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Public Health Expenditure and Life Expectancy: A Healthy Investment

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During the financial crisis and subsequent economic recession, life expectancy in Spain continued its growth trend, rising from 82.3 years in 2008 to 82.92 years in 2014. However, in a context of low mortality rates, it is also important to know about the evolution of time in which we live in good and bad health. Spain's great regional heterogeneity and its decentralised public health system make it possible to observe how a variety of regional economic and sociodemographic factors may be associated with changes in health indicators. In this study, we analyse the evolution of years lived with and without the most prevalent and disabling health conditions after the age of 50 in 17 Spanish Autonomous Communities in order to understand their association with several macro socioeconomic factors, public provision of health services, public health expenditure, and health-related behaviours. The period of analysis is from 2006 to 2019 in order to cover the phases of expansion, crisis, and economic recovery that the country has experienced in the recent years. The results show that per capita public health expenditure is one of the components that most clearly explains health differences between regions; and higher public health expenditure means more years lived in good health and fewer years lived in bad health.

Where do people live longer and where do they live better?

During the recent economic recession (2008 – 2014), life expectancy in Spain continued to rise and, in the first years, the biggest gains in terms of mortality were seen among the more disadvantaged social classes (Regidor et al.., 2016). This may seem paradoxical because, at the individual level, having a higher socioeconomic status is associated with better health. However, during an economic crisis, there are collateral effects, as a reduction in occupational and traffic accidents, which have a positive impact on the population's life expectancy. At
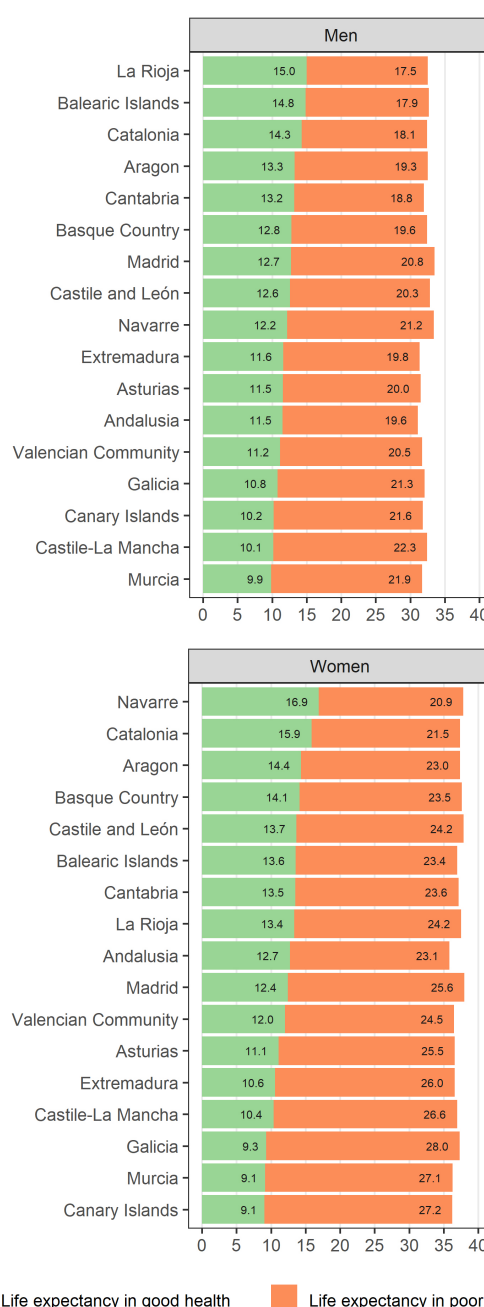
Figure 1. Life expectancy in 2019 with and without chronic health conditions by AC, for men and women
**Source:** European Health Interview Survey 2019 and INE

the same time, although life expectancy is a widely used indicator for measuring the level of health of a population, in the context of low mortality rates, as occurs with Spain, a greater longevity may mean more years lived in bad health. It is therefore important to measure, in addition, the number of years in which people are expected to live in good and bad health.

In an earlier study (Zueras and Rentería, 2020) we showed that, in Spain, life expectancy in good health had not progressed as positively as life expectancy per se among people aged 65 and over. Years lived in good health showed moderate improvement between 2006 and 2012, followed by stagnation until 2017, with widening differences between the Autonomous Communities (AC). This increasing heterogeneity of life expectancy of good and poor health by AC occurred in a context of a financial crisis that had a major impact on the socioeconomic level of individuals and also on the allocation of public resources. Given the decentralisation of Spain's health system, and the various public expenditure strategies adopted during the crisis, the temporal pattern suggests that not all the ACs recovered at the same rate from cuts in the public health services between 2009 and 2014.

