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Review

Health, economic crisis, and austerity: A comparison of Greece, Finland and Iceland

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ABSTRACT

Reports have attributed a public health tragedy in Greece to the Great Recession and the subsequent application of austerity programs. It is also claimed that the comparison of Greece with Iceland and Finland—where austerity policies were not applied—reveals the harmful effect of austerity on health and that by protecting spending in health and social budgets, governments can offset the harmful effects of economic crises on health. We use data on life expectancy, mortality rates, incidence of infectious diseases, rates of vaccination, self-reported health and other measures to examine the evolution of population health and health services performance in Greece, Finland and Iceland since 1990–2011 or 2012—the most recent years for which data are available. We find that in the three countries most indicators of population health continued improving after the Great Recession started. In terms of population health and performance of the health care system, in the period after 2007 for which data are available, Greece did as good as Iceland and Finland. The evidence does not support the claim that there is a health crisis in Greece. On the basis of the extant evidence, claims of a public health tragedy in Greece seem overly exaggerated.

1. Introduction

There is a strong interest in the public health literature to assess the effects on health of the Great Recession—which started in the late years of the past decade and painfully lingered in a number of European countries. Somewhat surprisingly, some studies have referred to very harmful effects of the Great Recession on health and health care in the European countries [1], while others have found that the recession is having beneficial effects on health [2,3], particularly on major indicators of population health, including general mortality rates [4].

A special case is that of Greece, where the Great Recession has been particularly severe and protracted. According to early reports by Bonovas and Nikolopoulos [5] and by Kentikelenis et al. [6], a public health tragedy was developing in Greece as a consequence of the economic crisis. Though these reports were considered an exaggeration by some authors [7], Kentikelenis et al. have insisted in the idea of a major health tragedy in Greece, presenting what they consider "mounting evidence" of a health crisis that would be the consequence of "one of the most radical programmes of welfare-state retrenchment in recent times" [8, p. 752].

Reports on health problems in Greece related to the economic crisis have indeed appeared in many journals. According to a systematic review of publications on the economic crisis in Greece appeared in health journals between 2009 and 2013, the literature has reported reductions in public health expenditure and changes in

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healthcare services and the pharmaceutical market, with an increasing number of admissions in hospitals of the public sector [9]. The literature also reported "post-crisis deterioration of public health with increasing rates of mental health (*sic*), suicides, and epidemics, and deterioration of self-rated health" [9].

Besides asserting that a health tragedy is developing in Greece, Kentikelenis et al. claimed that the contrast between such health crisis in Greece, where austerity policies have been applied, and the good evolution of health in other countries such as Finland and Iceland where austerity was not applied, demonstrate a clear and discernible effect of austerity on health [8]. As stated by these authors, the experience of Greece compared with that of Iceland and Finland indicate that "by ring-fencing health and social budgets" when cutting public spending, the harmful effects of crises on population health can be avoided [8, p. 751].

Much of existing research on macroeconomic fluctuations and health does not support the idea that recessions have harmful effects on health. Research using individual data [10–14] has shown that unemployment has harmful consequences on both the physical and the mental health of the unemployed. However, a number of studies with aggregate data have also revealed that overall, as measured by mortality rates, recessions—which are periods when unemployment rates are rising—tend to have a mild beneficial effect on population health, and it is in economic expansions, not in recessions, when death rates tend to increase above trend [3,4,15–21]. For these reasons, and to better understand to what extent and in what direction the Great Recession may have had effects on population health and health care, we have systematically compared Greece, Finland and Iceland examining the evolution of key indicators in these three countries. The purpose of this comparison is to investigate if the evidence suggests or demonstrate (a) that there is a health crisis in Greece, and (b) that the evolution of health indicators in Greece in recent years has been worse, as it has been claimed, than in Finland and Iceland.

2. Data and methods

We use data beginning in 1990 until the most recent year available—2010, 2011 or 2012, depending on indicators. Most data we used are from the World Health Organization [22,23], though for some particular outcomes we have used statistics from other reputable sources [24,25]. Our main purpose is to compare Greece, Iceland and Finland in terms of population health and health care to examine the evidence that may support the assertions that there is a health crisis in Greece, and that in terms of health, Greece is doing much worse than Iceland and Finland. Though we present indicators on morbidity, vaccinations rates, self-reported health, and financing of health care, we focus particularly on mortality rates and mortality-based indicators like life expectancy, as they are the most reliable indicators of population health. We present graphs which provide all available information on the evolution of the indicators during a period of more than 20 years. We graphically examine the evolution of indicators in the three countries to establish whether they are or not departing from trend or whether they differ meaningfully between the three countries. Occasionally, to put comparisons in a wider context, we mention data from other European countries.

