

# Impact of the economic crisis on healthcare resources: An European approach

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## Abstract

**Background:** The financial and economic crisis period that prevailed along the first decade of 2000 was a global phenomenon, during which healthcare systems were under the risk of an increasing pressure, mainly due to a loss of operational financial resources and potential increases in the healthcare demand.

**Objective:** This research intends to evaluate the impact of the crisis, taking into consideration the healthcare financing systems and healthcare resources utilization in Europe.

**Study design and setting:** We considered as our sample the financial and healthcare data regarding the 27 European member states, from 2000 until 2009. The data were collected from Eurostat database (2011) and OECD database (2010), respectively. We perform a descriptive analysis, a correlation analysis, and a multivariate linear analysis by ordinary least squares.

**Results:** We found that during economic crisis there was an increase in the total pharmaceutical expenditure as a percentage of total healthcare expenditure, and in the number of medical consultations *per capita*. Along with a rise of the unemployment rate, there was a decrease of total healthcare expenditure as a percentage of GDP.

**Conclusion:** During the crisis we found a decrease in healthcare expenditure and an increase in pharmaceutical expenditure and in the number of medical consultations. The results were sensitive to the financial healthcare system, except for healthcare expenditure. During crisis, social health insurance systems promote better results in terms of life expectancy at birth, however, at a higher price – due to a rise in pharmaceutical expenditure and number of medical consultations – than general taxation ones.

**Keywords:** Health, Economic crisis, Pharmaceutical expenditure, Healthcare expenditure, Medical consultations, Average length of stay

## Introduction

Healthcare systems are dynamic entities which are able to translate financial resources into health outcomes, to assist the population they are entitled to serve. However, those resources may decrease during an economic crisis, with the stock of public health usually being sensitive to economic climate. The full impact of an economic crisis depends on the government's priorities, whether they decide that healthcare expenditure should be considered as an investment to retain, or that it must decrease as a consequence of the global scarcity of financial resources. Following the former pathway, a 'key to weathering recessions without worsening health or increasing health inequities is strengthening social protection measures, such as active labour market programs, improved unemployment benefits and more generous social welfare transfers'.<sup>1</sup> Regarding the later 'the nature of many health interventions makes them especially sensitive to fiscal decisions. In countries with weak budgetary process the burden of short-term expenditure cuts can fall disproportionately on health spending, causing disruptions in the availability of resources'.<sup>2</sup>

The current crisis is just another one, following the 447 international crises that occurred from 1970 until 2008.<sup>3</sup> However, the authors pointed out that this one is quite different from the others – it started in the United States, which is the world economic motor – and has spread quickly throughout the world. Following this recession the World Bank estimates a retraction of 2–5% in global trade.<sup>4</sup>

Nevertheless, the impact of an economic crisis on health can go behind the financial aspects, as defended by some researchers, which put the main emphasis on time frame. Their research demonstrates that 'the rapidity of economic change appears to be a key hazard to health. The direction

of change seems to be less important'.<sup>5</sup> But they note that not all the individuals are equally vulnerable; it depends also, among other factors, on the exposure to the risk factors, the social cohesion, and the social protection.

It is expectable that, as a result of an economic crisis, there were several impacts both at the country and individual level, mainly characterized by a decrease in economic growth and a fall at real household income and tax revenues, which tend to lead to poor health status.<sup>6</sup> Considering the former, we can theoretically expect a decrease in the healthcare budget and a subsequent fall in the healthcare supply to the population. Regarding the latter, there is a high probability of an increase in the unemployment rate, which in turn tends to decrease the individual's income and his access to healthcare and medicines. In addition, the increase in unemployment rate usually promotes unhealthy behaviour, which in turn will translate into poor health, starting to press the demand for healthcare.