In this context of great regional heterogeneity and decentralisation of the public health system, we aim to discover how these health indicators (life expectancy in good and bad health) are associated with factors at the macro level of each region during a period of expansion, crisis, and economic recovery, looking back over a period of 14 years (from 2006 to 2019). In order to do this, we estimate life expectancy at the age of 50, and years lived with and without the most prevalent and limiting chronic health conditions that have already been considered in previous studies: asthma, cancer, chronic back pain, chronic obstructive pulmonary disease, coronary heart disease, diabetes, hypertension, myocardial infarction, and stroke. The health data we use come from six national and European health surveys (2006, 2009, 2012, 2014, 2017, and 2019) and the mortality data are those provided by the Spanish National Institute of Statistics (INE). When considering macro factors, we use indicators of socioeconomic levels, public provision of health services, public health expenditure, and prevalence of health-related behavioural factors in 17 AC (not including Ceuta and Melilla) (Rentería and Zueras, 2022). When speaking of healthy life expectancy (HLE), we refer to the years in which a person is expected to live after a certain age without any of the chronic health conditions listed above. Unhealthy life expectancy or years lived with poor health (UHLE) will therefore be the number of years that a person is expected to live with one or more of these conditions, and the sum of HLE and UHLE will give life expectancy (LE).

Figure 1 shows the diversity among AC in terms of HLE and UHLE at the age of 50 in 2019. Those regions with higher LE are not always the ones that present more years of life in good health. For example, the CA with the highest LE for men at the age of 50 is Madrid (33.5 years) but, when ranked in terms of years of life lived in good health, it is ranked seventh (with 12.2 years). The figure captures considerable inequalities among the regions, and these become more pronounced when HLE and UHLE are compared. While the
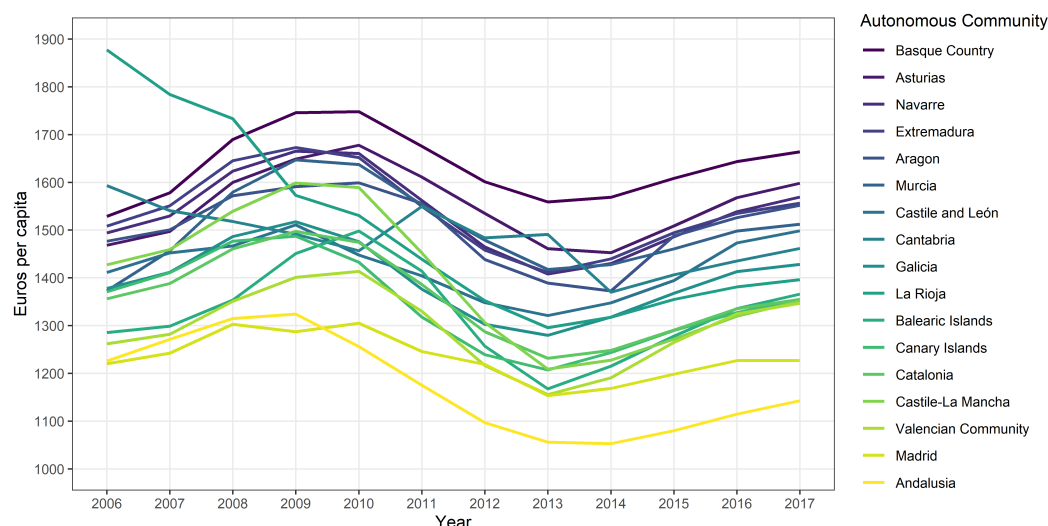
Figure 2. Evolution of public health expenditure by AC 2006-2019 (moving averages)
Source: Ministerio de Sanidad

difference between the regions with the highest and lowest LE is 2.4 and 2.1 years for men and women respectively, the greatest difference of the regions with the most and least years in terms of HLE is 5.1 years (men) and 7.8 years (women). The differences between the AC in terms of UHLE are also greater than they are for LE, with 4.8 years for men and 7.1 years for women.

## Regional differences in public health expenditure

Spain is characterised by a public health system that has been decentralised in favour of the regional administrations (AC) since 2002. The financial crisis of 2008 had a major impact in the Spanish public economy with effects that, spreading over time, led to readjustments in public finances. Between 2009 and 2014, cuts in public expenditure also affected public health expenditure throughout Spain, although with significant differences between the regions.

Figure 2 shows the evolution of per capita public health expenditure—in constant annual values (2015 euros)—in Spain's different ACs. Per capita expenditure levels differ greatly by region with the highest values exceeding the lowest values by as much as 50%. However, the time trends are similar and show two clear turning points. Although the onset of the changes in the different regions may differ by a

few years, public expenditure rose until about 2008-2010, after which it decreased until 2013-2014, when it began to rise again until the present. The two exceptions to this trend are La Rioja and Cantabria where the decline in per capita health expenditure has been observed since 2006. However, these are two smaller regions where per capita indicators are more sensitive to population changes. In 2012-2014, most regions showed the lowest levels of the period owing to public health cuts that began in around 2008-2010. In 2017-2019, although health expenditure recovered from 2013-2014 onwards, many AC had not yet reached the real values of 2008-2010.