For each health indicator we compared the slope of the linear trend for the years before and after the recession started. To conclude that the evolution of a given indicator improved, deteriorated, or did not change in the years 2008–2012 compared with the years 2003–2007, we tested the null hypothesis that there is not a trend break in the time series of the health indicator. For that purpose we used a trend-break regression model, which is common in the literature to analyze structural breaks [26,27]. Our model, for each health indicator and each of the three countries is $H_t = \alpha + \beta_1 \cdot t + \beta_2 \cdot (t - 2008) \cdot D + \varepsilon_t$ in which H_t is a health indicator for year t and D is a dummy variable $D = 0$ if $t < 2008$ and $D = 1$ if $t > 2008$. The term $(t - 2008) \cdot D$ is a linear spline specification that breaks the time trend in the year 2008. The coefficient β_2 allows for a direct statistical testing of the slope change of H_t. The P-value corresponds to the t-test in which the null hypothesis is $\beta_2 = 0$. We report P-values only for the cases in which the change in slope is statistically significant (for methodological details see the Online Appendix, where Table A1 provides all P-values obtained in the tests).

According to OECD statistics [24], in Greece and Finland the growth of the gross domestic product (GDP) was negative during three of the four quarters of 2007, while in Iceland there were two quarters of negative GDP growth in 2007 (Online Appendix, Table A2). The three countries had three quarters of negative GDP growth in 2008. For these reasons the year 2007 was chosen as the year in which the expansion ended and the recession started. The unemployment rate rose in 2008 in Iceland and in 2009 in Greece and Finland (Fig. 1), which illustrates how the unemployment rate is a lagged indicator of the business cycle, i.e., it starts rising several quarters after the recession is manifest in terms of contraction of trade and industrial activity as indicated by the contraction of GDP [28,29].

3. Results

3.1. Comparison of the recession and austerity policies in the three countries

The severity of the Great Recession in Greece is illustrated by the rise of the unemployment rate, which grew quickly since 2008 to reach 17.7% in 2011 and 24.5% in 2012 (Fig. 1, top left panel), and by the contraction of GDP all the years since 2008 to 2013 [25]. In Iceland unemployment started rising in 2008 and reached a peak of 7.6% in 2010, but then declined in 2011 and 2012. In Finland unemployment also rose slightly to reach 8.4% in 2010, but then declined. In Iceland GDP growth was negative in 2008 and 2009, while in Finland it was negative in 2009 and again in 2012 and 2013. These figures show that the crisis of the world economy that has been called Great Recession had a severe and long impact in Greece, where recent estimates put unemployment rates still above 20%. The Great Recession had only a mild impact in Finland and in Iceland the recession was sharp but brief.

