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HEALTH CARE AND LIFE SATISFACTION IN SPAIN

AN EMPIRICAL ANALYSIS FOR THE PERIOD 2002 - 2014

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Abstract

This document analyzes the effect of health care spending on the reported level of satisfaction in Spain during the period 2002 - 2014. Using data from the European Social Survey a panel data model is estimated for the 17 different regions over the 7 waves of the survey. The results show that health care spending per capita do have a positive effect on life satisfaction. Analyzing its three main components separately, it turns out that only the expenditures on pharmacy and primary health care seem to explain this effect. In addition, the outcomes of the model also show that both higher levels of GDP growth and GDP per capita tend to explain higher levels of satisfaction. Oddly enough, unemployment and inflation also seem to be positively correlated. Finally, some social characteristics also appear to explain some of these variations, such as marital status and subjective perception of one´s health.

Contents

1. Introduction and objectives

There are two main health care models prevailing in Europe nowadays, one based on mandatory quotas paid to the Social Security by employers and employees (Bismarck model) and the other financed mostly by public taxes (Beveridge model). While in the first one we can find countries like Germany, France or Belgium, the latter is leaded by Denmark, Italy and Spain. In the Bismarck model (also known as Social Health Insurance) the quotas collected are deposited in non-governmental funds regulated by law that manage all the resources, arranging the different contracts with hospitals, suppliers and employees. In the Beveridge model (aka National Health Service) instead, the whole public health care system is financed by progressive taxes and controlled by the state, which means that the total spending in health care is accounted in the National Budget every year. Therefore, the actions of the Government play a crucial role regarding the provision of health care services in the countries applying the Beveridge model.

The health care system in Spain has been under the focus these last years, as it has suffered a shortage of resources, first conducted by the crisis and then aggravated by the adjustment plan launched in 2012 by the Spanish government. On balance, the depth and duration of the crisis in Spain has had a clear negative effect on the welfare state and especially on the provision of health care services, which are among the budget items that have received greater cutbacks. The discomfort among the population has been noticeable, as people have been demonstrating on the streets against these policies. According to the National Barometer of Health, the satisfaction with the overall health care system dropped throughout the crisis until reach a grade of 6.31 in 2014, compared to the 6.59 given in 2011[1]. The survey also reports that while in 2007 the health care system was ranked the 10th concern among of the respondents, it had raised to the 5th place in 2014[2]. The motivation for this dissertation thus, lies on the study of whether the average level of life satisfaction over time is affected or not by the health care spending.

The objectives of this work can be divided as: (i) Study how the main macroeconomic variables, which will be used as a control variables, have affected the overall level of satisfaction in Spain during the period 2002-2014, and see if the results

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[1] G. Sevillano, Elena (2015). *"Los usuarios dan a la sanidad pública su peor nota desde 2008"*. http://politica.elpais.com
[2] Barómetro febrero 2014: http://datos.cis.es/pdf/Es3013mar_A.pdf

support the previous studies on life satisfaction. And (ii), analyze the specific effect of the three main components of the public health care spending in Spain: hospital and specialized health care, pharmacy and primary health care. Since Spain is a country in which people rely mostly on the provision of the health care services by the State, we should expect a positive relationship between the quantity of money spent in health care services and life satisfaction. And of the three main components, primary health care probably is the one which have more effect, since it is the provision at a local level and what can be more directly observed by individuals. Therefore, the hypothesis to formulate here can be state as: *Health care spending has a positive effect on life satisfaction, and we can expect the primary health care component being the one with a larger impact.*

This document is structured as follows: Chapter 2 makes an overview of the economic research in happiness and points out the main findings in this field. Chapter 3 presents the evolution of the health care spending in Spain, both national and regional, and its corresponding evolution of the levels of satisfaction during the period. Chapter 4 explains the methodology as well as the main variables used, and presents the econometric results and its analysis. Finally, chapter 5 ends with the main conclusions drawn from this document.

2. Review of the research in happiness and literature: an overview

Over the last years, the interest for the analysis of the subjective well-being has increased significantly among economists. This new approach challenges the former objectivist theory of the utility, which is based on choices made by individuals (revealed preferences). According to this view, these decisions and choices provide all the information needed to value individual's level of utility. The new subjectivist approach instead, takes into account the wide range of beliefs that people have about what happiness and quality of life actually is, pointing out that the observed behavior is just an incomplete indicator of individual's level of welfare. Therefore, the assumption made here is that people are, in fact, the best judges of their own quality of life. Surveys that ask directly to individuals about how satisfied are them with their quality of life or level of happiness, according to their personal circumstances or experiences, enable us to treat this data as empirical approximations of the individuals level of utility (Veenhoven, 1984). The terms usually used to describe subjective well-being are *life satisfaction* and *happiness*. Life satisfaction is usually asked as: *"Taking all things together how satisfied are you with your life as a whole nowadays?"*, with an ordinal answer. Therefore, when we talk about life satisfaction we are assuming cognitive judgments about how people feel their life as a whole. Happiness on the other hand, answers the question: *"How happy are you?",* giving an emotional response that measures people's current feelings (Clark and Senik, 2011). Both terms are the main components of the overall subjective well-being, which can be defined as 'a person's cognitive and affective evaluations of his or her life' (Diener, Lucas, & Oshi, (2002), p. 63)[3].

Today, the measurement of subjective well-being is increasingly gaining a lot of attention, not only among researches but also among politicians. Trying to measure and understand what drives people's level of happiness or life satisfaction is becoming one of the main goals in social sciences, especially in developed countries. Against what it was believed in the past, the reported level of subjective well-being is not as directly related as it was thought with income (Easterlin, 1974). This suggests thus, that instead of focusing only on the performance of the main economic indicators such as the GDP growth, level of inflation or level of unemployment, policymakers should also

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[3] Despite the technical differences between the terms, subjective well-being, life satisfaction and happiness are used as synonyms throughout the document

concentrate on those policies that may affect the subjective level of well-being, which, in turns, can contribute to other important outcomes such as productivity (Oswald, Proto and Sgroi, 2014) or better health (Siahpush (2008) and Veenhoven (2008b)).

The need to incorporate this new dimension into the indicators of economic progress has raised a lot of initiatives during the beginning of this century. In 2005, and inspired by the philosophy of the Bhutan's Kingdom, the International Institute of Management (U.S.) launched the Gross National Happiness index (GNH)[4], also known as the Gross National Well-being (GNW), which was the first of its kind combining subjective measures (satisfaction) and objective data (economic indicators), tracking 7 different areas of wellness. This index set the first framework for future research combining both subjective and objective data, going one step further compared to others development indexes that already went beyond the simple measure of the GDP (e.g. HDI). In 2008 the French president Nicolas Sarcozy, assessed by two Nobel Prizes[5] under the name 'The Quality life Comission', announced a revolutionary plan to include happiness and well-being among the key indicators of economic progress[6]. According to him, the standard measures of growth ignore some other factors vital to the well-being of the population: "GDP statistics were introduced to measure market economic activity. But they are increasingly thought of as a measure of societal well-being, which they are not." A year later, and because of the success of the initial conference in 2007, the European Commission released its own road map under the initiative 'GDP and beyond'[7]. Most recently, in 2011, the OECD released the Better Life Index (BLI) along with the report "How is life?". This index covers 40 countries, including all OECD members, and analyzes the situation of 11 different social areas, such as living conditions, provision of public services, work-life balance or life satisfaction. The next year, the United Nations released the 'World Happiness Report', a global survey that scores and ranks 156 countries by their level of happiness. Many other initiatives have been launched at a national level by different countries; all of them aimed to measure and include happiness in their measurement of national wealth[8].

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[4] See disambiguation with the GNH Bhutan index (1972): http://gnh.institute/gnh-index-gnw-index/gnh-vs-gnw-gnh-2.htm

[5] Joseph Stiglitz (2001) and Armatya Sen (1998)

[6] Samuel, H. (2009) *"Nicolas Sarkozy wants to measure economic success in 'happiness'"* http://www.telegraph.co.uk

[7] See http://ec.europa.eu/environment/beyond_gdp/background_en.html for more detailed information

[8] To see the full timeline: http://gnh.institute/happiness-economics/happiness-economics-timeline-milestones-history.htm

The economic research in happiness has provided many important insights so far, pointing out some key determinants of the subjective well-being. Easterlin (1974, 1995, 2001) found that income growth did not correlate as close as it was expected with the individual's level of satisfaction, stating that even though the richer individuals within a society tend to report highest levels of satisfaction, this did not hold at a country level. This, also known as the 'Easterlin paradox´, basically meant that continuous increases in the level of real per capita income did not led to higher levels of satisfaction in a country. Veenhoven (2003) did not find evidence of the paradox. Later on, Stevenson and Wolfers (2008) reconsidered the ´Easterlin paradox´, concluding that subjective well-being increases but slowly than real per capita income does. Oswald (1997) found that for US satisfaction seems to rise as the real income does, but that the contribution is so small that sometimes difficult to detect. Oswald (1997) also said that governments should first fight the amount of joblessness in the economy since unemployment seems to be a larger source of unhappiness. Di Tella, MacCulloch and Oswald (2003) showed that macroeconomic fluctuations have a noticeable effect on the overall level of happiness of nations. After controlling for a wide range of personal and regional characteristics, they found that the level of subjective well-being stands significantly correlated with both the level and change in GDP per capita, the rates of inflation and unemployment, and that there is constant gap between employed and unemployed people. Di Tella *et al* (2003) also found that cost of recessions were large, since the fall in the level of happiness during these periods extended beyond the decline of those macroeconomic variables. Welsch and Kühling (2015) analyzed, from data of 25 OECD countries, how the crisis of 2008 - 2009 had affected the subjective well-being. They conclude that GDP growth, level of unemployment and inflation do affect the overall level of satisfaction, being the first the one that has more impact. Using data for Spain, which is the same case of this thesis, Gamero (2009) found that, in contrast to previous studies treating macroeconomic variables, the level of unemployment and inflation had a positive effect on happiness in Spain, for the period 1999-2004. He attributes these results to a 'comparative effect' for the case of unemployment[9]: employed people value more their situation when unemployment is high in the region in which they belong; and a 'monetary illusion' for the case of inflation: people do feel richer when see their wages increase, even though that does not mean an increase in the purchasing power.