For some authors, the society that considers public health before crisis is more prone to continue along this frame, as the crisis seems to reinforce pre-existing values and developments.<sup>7</sup> This is why 'the challenging facing the world now is to prevent an economic crisis becoming a social and a health crisis'.<sup>8</sup> The answer comes with a political approach. For that purpose, it is expected that governments consider the importance of putting in place actions in the area of the health determinants, and strengthening their actions according to the principles of efficiency, equity, and solidarity. The first one intends to promote the rationalization regarding the resources utilization, avoiding their waste and misuse; the second one tends to promote the selective approach of specific segments of the population, namely the most vulnerable from a socio-economic point of view, usually those that face a greater risk regarding their health status; and last but not least, it is desirable that such approaches are shared among the whole population. According to the World Health Organization, the 'investment in health systems feeds into sustained benefits not only in health but also in economic growth, but which by doing so reduce the future demands on those health systems'.<sup>9</sup>

In support of this approach, it was mentioned that there is a straight relation between the gross domestic product per capita, its distribution among the population, and the public health status.<sup>3</sup> This point of view is shared by other researchers, for whom the 'economic growth accompanied by decreasing income disparities and increasing levels of education, can be expected to strengthen the

status of the determinants of health (...) as well as the life course dimension'.<sup>10</sup> Looking forward, it is considered that the preparation for a difficult financial and healthy future seems unavoidable.<sup>11</sup>

To approach this topic, the paper is organised as follows: we start with the development of the conceptual model, by presenting the theoretical fundamentals concerning the macroeconomic context and its relationship with some socioeconomic variables. This is followed by a brief description of the two major healthcare financial systems in Europe, and its association with the macroeconomic environment and the consequences for public health status. In the second part we present the empirical model, starting with the formulation of the research question, and followed by the materials and methods that were selected. The results obtained were presented and discussed considering the evidence already published. We finalised the paper with our conclusion and the contribution derived from this research to further ones.

#### *Macroeconomic ground*

The macroeconomic performance of a country can be measured through national economic variables that take into account the interactions at supranational levels, considering that not only 'many health systems are highly dependent on economic climate'.<sup>12</sup>

One of the proxies of macroeconomic conditions, at the ground of macroeconomic impact on welfare use, is the unemployment rate.<sup>13,14</sup> During our research we will use this indicator, as it is 'the most common indicator of macroeconomic conditions'.<sup>14</sup> Usually it tends to increase during economic downturns, as a result of a decrease in the GDP, but also of higher tax levels and uncertainty of markets. Furthermore, if 'the economic crisis has had a negative impact on consumer purchasing power, so it is expected to have a negative impact on health care expenditure too'.<sup>8</sup>

As a result we can expect both an increase on, and a shift of, the healthcare demand, from private to public services,<sup>15</sup> which can also be associated with a decrease in the supply by public healthcare providers, as a result of a decrease in the healthcare budget. An example from Greece, during the actual recession, tells us that 'every day, more and more people choose to be treated in national hospitals rather than private ones, so the faults of an old and declining national health system are more easily exposed'.<sup>16</sup>

The association between income and health, for both developing and developed countries, was assumed by several researchers,<sup>6,17,18,19</sup> which

tends to be strong in developing economies with low levels of *per capita* income.<sup>6</sup> The evidence data for the United States suggest that during economic upturns the mortality tends to rise, except for suicide.<sup>20</sup>

It is considered by several researchers that unemployment rate is negatively correlated with the probability of health insurance coverage, and, subsequently, with the health of the population.<sup>21</sup> Behind the first approach – the economic one – it was considered that ‘unemployment imposes additional burden on the individual, a burden that might be referred to as the non-pecuniary cost of unemployment’,<sup>22</sup> as it can impact on health by increasing mortality, suicide and crimes, and decrease marital stability. On the other hand, it was found that the trade cycle – comprehending periods of boom and recession – appears to have no effect regarding the health of long-term unemployed individuals.<sup>23</sup>

#### *Healthcare financing system*

The common pathway to healthcare financing in the European Union is mainly sustained by the social solidarity principle. However, there are differences concerning funding, pooling, purchasing, and distribution of funds, which explain the two main healthcare financing systems – social health insurance (SHI) and general taxation (GT). At the core of both there is the healthcare budget – the financial amount that is *a priori* available to spend within healthcare system in order to produce health outputs.

The SHI system usually has a stable budget for healthcare, has there is a monthly mandatory contribution from employers and employees, which is usually managed at the regional level. It was implemented for the first time in Germany – 1883 – and subsequently in the Netherlands, France, Austria, and Luxemburg.

Regarding the GT system, the amount of taxes is collected at national level, and will be allocated according to yearly priorities of the government regarding each one of the social areas, regarding government’s concept of the social role of the state. Usually there is a competition among the different areas of state intervention, ‘which budget allocations will continue to reflect’.<sup>24</sup> It was implemented for the first time in the United Kingdom in 1946 and was followed namely by Spain, Portugal, Norway, Sweden, and Italy.

