; (Rădulescu, Miu, Gheorghe, 2008)
- Decrease performance in the health system;
- Decrease the satisfaction level felt by the beneficiaries of the health system and by the medical staff;
- Decrease investments in the health system;
- Decrease the quality of the healthcare services, and reduce accessibility to medical services;
- Decrease the efficiency of public expenditures allocated to health;
- Delays in the patient's diagnosis and treatment processes;
- Decrease of the quality of products, equipment and technologies used in the health system;
- Deteriorate the image of the health system;
- Decrease the trust in the existing health system;
- Generate wrong or delayed medical and diagnosis errors;

- Cause the worsening of the sick patient's state;
- Decrease the living level;
- Increase the mortality rate;
- Increase unemployment;
- Reduce the performances of the macroeconomic system.

The main solutions and recommendations are:

- Create a national methodology providing a unique calculation manner subsequently applied to the costs of each hospital; (Societatea Academica din Romania, 2013)
- Create a methodology to evaluate the potential of corrupt practices at hospital level; (Ministerul Justitiei, 2011)
- Determine the actual amounts that a hospital may draw from other sources than the public ones; (Societatea Academica din Romania, 2013)
- Publish at hospital level the list of medicines guaranteed free of charge (Societatea Academica din Romania, 2013), as well as the waiting lists with the patients scheduled for various interventions/treatments, and the deadlines to settle the existing cases;
- Set punishments for not settling, in the agreed deadline, the cost of the performed treatment. (Societatea Academica din Romania, 2013)
- Periodically evaluate the degree of implementation of the proposed measures, as well as the intensification of monitoring, evaluation, control activities to reduce/eliminate corruption; (Ministerul Justitiei, 2011)
- Create a department at hospital level, that will deal with the notification of corrupt, abusive practices, lack of ethics, simply put, create a call-center for these purposes (Ministerul Justitiei, 2011) and publish the report created following the collected data concerning the corrupt practices, by eliminating the nominal criterion;
- Increase the initiatives referring to the development of platforms reporting the activity of the centers and institutions providing health care services, together with the possibility to access the data related to patients, their medical file;(Minsterul Justitiei, 2011)

- Establish the criterias for the confidential information (Minsterul Justitiei, 2011) and publish said criteria on the official sites of the medical institutions.
- Increase the motivation level of the medical staff,(Petrescu, Ioncica, 2012)
- -Create a unitary management system of collection and reporting of data and medical indicators.

6. CONCLUSIONS

The corruption extension level differs in the European area from one country to the next according to the features of the health system and to the acceptance degree of this phenomenon. Corruption influences the quality of health results and is on its turn influenced by the quality of the management applied at medical institution level. The effects generated by corruption have a huge negative impact on the performance in the health system and over the macroeconomic and microeconomic systems. It requires a joint effort from governments to create a methodology that will be unanimously accepted at European level, where clear sanctions should be set for those failing to respect it. The results obtained showed that there is a big correlation between corruption perception index and the effective employment of the population, life expectancy at birth, out of pockets, public health expenditure. The tested hypotheses were validated. When the level of corruption increases, the results for life expectancy at birth are low, because of the quality of medical services that is seriously affected. Also, the high level of out of pockets encouraged the expansion of corruption in the system medical. A low level of effective employment of the population and a low level of public health expenditures, determine the worsening of health care capacity and generates corrupt practices for obtaining access to the healthcare system.

REFERENCES

- Andrei, T., Matei, A. I., & Oancea, B. (2009). Simultaneous equations models used in the study of some issues related to the corruption and performance of services in the public health system. *Theoretical and Applied Economics*.
- Boboc, E. (2009). *Identifying determinants of corruption in health care: a cross-country analysis* (Doctoral dissertation, Central European University).
- Cherecheș, R., Ungureanu, M., Rus, I., & Baba, C. (2011). Informal payments in the health care system-Research, Media and Policy. *Transylvanian Review of Administrative Sciences*, 7(32), 5-14.
- Condrea, E. (2013). Corruption as a major supporter of underground economy in Romania. *Actual Problems of Economics*, 144(6).
- European Comission. (2014) *Corruption report- Special Eurobarometer 397-TNS Opinion&Socia*, Brussels.