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[9] Unemployed people are not included in this study. Therefore, these results could be different in their case.

Some other studies analyze the relationship between individuals' own satisfaction and the level of income of a reference group (see e.g. Ferrer-i-Carbonell (2004) or Georgellis, Tsitsianis and Ping Yin (2009)), showing a negative correlation between the increase in income of the reference group and one's level of well-being. Other paths of research have also focused on how life satisfaction responds to environmental and quality life conditions, also externalities. Higher levels of both noise and poor air quality at the workplace tend to reduce significantly the level of satisfaction (See e.g García-Mainar, Montuenga and Navarro-Paniagua (2015) or Ferreira, Akay and Brereton (2013)).

Less research has been carried out as far as the provision of public goods or the size of the welfare state is concerned, especially for the case of healthcare services. On the one hand, Veenhoven (2000), using large data of 40 countries for the period 1980-1990, finds no relation between the size of welfare state and the level of satisfaction. On the other, Bjornskov, Dreher and Fischer (2007) conclude that satisfaction decreases as government spending increases. Likewise, using data from the European Social Survey covering the years 2002-2006 Bollerman (2009) does find a negative correlation between the average level of happiness and the welfare state spending. These studies though, only measure the aggregate expenditures of the state and not any specific provision of public service, which is what individuals can observe and therefore affect their level of happiness. In this sense, Di Tella *et al*. (2003) did find a positive relationship between the level of satisfaction and the income replacement rate[10] and unemployment benefits for unemployed people. Regarding the provision of health care services, Kotakorpi and Laamanen (2007) found that excess expenditure in primary health care have a positive effect on happiness, whereas the spending on specialized health care does not. However, this study only analyzes the data of one single year (2000) and do not take into account the main macroeconomic indicators. To my knowledge, this is the only research studying the relationship between health care services and life satisfaction.

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[10] The percentage of working income that must be paid out a pension fund for retirement

3. Descriptive analysis of the data

3.1 Health care spending in Spain during the period 2002 – 2014

To begin with, the health care system in Spain is not bad, but rather the opposite. Spain possesses one of the most generous and efficient systems in the world, giving coverage to the entire population regardless of their labor status or nationality. Health care in Spain is completely free and universal, and is one of the few countries (together with Denmark and United Kingdom) that only apply a copayment for prescription medicines. In the most of the other countries, the copayment is extended to all the other health care services (including primary health care and hospital and specialized health care). The effectiveness of the system is reflected on the health indicators, which are above the European average, and some at the head (e.g. highest life expectancy at birth or the second lowest rate of mortality[11]). Spain was ranked 7th in the ranking published by the World Health Organization in their report in 2000, which evaluated 191 different countries regarding the average level of population's health (50%), quick response of the health services (25%) and fairness in financing the health care system (25%)[12]. However, the health care system in Spain has gone through tough times these last years, not only has been affected by the crisis, but also for the adjustment plan launched in 2012 by the Spanish government. The plan, whose main objective was to restore the budget deficit and align it to the European fiscal pact (signed in 2012), applied austerity measures to all the budget items, and expecting to reduce the yearly health care and education spending in 10000 M€.

The total health care spending in Spain has been following a positive trend since 2000, rising along with the GDP growth during this period. As we can see in figure 1, in 2009 the total money spent in public health care accounted for 70.560 million of Euros compared to the 38.552 of 2002. As a percentage of the GDP, the health care system has always represented around the 5 – 7%, reaching the highest rate in 2009. Despite the beginning of the crisis in 2008 the total spending on health care still raised the following

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[11] Spain health statistics:
https://www.msssi.gob.es/estadEstudios/estadisticas/inforRecopilaciones/indicadoresSalud.htm
[12] The WHO declined to rank again the different countries the following years because of the controversy and the criticism raised with the methodology used. Many other rankings have been launched by private organizations later on, such as Bloomberg (Bloomberg Health Care-efficient index, which ranked Spain 3rd in 2015) or the Health Consumer Powerhouse (Euro health consumer index, which ranked Spain in the 19th position respect 35 European countries in 2015). Obviously, not free of criticisms.

year. However, since 2010 the total spending started to fall until reach the lowest level in 2013, when it accounted for 61.760 million of euros.
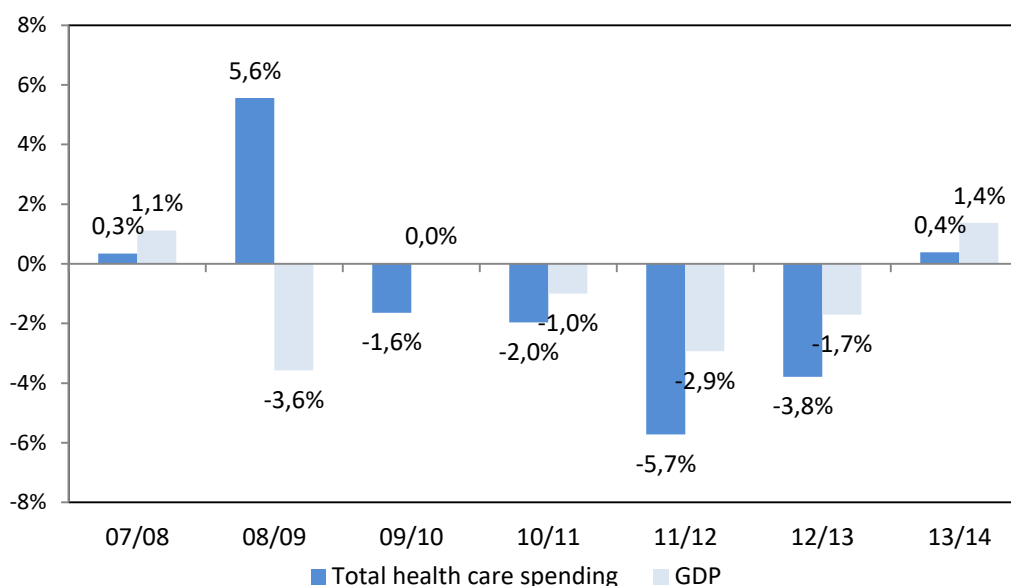
Figure 1. Evolution of the total health care spending and its share of the GDP
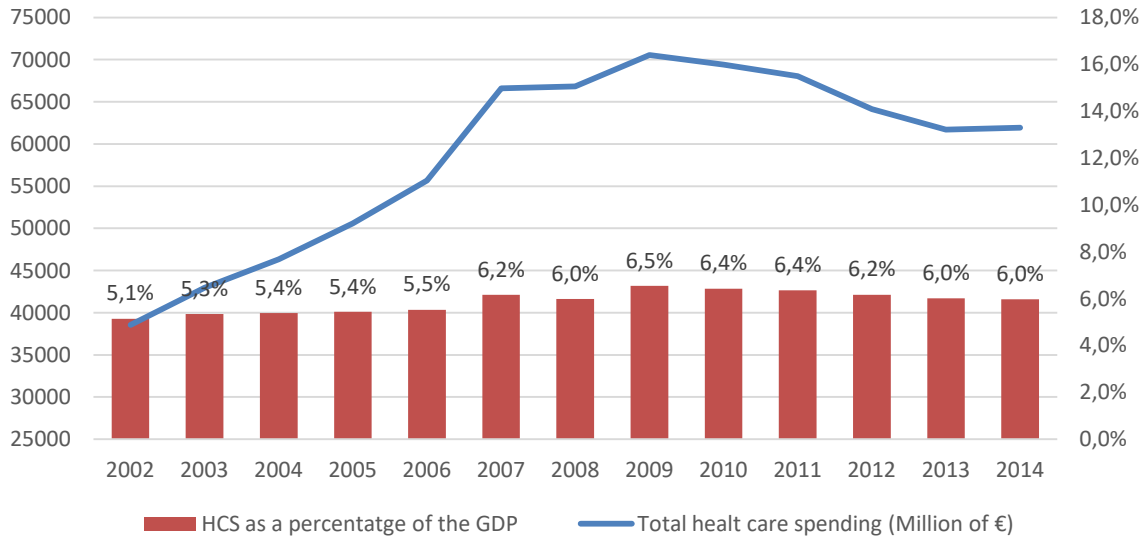
Source: Own elaboration based on data from the Ministry of Health and the National Institute of Statistics (INE)

Observing figure 2 we can see that the crisis had a negative effect on the total health care spending, even though with a lagged effect. After an increase of 5.6% in 2008/09 respect to the previous year, this fell by 1.6% and 2 % the year 2010 and 2011 respectively. However, we can see that since the year 2012, when the Spanish government announced the adjustment plan, the decrease in total health care spending was significantly affected, being reduced much more than the fall in the GDP. This situation was held the subsequent year, accounting with a reduction of the 3.8% respect of the year 2012, and with a lower increase in 2014 when the GDP growth was already recovering. This period, first conducted by the crisis and aggravated by the fiscal consolidation put under pressure the financing of the public health services, reducing in nominal terms 8800 M€ of the annual budget between 2009 (the year with the highest expenditure) and 2014 (when it stopped falling).