About the healthcare budget, it must be considered that an increase is not a synonymous of better public health. In fact, it crucially depends on the healthcare system organization and management.

This could be illustrated by the Greek case that during the period from 1991 until 2008, increased the total healthcare expenditure in 4.4% of GDP, but it became worse in terms of global health outcomes, mainly due to a highly fragmented primary care system.<sup>25</sup> In times of economic crisis when financial resources are lacking, it is better to assume a rationalization regarding healthcare expenditure, rather than to promote rationing based in cost contention approach.

During recession we can expect that healthcare systems financed by SHI are the most vulnerable, and their budgets tend to decrease easily with the rise of unemployment rates. Nonetheless, according to actual national political approaches, in certain circumstances, those systems can be subsidized by the State to guarantee the goals they must pursue, independently of individual employment status.

Regarding this system, and as an example during the current crisis, the two major political parties in Croatia agreed that the best option to manage healthcare was to decrease expenditure on health, independently of any structural approach to the healthcare system.<sup>26</sup>

The link between macroeconomic ground and health insurance coverage was also investigated.<sup>27</sup> They found that when the unemployment rate rises 1% there is an increase of 1.2 million uninsured people. In the same field, was estimated that when the unemployment rate rises 1% there was an increase in Medicaid enrolment of 1.5 million.<sup>28</sup>

One of the branches regarding the healthcare expenditure that has *per se* a major relevance is pharmaceutical expenditure. It presents a large variability between countries, not only due to differences in prices but also in volumes that are consumed. The different systems of pricing and reimbursement of medicines, remain also as main factors that might explain the differences observed in this variable. However, during economic crisis, we can expect some changes in this area. As an example, Greece intends to put in place a system to promote a decrease in medicines consumption, by decreasing drug prescriptions.<sup>16</sup> Another opposite example, from Thailand, refers that during the economic crisis there was an increase of 12.2% in pharmaceutical expenditure on self-medication.<sup>6</sup>

The relevance of this subject has been recognized by the European Parliament which ‘emphasizes that the economic and financial crisis and the austerity measures taken by Member States, in particular on the supply side, may lead to a reduction in the level of funding for public health and health promotion, disease prevention, and long-term care services as a result of budget cuts and lower tax

revenues, while the demand for health and long-term care services may increase as a result of a combination of factors that contribute to the deterioration of the health status of the general population'.<sup>29</sup>

In a context of crisis, to cope with economic fragility and healthcare needs is a big challenge for healthcare leaders. It could also be an opportunity to reengineer the actual system, promoting value-based options, waste decrease and efficiency at long term. In fact, in such a situation, there is usually a wide consensus that agents are more committed to accept changes that are prone to cope with such a disruptive environment.

## Materials and methods

We collected annual data from the 27 Member States of the European Union, to develop a retrospective analysis, along the full decade from 2000 to 2009 ( $N = 270$ ). The economic and financial data are obtained from 2010 EUROSTAT database, and the healthcare data from 2011 OECD database. The calculations were performed by using the statistical software SPSS 18.

We start our research with a descriptive analysis which will allow exploring the data and identify specific trends of the research's variables. Subsequently a correlation analysis will provide information about the degree of association between the quantitative variables. In the end we will perform a regression analysis, by ordinary least squares, to identify the impact of the unemployment and the financial healthcare system on the expenditure and health outputs and outcomes.

Regarding the macroeconomic ground, we will consider the rate of unemployment (%), as a *proxy* of recession, in line with the work already published in this field of research.<sup>13,14</sup> To aggregate more information in order to achieve a strong integrated approach, we will look also at the evolution of the real GDP growth rate, along the decade.

The variations that occurred at the macroeconomic level could lead different countries to promote the adoption of opposite approaches regarding healthcare budget – an input to the system – according to their own healthcare financing system. For this purpose, we will use a dummy variable. If the system is financed by GT – dummy variable = 0 – in case of a social healthcare insurance – dummy variable = 1.

The financial resources allow managing the provision of healthcare in order to improve public health. To provide a macro level approach, we will consider how they are allocated: as total healthcare

expenditure as percentage of GDP growth rate or as the pharmaceutical expenditure as percentage of total healthcare expenditure.