- European Commission. (2015) *Report from the Commission to the European Parliament and the Council on Progress in Romania under the Co-operation and Verification Mechanism*, Brussels.
- Ensor, T. (2004). Informal payments for health care in transition economies. *Social science & medicine*, 58(2), 237-246.
- Farcasanu, D. O. (2010). Population perception on corruption, informal payments and introduction of co-payments in the public health system in Romania. *Management*, 14(1), 8-13.
- Haque, A. U. (2010). Corruption in the Government Hospitals. *International Journal of Pathology*, 8(2), 73-81.
- Liu, Q., & Vasarhelyi, M. (2013). Healthcare fraud detection: A survey and a clustering model incorporating Geo-location information. In *29th World Continuous Auditing and Reporting Symposium (29WCARS)*, Brisbane, Australia.
- Margret, J. J., & Sreenivasan, S. (2013). Implementation of Data Mining in Medical Fraud Detection. *International Journal of Computer Applications*, 69(5).
- Ministerul Justitiei. 2011 *Strategia Nationala Anticoruptie pe perioada 2012-2015*, Romania.
- Nadpara, N., & Samanta, S. (2015). An Empirical Examination of the Effect of Corruption on Health Outcomes. *The College of New Jersey*.
- Parente, S. T., Schulte, B., Jost, A., Sullivan, T., & Klindworth, A. (2012). Assessment of Predictive Modeling for Identifying Fraud within the Medicare Program. *Klindworth*. A.
- Pashev, K. (2007). *Corruption in the healthcare sector in Bulgaria*. Center for the Study of Democracy.
- Petrescu, E. C., Ioncică, D. E. (2012). Perception of Private and Public Medical Services In Romania. *Amfiteatru Economic Journal*, 14(Special No. 6), 653-664.
- Potcovaru, A. Girneata, A. Trifu, A. (2015). *Monitoring Romanian Medical System: International Perspectives*. Review of International Comparative Management. 16(1), 129-136.
- Rădulescu, I. Miu, A. & Gheorghe, A. Inside the Core of Corruption from the Health System. *University of Ploiesti Bulletin. Economic Sciences Serie*. Vol. LX No. 1/2008. 43 – 50.
- Şahin, İ., Özbek, M. A., Güran, M. C., & Tosun, M. U. Corruption in the Health Sector: Ministry of Health Professionals' Perceptions of Corruption. *Review of Public Administration*. 3(4). 123-162.
- Savedoff, W. D. (2007). *Transparency and corruption in the health sector: a conceptual framework and ideas for action in Latin American and the Caribbean*. Washington^ eD. CDC: Inter-American Development Bank.
- Societatea academica din Romania. (2013) *Raportul anual de analiza si prognoza din 2013*, Romania.
- Stepurko, T., Pavlova, M., Gryga, I., & Groot, W. (2013). Informal payments for health care services—Corruption or gratitude? A study on public attitudes, perceptions and opinions in six Central and Eastern European countries. *Communist and Post-Communist Studies*, 46(4), 419-431.
- Stoica, M. (2012). Implementation Of Performance In Romania'S Health System. In *Proceedings of the international management conference* (Vol. 6, No. 1, pp. 445-450). Faculty of Management, Academy of Economic Studies, Bucharest, Romania.
- Thorpe, N., Deslich, S., Sikula Sr, A., & Coustasse, A. (2012). Combating Medicare Fraud: A Struggling Work In Progress. *Franklin Business & Law Journal*, 2012(4).

The Corruption Perceptions Index (2015). Retrived January 1, 2015 from <http://www.transparency.org/cpi2015>.

The World Bank Data. (2013). Retrieved January 1, 2015 from <http://data.worldbank.org/>.

Vian, T., & Nordberg, C. Corruption in the health sector. U4 Issue 2008: 10.

Yang, W. S., & Hwang, S. Y. (2006). A process-mining framework for the detection of healthcare fraud and abuse. *Expert Systems with Applications*,31(1), 56-68.