Figure 2. Interannual variation of total public spending on health care services and GDP growth

Table 1 shows the distribution of the health care budget of a representative year (2014) according to the functional classification. As we can appreciate, there are three components that represent more than the 90% of the total budget, which are hospital and specialized health care, pharmacy (prescriptions) and primary health care (local and primary services). By far, the first is the one that represents a greater share of the total health care budget, with a 61.4% for the year 2014.

Table 1. Representative year of the national total health care budget according to the functional classification

|	2014		
	Total spending (M€)	Percentage	
Hospital and specialized services	38.042,703	61,4%	
Pharmacy	10.388,440	16,8%	92,8%
Primary health care	9.045,442	14,6%	
Capital spending	862,227	1,4%	
Collective services	1.720,151	2,8%	
Prostheses and therapeutic devices	1.235,571	2,0%	
Public health care	652,508	1,1%	

Total	61.947,041

Source: Own elaboration based on data from the Ministry of Health.

However, the evolution of each component has been uneven. In perspective, with year 2002 as index 100, it can be appreciated in figure 3. It shows that the total spending in hospital and specialized health care has been increasing much more than pharmacy and primary health care respect to the previous years. Moreover, since the crisis and the deliberated adjustments in 2012, their performances have also been different. On the one hand, the national spending in hospital and specialized health care has been maintained, or even raised, during this period, excepting the little bump in 2013. On the other, spending on pharmacy has not only been lower compared to the other components, but has also dramatically fallen since 2009, standing at a level of 2005 the year 2014. Last but definitely not least, the item primary health care has been also quite affected during this period, reaching levels in 2014 much lower than what it was at the beginning of the crisis. It can be seen thus, that the financial adjustment has been through the pharmacy and primary components rather than the hospital and specialized health care.

Figure 3. Evolution of the 3 main components of the Health care budget during the period 2002 – 2014. Base 100 year 2002
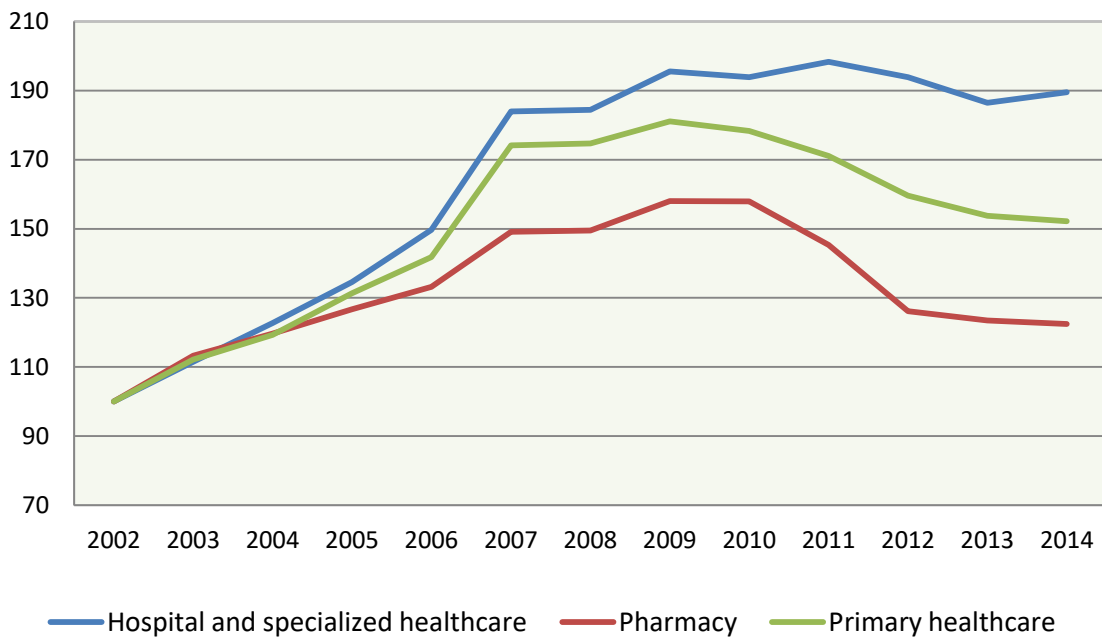
Source: Own elaboration based on data from the Ministry of Health.

Nevertheless, Spain is a highly decentralized country, which has transferred most of its competences to its regions, also known as Autonomous Communities. And the health care competence is not an exception[13]. The health care system in Spain is divided into 17 different sub-divisions (each one managed by every region). All of them controlled by the National Health System's Inter-territorial Council, whose aim is to promote the coordination, cooperation and communication among regions and the central administration and ensure the quality and equity of the health care services of the citizens around the country. According to the Constitution and the article 41 of the General Health Act every region is able to apply its competences according to its own Statute of autonomy, unless some decisions or actions have been reserved to the central government. This basically means that, even though the central government is the responsible for collecting taxes, every community can decide where to spend and invest the money that is returned according to the distribution criteria. This is a very important issue to take into account when analyzing the situation of Spain, since every region can behave very different in response of their economic situation or even for cultural or social disparities.

Figure 4 shows the variation rate between the three main components of the health care spending between 2011 and 2013. These two years are of important analysis, since they show the response of every region to the action of the central government in reducing the public spending. The cutbacks in every item have been completely different in every region. On the one side, we have those that have managed to cut as little as possible, like País Vasco, La Rioja or Galicia. On the opposite side though, we can find Illes Balears, Aragón, Comunitat Valenciana or Castilla La-Mancha, where the reduction has been significant for all three items of the regional budget. Some cases need also to be looked in detail. For instance, even though Castilla y León cut around 19% on pharmacy, only a small reduction of 2% was made in primary health care, and even increased its spending in hospital and specialized health care by 14%. Similarly, Asturias cut from pharmacy and specialized health care (23% and 16% respectively) and, in this case, gave priority to primary health care, which was increased by 18%. Stand out also how Andalucía cut mostly in primary health care while the other items remain almost the same, or how Cantabria reduced from pharmacy

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[13] Only for the regions Ceuta and Melilla the provision of health care services is directly managed by the central government

and increased specialized health care while did not touch the primary health care spending at all.

Figure 4. Variation rate between 2011 and 2013 of the 3 main components of the health care budget by region
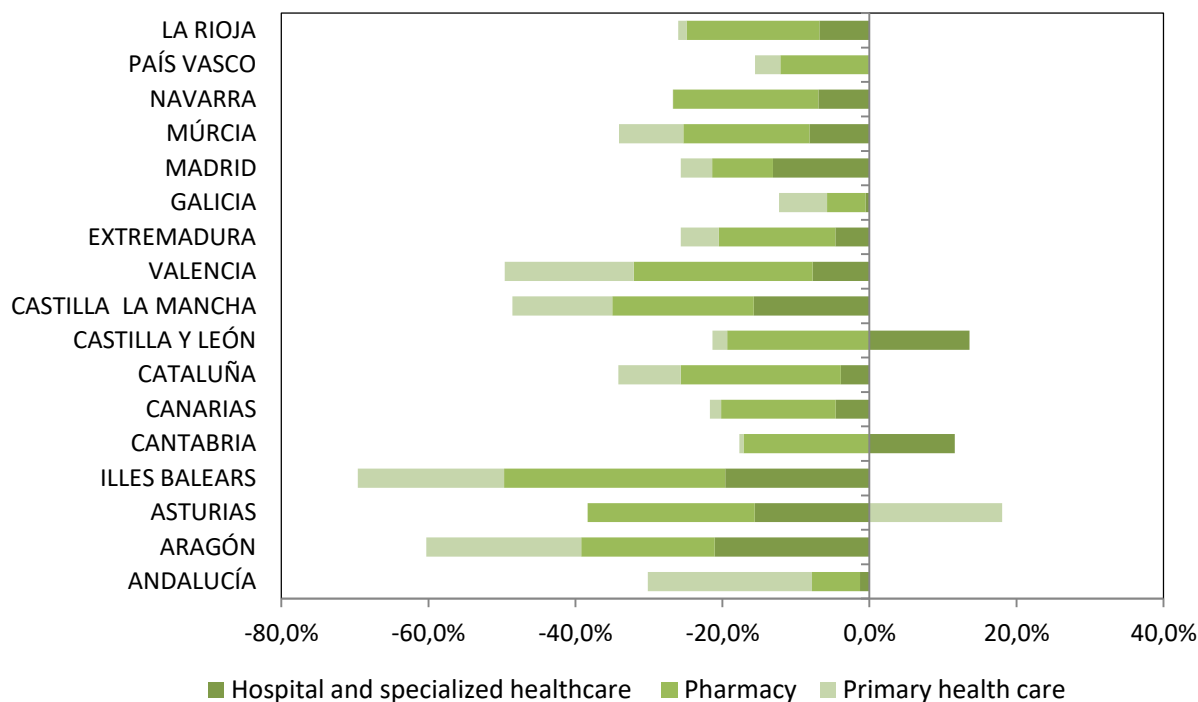
In aggregate terms, we can see that the total health care spending per capita also differs by region. Figure 5 and 6 show the total spending in public health care per capita of the different regions for the years 2009 and for the 2014 respectively. By 2009, which was the year with the higher national amount spent in health care with 70560 M€, the region with the higher spending per capita was País Vasco with 1656,7 €. The lower, was Andalucía with 1246,6 €, and the mean was set in 1521,8 €. In 2014, things had substantially changed. The healthcare spending per capita of all the regions had decreased compared to 2009 levels. País Vasco still was at the head with a decline of 4,6% respect to 2009 whereas Andalucía was the lower with a reduction of 19,7%. The average was also decreased to 1333,5 €. Notice that in 2014 almost all the regions remain in the same relative position compared to 2009. Only Cantabria avoided cutting as much as the others did, and even managed to increase its spending per capita standing above the average.