After, we will consider the provision of healthcare outputs in ambulatory setting, considering the number of medical consultations *per patient per year*. As the average length of stay did not comply with the conditions to perform a linear regression analysis, it was not considered in this step.

During the second step of the research we will perform a correlation analysis to evaluate the degree of association between the unemployment rate and the variables representative of health and healthcare, by calculating the Spearman's coefficient. These preliminary data will allow a comparison with the results already obtained by other researchers, concerning the same subject.

Finally, we will perform a multivariate linear regression analysis, by ordinary least squares. It will provide information for inferential purpose. The criteria to ensure the application of this methodology were verified and accomplished.

As a first approach we want to appraise if all the variables related to health and healthcare ( $Y$ ) are sensitive to the variation of unemployment rate ( $X$ ), according to Equation 1; the same procedure will be adopted for the healthcare financing system ( $E$ ), according to Equation 2.

$$Y_{it} = \alpha_0 + \alpha_1 X_{it} + \varepsilon_{it} \quad (1)$$

$$Y_{it} = \alpha_0 + \alpha_1 E_{it} + \varepsilon_{it} \quad (2)$$

In this case, for each one of the regressions,  $Y$  represents different variables: total health expenditure as percentage of GDP growth rate, total pharmaceutical expenditure as percentage of total healthcare expenditure and the number of medical consultations *per capita*.

$$Y_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 E_{it} + \varepsilon_{it} \quad (3)$$

After, according to Equation 3, we want to generate evidence about the impact of the different financial healthcare systems ( $E$ ), namely if they are committed to explain the variations observed in the variables considered above for healthcare outputs, along with the impact of unemployment rate.

$$Y_{it} = \alpha_0 + \alpha_1 X_{it} + \alpha_2 E_{it} + \alpha_3 X_{it}^* E_{it} + \varepsilon_{it} \quad (4)$$

Finally, we want to investigate if the modification of unemployment rate impacts differently on member states financed by GT or by SHI, concerning the health outputs identified above – Equation 4.

## Results

### Macroeconomic approach – unemployment rate

During the period of analysis, and according to the data presented in Table 1, the unemployment rate average was 7.9 ( $\pm 3.7$ )%, for the 27 European member states. This value has dropped slightly from 2000 until 2008, when the minimum average was 6.2%. By 2009 we observed a sudden increase to 8.8%, along with a huge contraction in GDP growth rate to  $-5.6\%$ .

When considering another approach, mainly based on the financing healthcare system, as presented in Fig. 1, we can observe that by the year 2000 there is a difference of 2% in the unemployment rate between the two groups of countries, with those financed by GT presenting a lower level of unemployment rate. By the end of the decade it is observed an opposite pattern, with countries financed by SHI presenting a lower level of unemployment than those financed by GT, which is mainly driven by the decrease of unemployment rate in east European countries.

When considering the correlation analysis, as presented in Table 2, we can observe that there is a medium negative association between unemployment rate and total healthcare expenditure as percentage of GDP ( $-0.33$ ,  $P < 0.01$ ) (Fig. 2). Considering the other variables, there is a positive association between unemployment rate and total pharmaceutical expenditure as percentage of total healthcare expenditure ( $0.67$ ,  $P < 0.01$ ), the average length of stay ( $0.11$ ,  $P < 0.01$ ), and the number of medical consultations ( $0.27$ ,  $P < 0.01$ ).

As a preliminary conclusion, based on correlation analysis, the economic crisis was associated with a decrease in healthcare expenditure. It was also associated with an increase in medicine’s spending

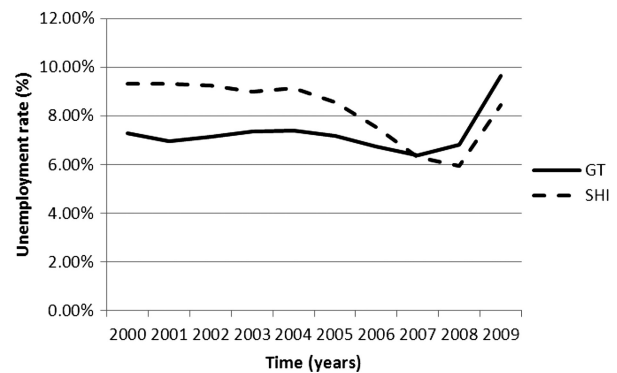


Figure 1: Evolution of unemployment rate, along the decade from 2000 to 2009, regarding the 27 member states of European Union, according to the healthcare financing system – SHI or GT.