Macro regional factors that explain changes in life expectancy in good and poor health

In order to ascertain whether there is a relationship between the evolution of public health expenditure and time lived without and with chronic health conditions, we produced a model in which we control for various factors at the macro level of the Spanish AC. We chose various socioeconomic indicators, health expenditure data, indicators of services and human resources in health, and information about individual health-related behaviour. In the final model we only included indicators that were statistically significant
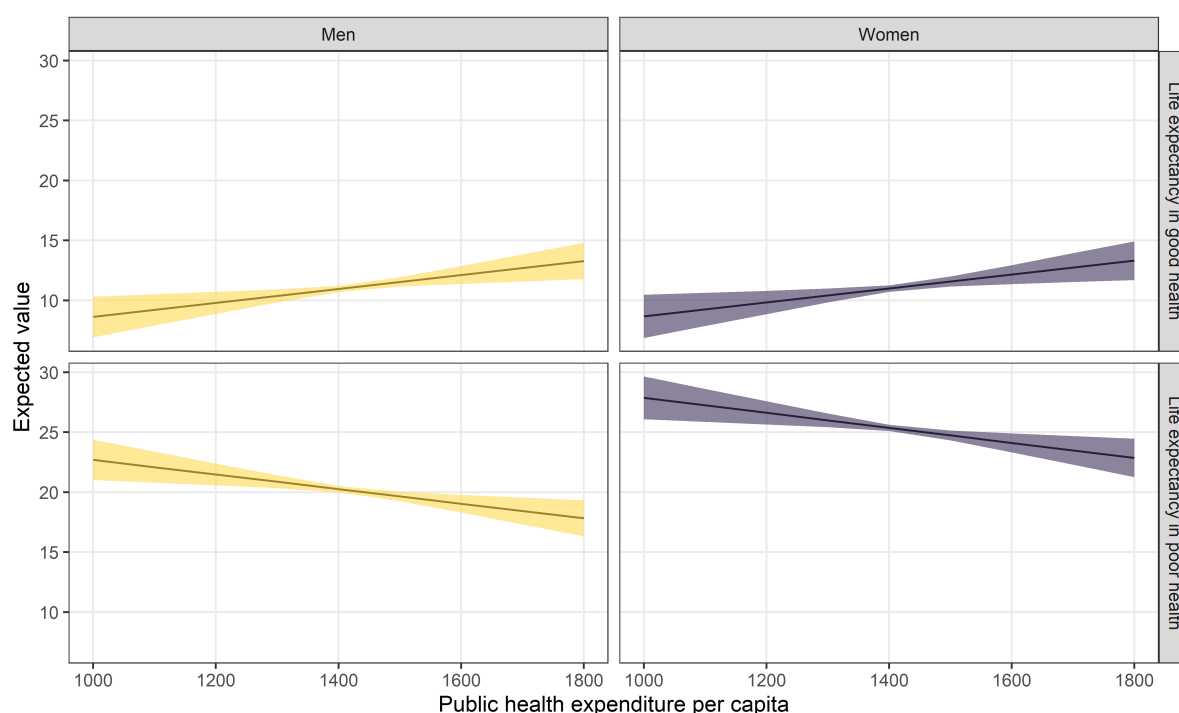
Figure 3. Correlation between HLE/UHLE and public expenditure per capita, men and women
Source: Author's calculations

in the pairwise correlation with the health measures (HLE and UHLE), these being: GDP per capita, unemployment rate among people over 55 years old, percentage of the population aged 50 years and over with primary education or less, public health expenditure per capita, public hospital expenditure per capita, public primary care expenditure per capita, number of specialist doctors per 1,000 inhabitants, number of specialist nurses per 1,000 inhabitants, and percentage of the population aged 50 years with obesity. We ran a fixed effects model for men and another for women, and for each measure of health. Although all the above variables showed an association with HLE and UHLE, when all were included together, the only variable that was significant in all models was public health expenditure. This showed that the higher the public health expenditure per capita, the greater the number of years lived without illness (HLE) and the lower the number of years lived in poor health (UHLE). Likewise, hospital expenditure per capita presented the same association as public health expenditure for both sexes but only in the case of HLE.

Figure 3 shows the expected value of the correlation between public health expenditure per capita and HLE and UHLE, for men and women with their corresponding confidence intervals. This correlation controls for all the other macro factors we include in the model. Based on what is observed for these 14 years, the model estimates that spending 800 euros in public health, per person, translated into at least 1.5 more years of life in good health at the age of 50 for men, and 1.2 years more for women. In the case of poor health, an extra expenditure of 800 euros would mean 1.7 fewer years of life in poor health for men, and 1.6 fewer years for women.

Spending more on public health increases years of life in good health

In this study we measured the years lived with and without chronic health conditions at the age of 50 in Spain's AC and analysed the factors that might explain the differences in these measures across the territory. Among all the macro indicators we used, the most consistent was per capita public health expenditure, the growth of which was truncated with the financial crisis. The temporal and regional differences in the application of this health expenditure seem to be associated with the fluctuations observed in years lived in good and poor health, so that higher per capita health expenditure means more years of life expectancy in good health and fewer years of life expectancy in poor health, in the period observed. It can therefore be argued that health management at the regional level has a significant impact on the prevalence and prevention of disease among people of mature and advanced ages, and this should be duly considered when designing public policies aiming to reduce the burden of disease in the population. Lest there be any doubt, health expenditure is a healthy investment.

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