Figure 5. Health care spending per capita per region in year 2009
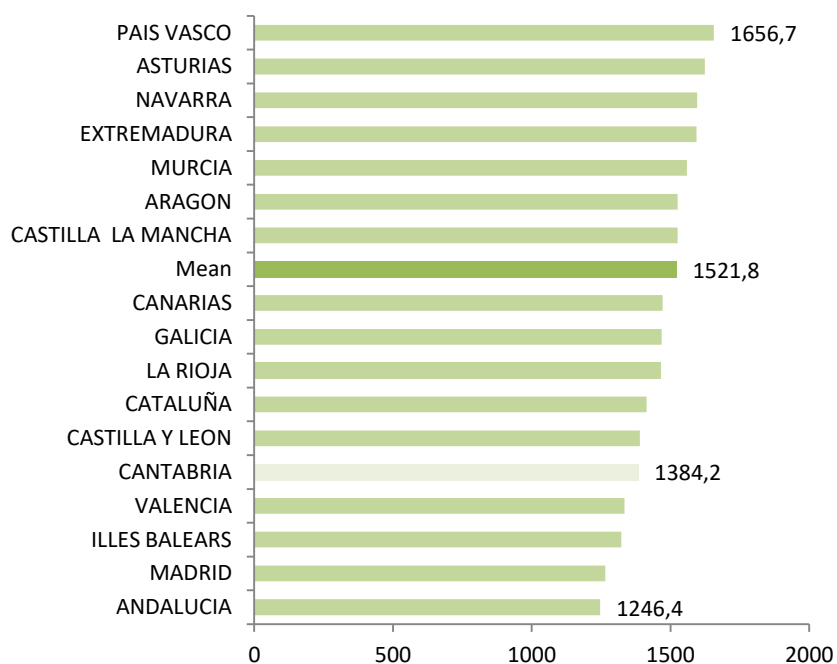
Source: Own elaboration based on data from the Ministry of Health

Figure 6. Health care spending per capita per region in year 2014

Source: Own elaboration based on data from the Ministry of Health

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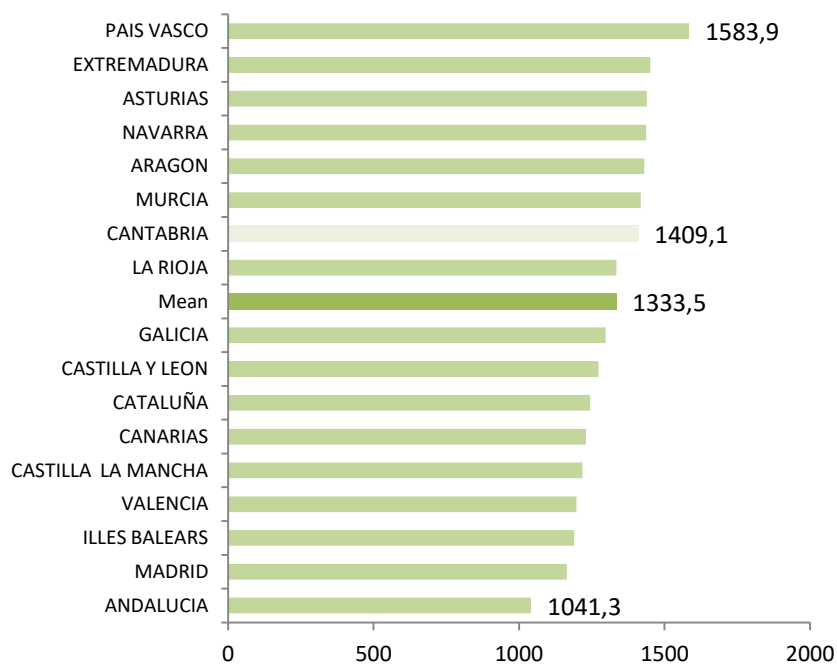
3.2 Data on life satisfaction during the period 2002 – 2014

The data used for the analysis of the subjective well-being has been extracted from the European Social Survey (ESS)[14], a survey carried out every two years since 2002. The questions asked cover a large range of topics, which go from individual and personal characteristics such as social life, labor status or subjective well-being, to topics regarding country issues, such as trust in the legal systems, politics or immigration. Regarding subjective well-being, two questions are asked: "*taking all things together, how happy would you say you are?*" and "*All things considered, how satisfied are you with your life as a whole nowadays?*" . For both questions, the respondents must answer a number within the scale 0-10, where 0 means "*extremely unhappy/dissatisfied*" and 10 "*extremely happy/satisfied*". There are more than 30 participating countries, including all the European ones. For every round, samples are randomly selected, and every individual is personally interviewed. Moreover, the data is not only at a national level but also at three different regional levels, NUTS 1, 2 and 3[15]. So far, seven rounds have been carried out [16] and the data is freely available on its database.

For the case of Spain, all 7 rounds (covering the years 2002/4/6/8/10/12/14) are available at a NUT 2 level, which corresponds to the Autonomous Community region. Between the two questions on subjective well-being, the variable chosen is *satisfaction with life*. Since the purpose here is to analyze the relationship between health care spending and subjective well-being of people, we expect cognitive judgments about how people feel their life as a whole regardless of their emotions or feelings. A total of 12993 valid cases are collected throughout the 7 rounds, with the following distribution per year:

Table 2. Number of respondents by round

	2002	**2004**	**2006**	**2008**	**2010**	**2012**	**2014**	**Total**
Respondents	1567	1566	1831	2492	1857	1822	1858	12993

Figure 7 shows the evolution the average level of satisfaction during the period 2002 and 2014 at both regional and national level. These regional averages correspond

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[14] http://www.europeansocialsurvey.org/
[15] NUT 1 correspond to the biggest regional unit and NUT 3 to the smallest one.
[16] By the time this work is written, the 8th wave (year 2016) is still not available

to the mean of the sample of every region for every year, while the national average is the mean of the all 17 regions per year. As it can be appreciated, the Spanish average level of satisfaction noticeably raised up during the period 2002 – 2006, reaching up to a grade of 7,44 this last year compared to 2002, when it was a grade of 6,91. Also of interest, is to see how the means of the all regions converge in 2006. The region with the lowest average stood at the threshold of the grade 7 and at closely the 8 threshold the region with the highest valuation. By the beginning of the crisis, the 2008 levels show that the national average slightly fell, waning to a mean of 7,26. The regional levels diverged again that year, with a big difference between the highest region (7,78) and the lowest (6,62) . In 2010, the average levels went up again, getting almost the same grades that in 2006. However, in 2012 there was the sharpest decrease of the whole period, standing the national average at a 6,96. For the next round (2014), the average slightly increased again, even though the regions' means spread again.