Data source: EUROSTAT database 2010.

Table 2: Spearman’s correlation coefficient between macroeconomic variables and health outputs and outcomes regarding the 27 European member states, from 2000 to 2009

	Unemployment rate (%)
Total pharmaceutical expenditure % total health expenditure	0.67**
Total health expenditure % gross domestic product growth rate	-0.327**
Average length of stay	0.109**
Number of medical consultations	0.268**

Data source: Our calculations were based on OECD database 2011 and EUROSTAT database 2010.

\* $P < 0.05$ , \*\* $P < 0.01$ .

and an increase of the number of medical consultations and the average length of stay in acute healthcare settings.

Table 1: Summary statistics of the variables considered in the research, for the 27 European member states, from 2000 to 2009

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
Unemployment rate (%)	270	7.9	3.7	1.9	20
Total health expenditure % gross domestic product	197	8.5	1.6	4.8	12
Total pharmaceutical expenditure % total health expenditure	191	18.5	6.4	7.3	38.5
Number of medical consultations <i>per capita</i>	174	6.8	2.8	2.8	15
Average length of stay – acute care (days)	201	6.7	1.1	3.4	9.2

Data source: Our calculations were based on OECD database 2011 and EUROSTAT database 2010.

\* $P < 0.05$ , \*\* $P < 0.01$ .

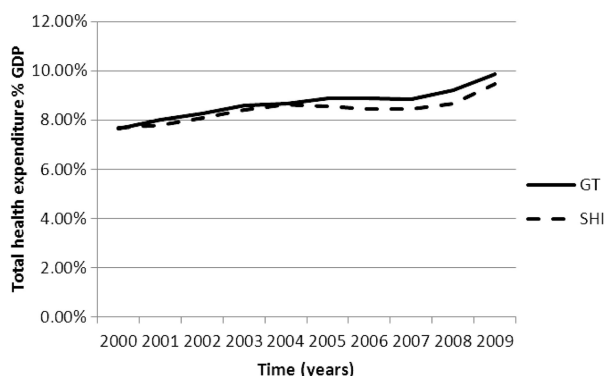


Figure 2: Evolution of total healthcare expenditure as percentage of GDP, along the decade from 2000 to 2009 regarding the 27 member states of European Union, according to the healthcare financing system – SHI or GT. Data source: OECD database 2011.

*Total healthcare and pharmaceutical expenditures*

Regarding the financial indicator – the total healthcare expenditure as percentage of GDP – we observed a smooth increase for all countries of the European Union from 2000 to 2009. According to the descriptive analysis, the countries financed by GT spend on healthcare a slightly higher value than those financed by SHI (Tables 3–6).

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Table 3: Results of model 1 in which log of health and healthcare-related variables are regressed on unemployment rate

	Unemployment effect		N	R <sub>a</sub> <sup>2</sup>
	α <sub>1</sub>	SE		
TPE %THE	1.203**	0.096	191	0.46
THE%GDP	-0.143**	0.029	197	0.10
Number of medical consultations	19.822**	5.444	174	0.07

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Data source: Our calculations were based on OECD database 2011 and EUROSTAT database 2010. \*P < 0.05, \*\*P < 0.01.

Table 4: Results of model 2 in which log of health and healthcare-related variables are regressed on healthcare financing system

	Healthcare financing system effect		N	R <sub>a</sub> <sup>2</sup>
	α <sub>1</sub>	SE		
TPE %THE	0.038**	0.009	191	0.08
THE%GDP	-0.002	0.002	197	0.00
Number of medical consultations	3.635**	0.348	174	0.38

Data source: Our calculations were based on OECD database 2011. \*P < 0.05, \*\*P < 0.01.

Concerning the total pharmaceutical expenditure as a percentage of total healthcare expenditure there is no common pattern along the decade. However, for the majority of the European member states there was a decrease, except for Estonia, Germany, Greece, Hungary, and Ireland. However, when we consider the pattern regarding healthcare financing system, we note that the expenditure on medicines is higher for countries financed by SHI than for countries financed by GT. Regarding the latter, the pharmaceutical expenditure presents an almost flat pattern from 2000 to 2007, when it starts to drop from 17 to 15%; during that time the pharmaceutical expenditure decreases from 20 to 19% for countries with a SHI system.