Figure 7. Evolution of the average level of satisfaction (national and regional)
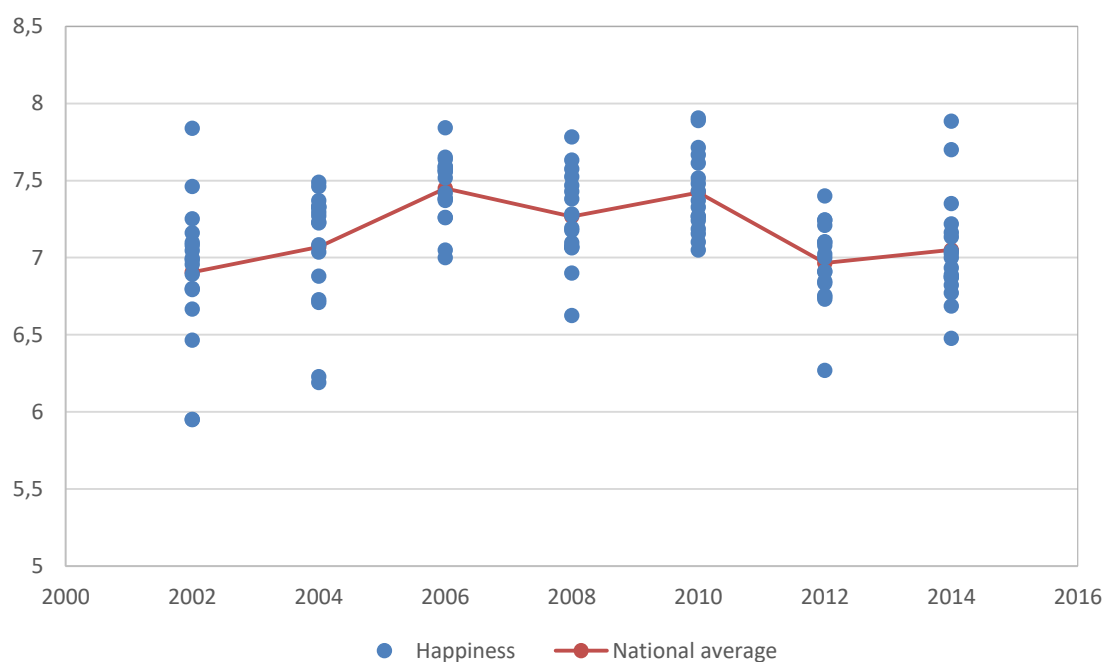
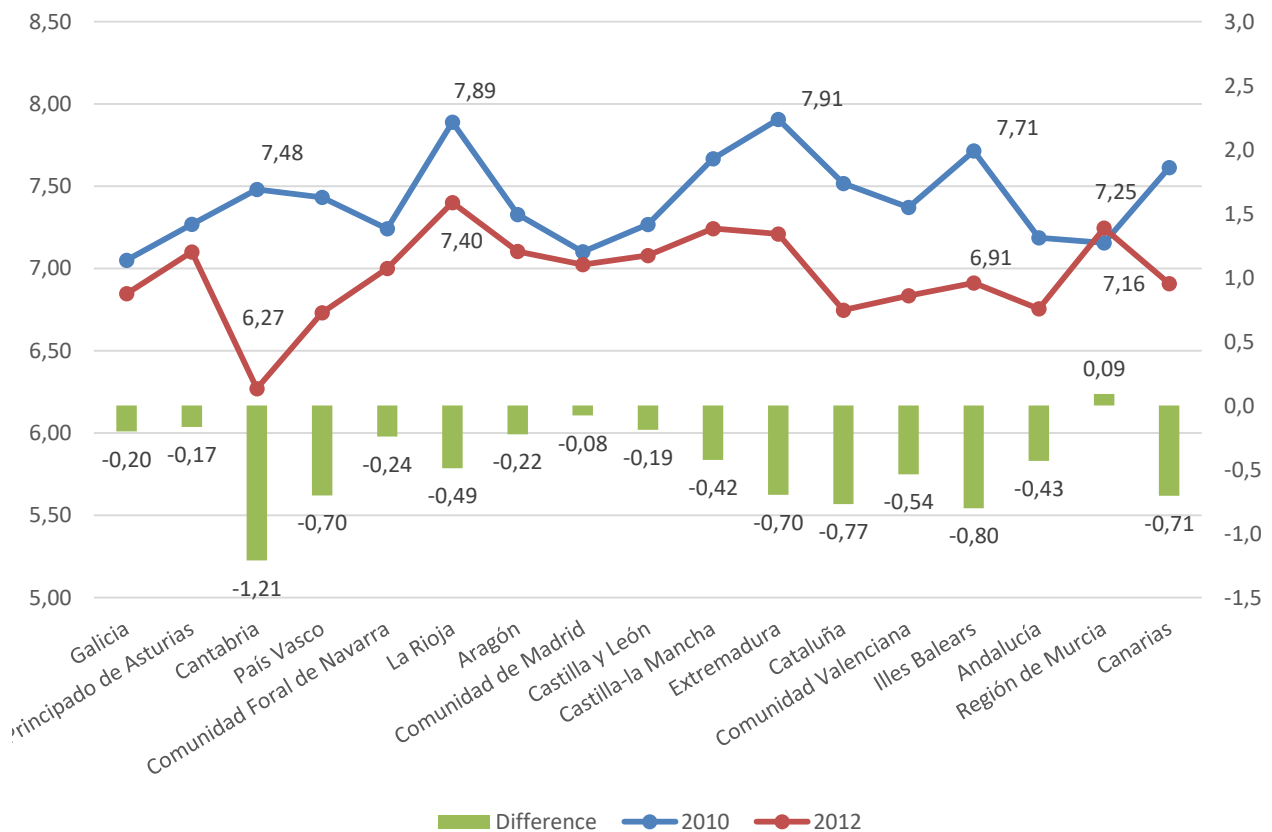**Source:** Own elaboration based on data from the European Social Survey (ESS)

The year 2012 must be looked closely, not only because it registered the strongest drop of the period, but also because it happened 4 years later after the beginning of the crisis. Figure 8 shows the different regional levels for the years 2010 and 2012. Clearly, the average level of satisfaction between 2010 and 2012 fell in all

regions (except one). For the year 2012, all regional levels are below the previous round, what denotes that the country average dropped because of all regions. The gap in some is greater than in others, such as the case of Cantabria or Illes Balears, where the difference between the two years was of 1,21 and 0,8 points respectively. Even the two regions with the highest levels in 2010, Extremadura (7,91) and La Rioja (7,89), reported levels below the 7,5 in 2012. The only region that kept almost the same level was Murcia, with an average level of 7,25 the year 2012 compared to the 7,16 of the 2010.

Figure 8. Comparison between the average levels of satisfaction for between the years 2010 - 2012


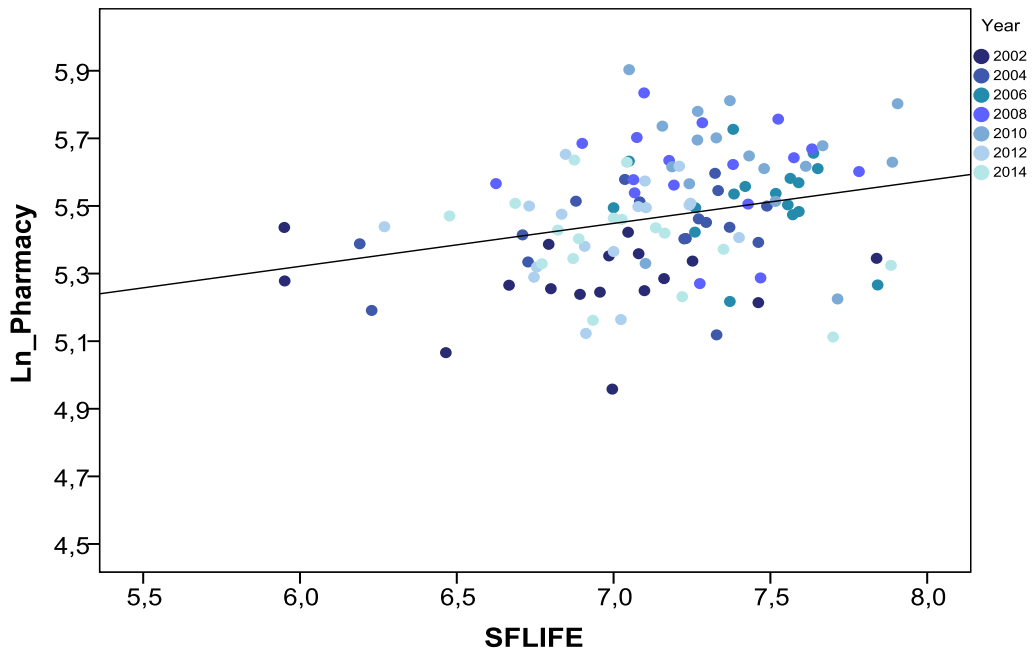**Source:** Own elaboration based on data from the European Social Survey (ESS)

Finally, in order to analyze the relationship between the levels of satisfaction and the components of the health care spending scatter plots are the best option. On the one hand, Figure 9 shows the relationship between the average level of satisfaction of every

region and year respect to the main component of the total health care spending per capita, hospital and specialized health care. In a first look, it does not seem to be a clear relationship between the two variables. Even though the slope appears slightly positive, the observations are pretty spread and the difference between the years can be easily appreciated, since the observations of the beginning of the period are significantly below to the ones at the end. Figures 10 and 11 on the other hand, show the relationship of the average level of happiness respect to the pharmacy levels and primary health services respectively. In this case, both look like to have a greater relationship with the reported average level of subjective well-being, specially the primary health care component with a steeper slope.

Figure 9. Correlation between the average level of satisfaction and the logarithm of the hospital and specialized health care spending per capita.
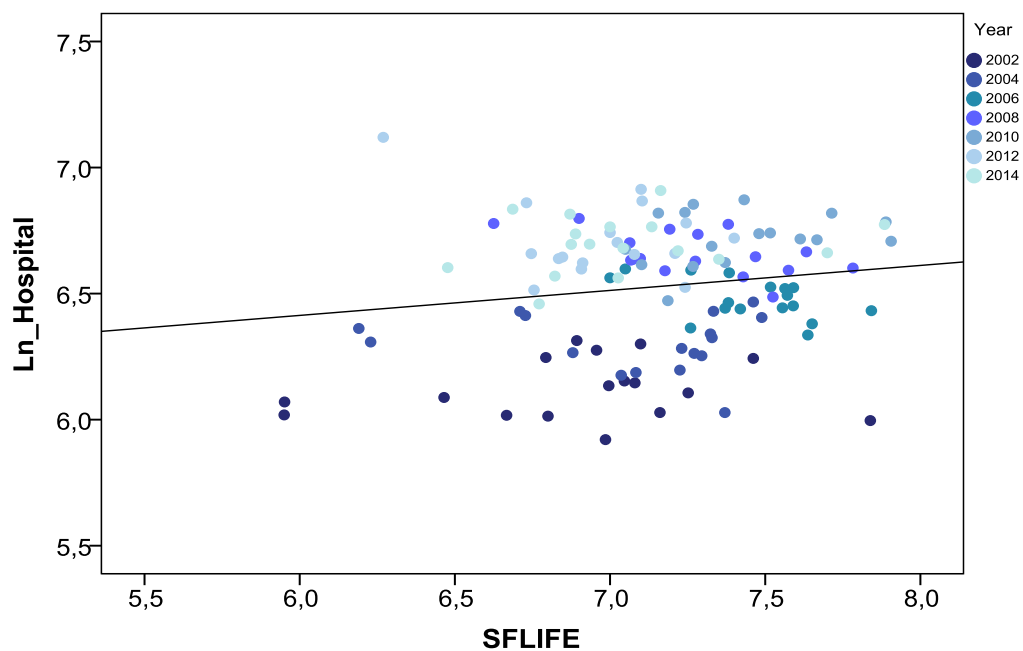
Figure 10. Correlation between the average level of satisfaction and the logarithm of the pharmacy spending per capita.
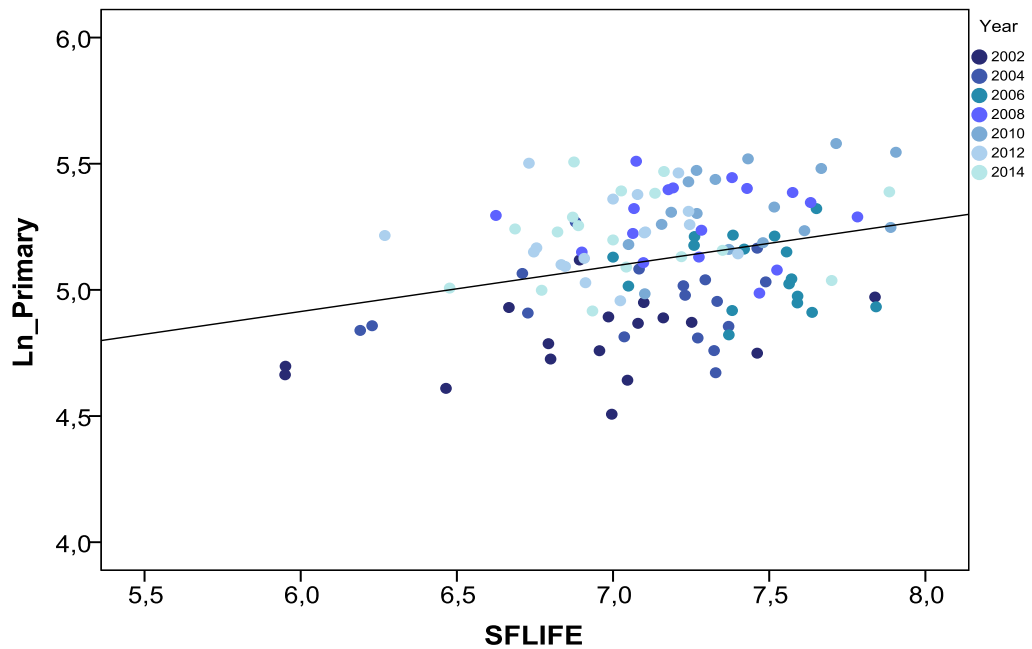

Figure 11. Correlation between the average level of satisfaction and the logarithm of the primary health care spending per capita.

Source: Own elaboration based on data from the European Social Survey (ESS) and the Ministry of Health

4. Methodology and results

4.1 Explanatory variables

The explanatory variables have been split in three main groups. On the one hand, there are the macroeconomic variables, which are the main indicators of the economic performance of the country: inflation rate, level of GDP per capita, level of unemployment and GDP growth. All the macroeconomic indicators have been sorted by region and year, in order to control for the different economic disparities among regions. On the other, there are the social characteristics of the sample of every region for every round. The main problem facing when aggregating at a regional level is the omission of the individual characteristics of the respondents. In order to solve this, and being able to extrapolate these different social characteristics at a regional level, some coefficients have been calculated, giving regional rates of the population's characteristics. Finally, there are the health care variables, which are the main objectives of study in this document: the total health care spending per capita and its components.

(i) Macroeconomic variables

Variable	*Source*	Description
Inflation_ rate	*INE[17]*	Level of inflation per region and year
Ln_GDP_per_capita	*INE*	Real GDP per capita per region and year in logarithm terms
GDP_growth	*INE*	GDP growth per region and year in real terms
Unemployment_rate	*INE*	Level of unemployment per region and year

(ii) Social characteristics

In order to try to gather inside the model the personal characteristics of the respondents, some key variables have been computed. These variables represent the percentage of respondents with that specific characteristic respect to the total number of the respondents of that region and year. The characteristics chosen are those that are more likely to affect significantly the average level of satisfaction, such as marital

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[17] Spanish acronym for the National Institute of Statistics (INE: Instituto Nacional de Estadísitca)

status, level of studies, subjective perception of one´s health and gender. These variables give regional rates for every round and for every social characteristic.

$$SC_s = \frac{k_{i,t}}{N_{i,t}} \qquad , \qquad \text{such that} \qquad k \leq N \qquad (1)$$

Where:

s is the social characteristic

k is the number of respondents with that characteristic of the region i in the round t

N is the number of the sample of the region i in the round t

Variable	*Source*	Description
Div_Wid_Sep	*ESS*[18]	Percentage of respondents that their marital status correspond to widowed/divorced/separated. (The possible answers of the question are: Married, Widowed, Divorced, Separated, Single)
University_education	*ESS*	Percentage of respondents with university studies. Here are included those with a bachelor's degree or higher. (The categories defined in the question are: Master or higher, Bachelor's degree, Post-secondary education, secondary education and primary education)
Good_perception	*ESS*	Percentage of respondents that have a good perception of their own health. Here are included those who reported: *Very good* and *Good*. (The all answers of the questions are: Very good, Good, Fair, Bad, Very bad)
Male	*ESS*	Percentage of respondents that are male

(iii) Health care variables

Variable	*Source*	Description
Ln_Health_spending	MSSSI[19]	Total spending on health care per capita (per region and year) in logarithm terms
Ln_Hospitals	MSSSI	Health care spending per capita on hospital and specialized services (per region and year) in logarithms terms

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[18] European Social Survey
[19] Spanish acronym for the Ministry of Health (MSSSI: Ministerio de Sanidad, Servicios Sociales e Igualdad)

Ln_Pharmacy	MSSSI	Health care spending per capita on pharmacy (per region and year) in logarithms terms
Ln_Primary	MSSSI	Health care spending per capita on primary health care (per region and year) in logarithms terms

4.2 The model specification

The multiple regression analysis is the method used in this document, where a range of independent variables give response to the variations of the dependent variable Life Satisfaction, which varies in a scale from 0 (the lowest level) to 10 (the highest). Therefore, the equation to run here can be expressed as:

$$SFLIFE_{it} = \beta_{0i} + \sum \beta_m Macro_{mit} + \sum \beta_s Social_{sit} + \sum \beta_h Health_{hit} + u_{it} \qquad (2)$$

Where $SFLIFE_{it}$ is the average level of satisfaction of the region i in the round t, and $Macro_{mit}$ is the vector of the different macroeconomic variables m observed for the region i in the year t, $Social_{sit}$ the vector of the different social characteristics s calculated for the region i in the year t, and $Health_{hit}$ the vector of the different health care variables h for the region i in the year t. Finally, every β represent the different coefficients for every independent variable, and u_{it} the error term for region i and year t. Taking advantage of the panel data, the model performed is a mixed model with fixed and random effects. The random effect gathers the regional characteristic, while the rest of explanatory variables are specified as fixed effects.