The average for total pharmaceutical expenditure as percentage of total healthcare expenditure was 18.5 (±6.4)%, between 2000 and 2009 (Fig. 3). The minimum value of 7.3% was observed for Denmark by 2009, and the highest value of 38.5% was attained in Slovakia by 2003.

According to Equation 1 there is a statistically significant decrease of -0.143 (P < 0.01) in the total healthcare expenditure as percentage of GDP that is associated with the increase of 1% of the unemployment rate, opposite to an increase of 1.203 (P < 0.01) in the pharmaceutical expenditure as percentage of the total healthcare expenditure. Considering the results obtained using Equation 2, there is an increase of 0.038 (P < 0.01) in the total pharmaceutical expenditure as percentage of total healthcare expenditure, associated with each 1% rise of unemployment rate, mainly for SHI systems; the results were not statistically significant for healthcare expenditure as percentage of GDP.

The approach considered by Equation 3 allows drawing a conclusion that there is a 1.152 (P < 0.01) increase in total pharmaceutical expenditure as percentage of total healthcare expenditure when there is an increase of 1% in unemployment rate, and mainly for SHI system (0.026, P < 0.01), rather than for GT systems. There is also a decrease of -0.141 (P < 0.01) regarding the total healthcare expenditure as percentage of GDP; however, it is independent of healthcare financing systems.

According to Equation 4 there is no jointly statistically significant effect from unemployment rate and healthcare financing system that could impact on the total pharmaceutical expenditure as percentage of total healthcare expenditure and on the total healthcare expenditure as percentage of GDP.

Considering together all the effects from unemployment rate and healthcare financing system, we found that the total pharmaceutical expenditure tends to increase (0.978, P < 0.01) along with the

Table 5: Results of model 3 in which log of health and healthcare-related variables are regressed on unemployment rate and healthcare financing system

	Unemployment effect		Healthcare financing system effect		N	R <sub>a</sub> <sup>2</sup>
	α <sub>1</sub>	SE	α <sub>2</sub>	SE		
TPE %THE	1.152**	0.093	0.026**	0.007	191	0.49
THE%GDP	-0.141**	0.030	-0.001	0.002	197	0.10
Number of medical consultations	14.483**	4.327	3.498**	0.341	174	0.42

Data source: Our calculations were based on OECD database 2011 and EUROSTAT database 2010.  
 \*P < 0.05, \*\*P < 0.01.

Table 6: Results of model 4 in which log of health and healthcare-related variables are regressed on unemployment rate, healthcare financing system and the cross-effect between unemployment rate and healthcare financing system

	Unemployment effect		Healthcare financing system effect		Unemployment effect*healthcare financing system effect		N	R <sub>a</sub> <sup>2</sup>
	α <sub>1</sub>	SE	α <sub>2</sub>	SE	α <sub>3</sub>	SE		
TPE %THE	0.978**	0.195	0.009	0.018	0.226	0.222	191	0.49
THE%GDP	0.025	0.064	0.015*	0.006	-0.210	0.072	197	0.13
Number of medical consultations	17.546	10.770	3.766**	0.927	-3.657	11.768	174	0.42

Data source: Our calculations were based on OECD database 2011 and EUROSTAT database 2010.  
 \*P < 0.05, \*\*P < 0.01.

increase of 1% in unemployment rate, but is independent of healthcare financing system. On the other hand, the total healthcare expenditure tends to increase (0.015, P < 0.01) in the presence of a SHI system, but is not affected by unemployment rate.

*Number of consultations and average length of stay*

The average number of medical consultations per patient each year was 6.8 (±2.8). The minimum value of 2.8 was observed for Sweden (2000,

2003–2007), and the maximum of 15 consultations per capita each year was observed in Slovakia (2000).