4.3 Results

Table 3 shows the econometric results of the equation (2). Model 1 only takes into account the macroeconomic group of variables, in order to have a first glance of the effects of the main economic indicators. In model 2, has been included the social group characteristic, which contains the different individual characteristics collected on the survey and computed at a regional level. In model 3 and 4, the variables of the health care spending haven run along with the macro and the social group. On the one side, model 3 gathers the total spending per capita on health care services, which contains the

three main components that accounted for more than the 90% of the budget and the rest of items that accounted for the other 10% (e.g. capital spending, collective services). In model 4 though, the three components have been included separately to the Macroeconomic and Social groups without the total health care spending per capita. The reason behind this is the high correlation between the components and the health care spending per capita, what can lead to multicollinearity problems on the specification of the model. Therefore, model 3 analyzes the aggregate effect of the total spending per capita, whereas model 4 studies each component independently. Finally, yet importantly, model 5 is specified with only the significant variables of the four previous models, with the purpose of confirming their robustness.

In the analysis, some significant results obtained. To start with, model 1 shows a clear relationship between the reported average level of satisfaction and three of the four macroeconomic indicators specified in the model. Supporting the literature, GDP growth and GDP per capita do affect positively the average level of happiness (see e.g. Di Tella *et al* (2003), Oswald (1997) or Welsch and Kühling (2015)). Whereas the GDP growth is significant at the 99% throughout the 5 models, the logarithm of the GDP per capita does not hold all of them. When the total spending per capita is introduced in model 3 the GDP per capita becomes not significant. However, this variable is significant on the other models, even in the last one at the 95% of confidence. When it comes to the level of unemployment stands out its positive coefficient rather than its significance, what means that life satisfaction tends to increase as the level of unemployment raises. Unemployment rate is significant and positively related to life satisfaction for all the models, regardless of the variables are included. Thus these results, can lead to the conclusion of the robustness of this variable. Inflation, on the other hand, also appears to have a positive effect on life satisfaction. Unlike unemployment though, the inflation rate only becomes significant on the 3 and 5 model. On most of the empirical literature on happiness, higher levels of unemployment tend to decrease the average level of satisfaction, even when controlling for employed status (see e.g. Welsch and Kühling (2015)), what can be described as a "fear to be unemployed". However, these results are in line with the findings of previous studies for Spain. Gamero (2009) analyzed the situation of Spain for the period 1999-2004 and came across with a positive relationship between the life satisfaction and both the level of inflation and unemployment. Even though the sample used for that study was only of

employed people it still rejects the previous findings of other studies[20], which also found a negative relationship with employed people. Gamero argues that the effect of the unemployment can be due to an "effect comparison" between employed and unemployed people (employed people feeling lucky when the level of unemployment is high) and a "monetary illusion" for the case of inflation.

Regarding the different social characteristics, it turns out that only two of the four variables seem to play an important role when explaining the variations on the aggregate level of happiness. In particular, only marital status and perception of one's health. Clearly, when the percentage of the respondents that are either divorced, separated or widowed increases the level of satisfaction falls, since its coefficient is negative. This result is in accordance with previous studies (see e.g. Ferrer-i-Carbonell (2004) or Georgellis, Tsitsianis and Ping Yin (2009)). As it can be seen in the four models where it has been included, the variable concerning marital status significantly correlated at the 99% and 95% of confidence with a negative coefficient. The result is not that clear for the variable of perception of one's own health. The variable only appears to be significant on model 4 and 5 at the 90% of confidence. However, its coefficient is positive in all the models, what means that when the percentage of people that reports feel their level of health as good or very good increase tend to also report higher rates of satisfaction. Neither gender nor university studies look like to explain any of the variations of the dependent variable, since they are not significant in any of the models. However, their negative coefficients are in line with the literature. Previous findings showed that showing that men use to report significantly lower levels of satisfaction than women do (see e.g. Di Tella *et al* (2003), Georgellis *et al* (2009) or Ferreira, Akay and Brereton (2013)). Regarding the level of studies, most of the literature do find a positive relationship between happiness and both higher levels of studies and the number of years of education (see e.g Ferreira, Akay and Brereton (2013) or Di Tella *et al* (2003)). In contrast, the results of the model are in line with Georgellis *et al* (2009) that found that university education affects negatively on happiness. According to Georgellis *et al* (2009), one reason to this result might be the non-fulfillment of the expectations raised by higher education. They also suggest that the effect of education on happiness could be through other channels, since higher level

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[20] Further research must be carried out in order to determine the deviation of these results for Spain. Over the last years Spain has been characterized for high levels of unemployment and has had difficulties to control inflation.

of studies tends to increase income and wealth, what do have a positive effect on satisfaction.

Looking at the models that include the health care variables, which are the main objectives of analysis in this work, some interesting conclusions can be drawn. First, model 3 includes the total health care spending per capita along with the group of macroeconomic and social variables, and the aggregate spending appears to be highly correlated with the variations on the level of happiness at the 99% of confidence. With a positive coefficient, this result leads us to conclude that the average level of health care spending does have a positive impact on the reported level of satisfaction and, therefore, its provision does matter to people. When analyzing the components separately, only the spending per capita on pharmacy services and primary health care are significant correlated with the dependent variables, at the 95% and 90% respectively. As it was expected from the theory only those variables that can be easily appreciated by the population are the ones affecting their level of satisfaction. Even when including them with the significant variables in model 5, both still are significant at the same levels. According to the results, hospital and specialized health care spending apparently has nothing to do with the average level of satisfaction of people. Even more, its coefficient turns out to be negative, what would mean that excess expenditures on hospital and specialized health care could drive to unhappiness. These results are also supported by the literature. Kotakorpi and Laamanen (2007) analyzed the expenditures on health care services in Finland at a municipal level using data of the year 2000 and reached the same results. While the expenditures on the provision of primary health care appeared to be positively correlated with satisfaction, specialized health care did not. This relationship between local health care spending and satisfaction could have noticeable implications for policymakers, since if the goal of the government is to improve the country's level of satisfaction it is clear that decreasing local health care spending in front of fiscal imbalances is not the best option.

Table 3. Results

	Life satisfaction				
	(1)	(2)	(3)	(4)	(5)
Macroeconomic variables					
Inflation rate	0,027	0,019	**0,055****	0,040	**0,052****
	(0,027)	(0,027)	(0,027)	(0,028)	(0,025)
GDP growth	**6,818*****	**7,922*****	**11,596*****	**9,448*****	**9,512*****
	(2,580)	(2,517)	(2,466)	(2,477)	(2,353)
Ln GDP per capita	**0,572*****	**0,557****	0,334	**0,631****	**0,563****
	(0,214)	(0,232)	(0,226)	(0,275)	(0,203)
Unemployment rate	**0,016***	**0,018****	**0,018****	**0,008****	**0,018****
	(0,009)	(0,009)	(0,008)	(0,010)	(0,008)
Social characteristics					
University education		-0,241	-0,232	-0,254	
		(0,517)	(0,487)	(0,478)	
Divorced-Separated-Widowed		**-2,115*****	**-1,572****	**-1,767****	**-1,420****
		(0,709)	(0,681)	(0,681)	(0,643)
Good perception of health		0,556	0,568	**0,582***	**0,593***
		(0,368)	(0,346)	(0,342)	(0,342)
Male		-0,751	-0,663	-0,643	
		(0,463)	(0,436)	(0,427)	
Health care					
Ln Total spending per capita			**0,840*****		
			(0,215)		
Ln Hospitals				-0,125	
				(0,289)	
Ln Pharmacy				**0,525****	**0,488****
				(0,247)	(0,222)
Ln Primary				**0,417***	**0,397***
				(0,218)	(0,209)
Constant	1,069	1,489	-2,476	-3,634	-3,842
	(2,281)	(2,411)	(2,486)	(2,681)	(2,626)
AIC	128,624	120,0399	108,8988	108,837	106,7586

Notes: standard errors in parentheses. Significance: ***0.01,**0.05,*0.1

5. Conclusions

This work has attempted to study the evolution of the health care spending in Spain during a period of 12 years and its effect on the average level of satisfaction. On the one hand, the descriptive analysis has shown that the Spanish health care system has suffered a significant decrease on the resources over the last years, and that the response has indeed differed among its regions. On the other, the econometric results show that total health care spending per capita do have a positive effect on the reported level of satisfaction over time, and that this effect is conducted by the local services, pharmacy and primary health care. In particular, the pharmacy spending seems to be more correlated than primary health care, since it is more significant in the model. Instead, hospital and specialized health care does not seem to explain the fluctuations of satisfaction over time. In aggregate terms thus, it can be stated that people do really care about the health care spending, and especially for those services more often used. Regarding the different social characteristics included, marital status and the subjective perception of one's health play an important role on the reported level of satisfaction. Finally, when it comes to the main macroeconomic variables, there is no doubt that the economic performance of the region also matters to people. Both higher levels GDP per capita and GDP growth do have a positive impact on satisfaction over time. In contrast, the level of unemployment and inflation come up with a strange result, difficult of giving a rational explanation. According to the results of the model, both variables are positively correlated with satisfaction over time. However, more research must be carried out in order to understand the results of these two variables, given the economic situation of Spain during this period.

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<u>Data sources:</u>

European Social Survey

http://www.europeansocialsurvey.org/

Instituto Nacional de Estadística

http://www.ine.es/

Ministerio de Sanidad, Servicios Sociales e Igualdad – Banco de datos

https://www.msssi.gob.es/estadEstudios/estadisticas/bancoDatos.htm

7. Appendices

Appendix A

Table A1. Average level of satisfaction

Round	1	2	3	4	5	6	7
Galicia	7,05	7,32	7,38	7,10	7,05	6,85	7,04
Asturias	6,79	7,33	7,05	7,28	7,27	7,10	6,69
Cantabria	6,96	6,73	7,00	7,78	7,48	6,27	6,87
País Vasco	7,10	6,71	7,38	7,38	7,43	6,73	7,16
Navarra	6,89	7,46	7,26	7,19	7,24	7,00	7,88
La Rioja	6,80	7,23	7,57	6,63	7,89	7,40	6,89
Aragón	7,08	7,49	7,56	7,63	7,33	7,10	7,13
Madrid	7,00	7,33	7,37	7,47	7,10	7,02	6,93
Castilla y León	6,67	7,08	7,52	7,18	7,27	7,08	7,03
Castilla-la Mancha	6,99	7,37	7,42	7,58	7,67	7,24	6,82
Extremadura	7,84	6,88	7,65	7,07	7,91	7,21	6,88
Cataluña	7,25	7,30	7,56	7,07	7,52	6,75	7,22
Comunidad Valenciana	5,95	7,04	7,64	7,52	7,37	6,83	6,48
Illes Balears	6,47	6,23	7,84	7,28	7,71	6,91	7,70
Andalucía	7,16	7,23	7,26	7,43	7,19	6,75	6,77
Región de Murcia	5,95	7,27	7,59	6,90	7,16	7,25	7,00
Canarias	7,46	6,19	7,59	7,06	7,61	6,91	7,35
Total National	6,91	7,07	7,45	7,27	7,42	6,96	7,05

Table A2. Total health care spending per capita

	2002	2004	2006	2008	2010	2012	2014
Galicia	863,7	1041,7	1182,1	1378,8	1420,7	1276,4	1297,2
Asturias	924,1	1110,0	1258,8	1443,6	1553,8	1545,9	1439,5
Cantabria	977,1	1199,5	1358,0	1330,4	1456,0	1770,0	1409,1
País Vasco	961,5	1095,3	1266,4	1542,0	1653,1	1582,0	1583,9
Navarra	994,0	1141,5	1262,7	1473,3	1572,0	1436,5	1436,4
La Rioja	867,9	1057,3	1495,2	1477,1	1458,8	1308,9	1334,9
Aragón	889,5	1099,6	1238,6	1419,9	1481,7	1524,1	1429,9
Madrid	760,2	906,7	1022,8	1184,7	1153,2	1192,9	1164,1
Castilla y León	839,0	1023,2	1264,4	1422,0	1420,7	1367,3	1273,1
Castilla-la Mancha	827,9	872,7	1213,1	1400,1	1532,5	1244,5	1217,4
Extremadura	894,6	1063,4	1251,3	1520,1	1572,4	1411,5	1451,6
Cataluña	853,1	966,6	1140,5	1338,2	1429,4	1265,0	1243,9
Valencia	807,6	943,5	1080,9	1237,3	1364,1	1223,3	1197,5
Illes Balears	796,6	946,4	1091,5	1240,9	1543,7	1171,0	1189,0
Andalucía	789,6	918,5	1052,4	1261,8	1205,5	1100,2	1041,3
Murcia	823,1	994,0	1145,6	1489,5	1538,3	1444,3	1418,1
Canarias	916,2	1038,3	1206,0	1420,2	1389,4	1203,8	1229,5

Picture A3. Questions regading happiness and life satisfaction of the questionnary in the 7th round (2014) asked in Spain.
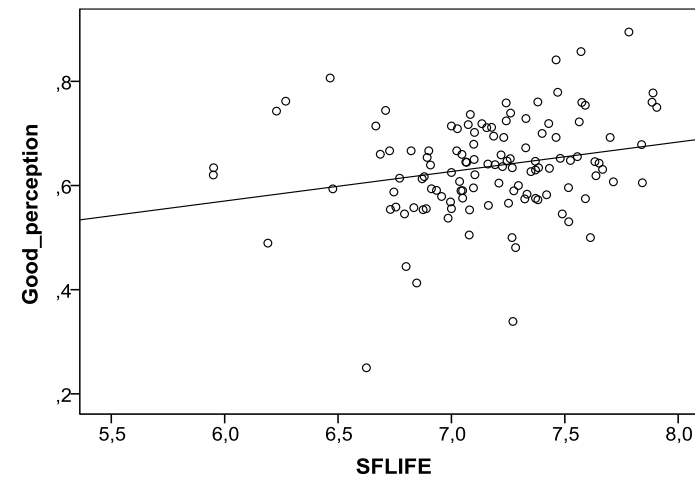
Appendix B

Table B1. Correlation between the explanatory variables

		1	2	3	4	5	6	7	8	9	10
1	**Inflation_rate**										
2	**GDP_growth**	0,535									
3	**Ln_GDP_per_capita**	0,102	0,240								
4	**Unemployment_rate**	0,426	0,678	0,670							
5	**University_education**	-0,176	-0,167	-0,366	-0,264						
6	**Div_Wid_Sep**	0,185	-0,019	-0,103	-0,096	-0,068					
7	**Good_perception**	-0,031	-0,056	-0,136	-0,039	0,217	0,178				
8	**Male**	0,174	-0,066	-0,018	-0,016	-0,004	0,299	0,010			
9	**Ln_Hospital**	0,386	0,310	-0,550	-0,171	-0,022	0,156	0,041	0,021		
10	**Ln_Pharmacy**	-0,194	-0,089	0,485	0,278	-0,033	-0,175	0,083	0,015	-0,436	
11	**Ln_Primary**	0,078	-0,005	-0,109	-0,170	0,047	0,176	-0,106	0,014	-0,282	-0,425

Appendix C

- Scatter plots between the social variables and the level of satisfaction
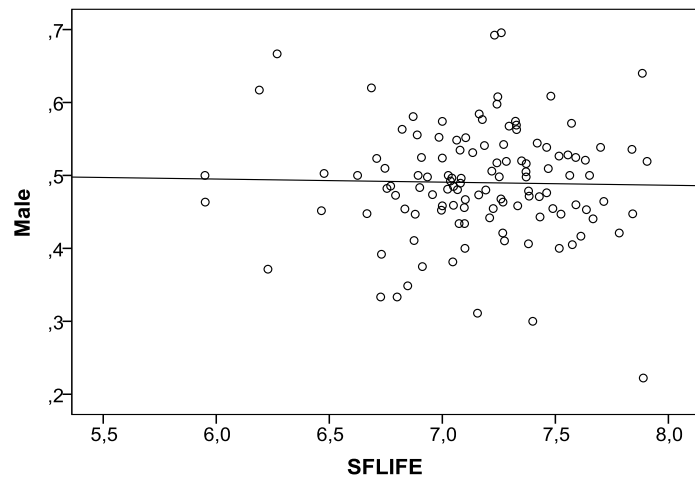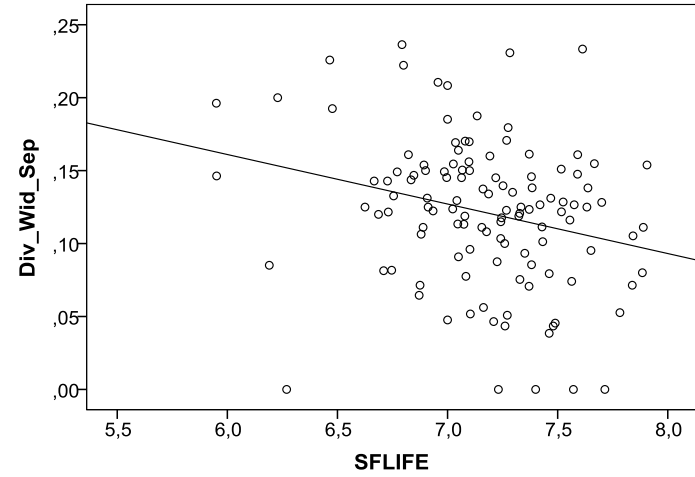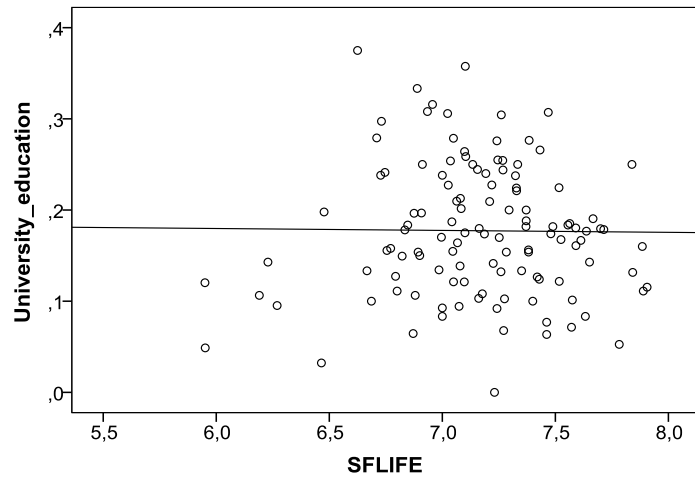
- Scatter plots between the macroeconomic variables and the level of satisfaction