According to the healthcare financing system, as presented in Fig. 4, there is a huge difference between the number of medical consultations in countries financed by GT or SHI. By 2000, the difference between both is nearly 4 medical consultations per patient per year, with the highest value observed for SHI systems, with an average of 8 medical consultations. By 2009, the difference was almost the same, with a slightly increase for GT systems and an identical decrease for SHI systems. However,

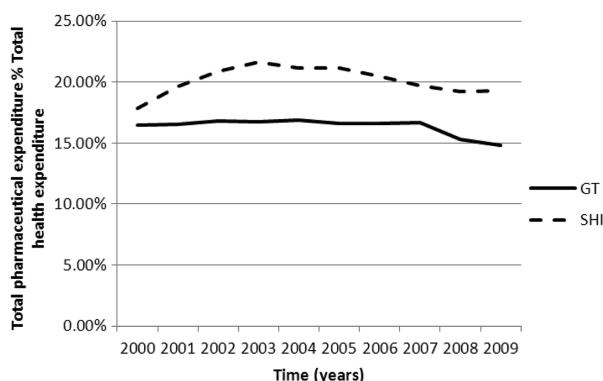


Figure 3: Evolution of total pharmaceutical expenditure as percentage of total healthcare expenditure along the decade from 2000 to 2009 regarding the 27 member states of European Union, according to the healthcare financing system – SHI or GT.

Data source: OECD database 2011 and EUROSTAT database 2010.

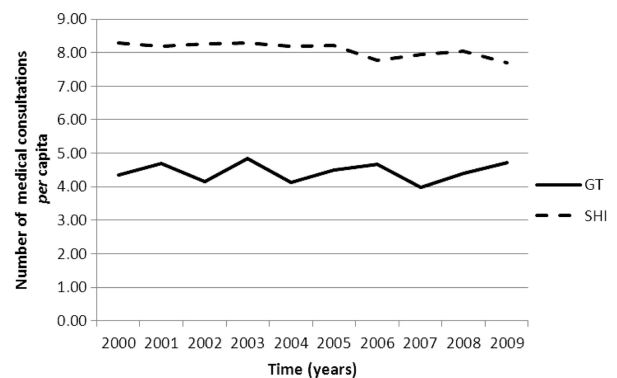


Figure 4: Evolution on the number of medical consultations along the decade from 2000 to 2009 regarding the 27 member states of European Union, according to the healthcare financing system – SHI or GT.

Data source: OECD database 2011.

between 2000 and 2009 there was an increase of 0.36 consultations per patient per year for the GT system, and a decrease of 0.59 for the SHI systems.

The average length of stay, in acute care, decreases along all the decade from 7.2 (2000) to 6.1 (2009). This pattern was shared by all the countries. When we consider this variable according to the system of healthcare financing, we note that there is an almost flat pattern around 6 days, concerning systems financed by GT, but for systems financed by SHI was observed a sharp decline from 8 days by 2000 to 6 days by 2009 – the same value observed for GT systems, as shown in Fig. 5.

According to the data obtained by Equation 1, there is a statistically significant increase of 19.822 ( $P < 0.01$ ) regarding the number of medical consultations associated with the increase in 1% in unemployment rate. This increase is also statistically significant, according to Equation 2, when considering the financial healthcare system. In case of a SHI system there was an increase of 3.635 ( $P < 0.01$ ) regarding the number of medical consultations *per capita per year*, when compared with the figures for GT system. Also according to the model represented by Equation 3, the unemployment rate affects the number of medical consultations by increasing 14.483 ( $P < 0.01$ ) associated with an increase of 1% in unemployment rate, plus 3.498 ( $P < 0.01$ ) mainly for SHI systems rather than for GT ones. Considering the information provided by Equation 4, there is no jointly effect from unemployment rate and healthcare financing system that impacts on the number of medical consultations *per capita per year*. However, there is an increase of 3.766 ( $P < 0.05$ ) for countries with SHI.

The number of medical consultations increase along with an increase in unemployment rate, and

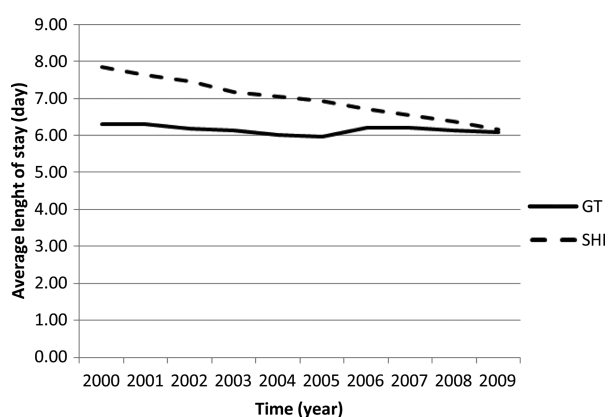


Figure 5: Evolution on the average length of stay along the decade from 2000 to 2009 regarding the 27 member states of European Union, according to the healthcare financing system SHI or GT.

Data source: OECD database 2011.

mainly for countries with SHI systems rather than for GT ones. However, there is no incremental contribution to the number of medical consultations from a jointly effect regarding unemployment rate and healthcare financing system.

## Discussion

The data from descriptive statistics displayed above, reveals huge amplitude of values for all the variables, which certainly occur due to the different socio-economic and organizational patterns of each of the European member states. However, it is realistic to consider that each one of them tends to adopt different measures when facing a recession. For this reason, the impact will certainly be different at the member states level.

It is also important to notice that the economic crisis started at the end of the decade, and its full effects – regarding healthcare, on the domains of financing and outputs – will certainly be delayed by some years from now. This is due in part to the time that is necessary for governments to assess the situation and to identify, develop and implement the adequate legal framework, to lead with this situation. This topic should be perceived as a contribution to the fragility of our conclusions, but also as an incentive to proceed with this study, when a larger sample will be available.

The interpretation of the results considering the two kinds of healthcare financing systems must be considered carefully. In fact, the group of the countries with SHI is composed by east and west European countries, with the former presenting less developed economies than the latter, and this reality can explain the huge difference observed. In fact, the economic pattern of countries that apply GT is more homogeneous than the one of countries where SHI system was put in place.

Our research demonstrates that along with a rise in the unemployment rate there is a decrease in total healthcare expenditure as percentage of GDP. The opposite was verified for total pharmaceutical expenditure as percentage of total healthcare expenditure and the number of medical consultations which tends to increase with a rise in unemployment rate.

The decrease of total healthcare expenditure that accompanied the rise in unemployment rate is expectable, as it reflects the lower global financial resources, and a subsequent tendency to reduce all the items of the public expenditure. Here the results were different than those that we expected, as there was no impact regarding the healthcare financing system on this variable, mainly for GT



one. Our results were in line with those obtained by Hopkins.<sup>6</sup> By the contrary, Oikonomou and Tountas<sup>25</sup> found that during crisis there was an increase in total healthcare expenditure.

This result can also be explained by the inverse pattern that was observed regarding the trend of unemployment rate and GDP. For the period under study, we observe that when the GDP presents a huge drop by 2007, the unemployment rate starts to rise. So, the negative association can be increased not only due to a decrease in total healthcare expenditure but also to a decrease in GDP, mainly if this one was lower than the first one.

The huge increase of total pharmaceutical expenditure may be associated with the increase in the number of medical consultations – where the prescriptions were made – but also with the poor health of the population, that could have a tendency for more co morbidities, more severe diseases and for a larger period of time. It could also affect preferentially the elderly that tend to present a large period of recovery. In fact, according to our research, the number of medical consultations tends to rise during the increase in the unemployment rate. The same results were obtained by other researchers. According to Karamanoli<sup>16</sup>) during economic crisis the Greek system will recommend a reduction in prescriptions, which will contribute to a decrease in pharmaceutical expenditure only if the price of medicines remains the same or decrease; the research conducted by Hopkins<sup>6</sup> provides information that during economic crisis the pharmaceutical expenditure tends to increase, mainly driven by self-medication.

Another explanation concerns the pharmaceutical industry as a highly innovative one, with innovative medicines having usually much higher prices than the older ones. In the presence of high substitution rates there will be an increase in pharmaceutical expenditure.

Considering that there are two main healthcare financing systems at the European level, it is important to investigate whether the recession impacts according to different pathways regarding each one of them. In fact, we found huge differences regarding all the variables, except for total healthcare expenditure, which seems to be immune to the system.

SHI systems tend to present higher expenditures with pharmaceuticals and higher number of medical consultations than the figures observed for countries financed by GT, which tend to attain a lower impact on public health with a smaller life expectancy at birth.

## Conclusions

In this research we approach the impact of economic crisis in the European Union during the decade from 2000 to 2009. We found that during the economic crisis there is a decrease in the total healthcare expenditure, that is lower for SHI systems, than for GT ones. There was an increase in the total pharmaceutical expenditure, the number of medical consultations and the average length of stay, associated with the rise of unemployment rate.

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