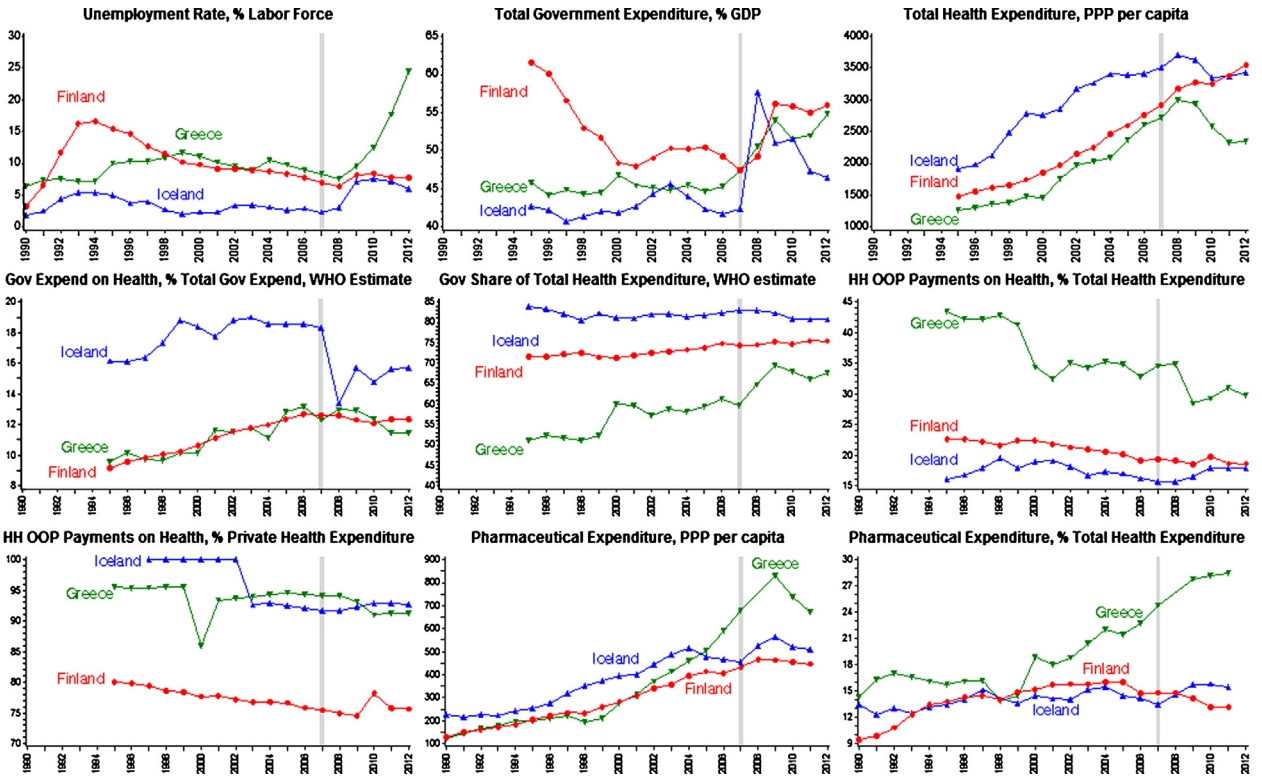

Fig. 1. Unemployment rate and eight indicators of public policy, health policy and health spending in Finland, Greece and Iceland. In this and the following figures the gray bar in 2007 indicates the end of the expansion and the start of the recession. GDP: gross domestic product; PPP: international units of purchasing power parity; HH OOP: household out of pocket; Gov: government; Expend: expenditure.
Source: Authors elaboration. All data from WHO [22] except the Greek unemployment rate for 2012, taken from OECD statistics [24].

Austerity policies as manifested by cuts in government spending were applied in the three countries after the crisis started. Considering available data until 2012, the reduction in the ratio of total government spending to GDP was much more marked in Iceland than in Finland or Greece (Fig. 1, top mid panel), but in Greece there were major cuts in total health spending (Fig. 1, top right panel). The share of health spending in total government spending declined in the three countries following the start of the recession, but the contraction was more severe in Iceland (Fig. 1, left middle panel). Between 2007 and 2012 the government share in total health spending rose in Greece and kept steady in Iceland and Finland, so that in Greece there was a drop in the proportion of out-of-pocket payments in total health expenditure (Fig. 1, center and right mid panels). In Greece the government share in the financing of total inpatient expenditure declined from 82.5% in 2009 to 75.2% in 2011, while in Finland and Iceland kept steady [22]. In the same period, the total expenditure per hospitalized patient measured in international units of purchasing power parity dropped 19.9% in Greece (from 1074 to 859), decreased 9.6% (from 1597 to 1443) in Iceland and rose 1.9% (from 1162 to 1185) in Finland [22]. The share of out of pocket payments in total private spending on health kept more or less steady in the three countries (Fig. 1, bottom left panel), which means that for these years catastrophic health spending did not seem to be contributing to the financial distress of families. In Greece the recession dramatically cut the growth of pharmaceutical spending, though not the growth of pharmaceutical spending in total health expenditure (Fig. 1, mid and left bottom panels).

3.2. Population health during the recession

In the three countries most indicators did not change in trend in spite of the economic recession, and quite a number of indicators evolved after 2007 better than in previous years. Between 2007 and 2011, life expectancies at birth (LEB) and at ages 45 (LE45) and 65 (LE65) increased as fast as or even faster than in previous years (Fig. 2). Comparing Greece to Iceland and Finland, the gain in health was particularly marked in Greece for older adults, as indicated by the fact that between 2007 and 2011 the gap in LE65 between Finland and Greece was almost completely closed (Fig. 2, bottom panel), even though Finland's LE65 is one of the highest in the world and also increased during this period.

Gains in life expectancy are determined by reductions in age-specific mortality rates and in cause-specific mortality because of major causes of death. Accordingly, the data show that in the three countries mortality for most ages dropped faster or continued falling as fast as in previous years (Fig. 3). In Greece there was a slight but marginally significant ($P = 0.087$) increase in infant mortality after 2008, but mortality at all ages and at ages 25–64 kept falling, and mortality for ages 75+ dropped faster than in Finland and Iceland (Fig. 3, bottom right panel).

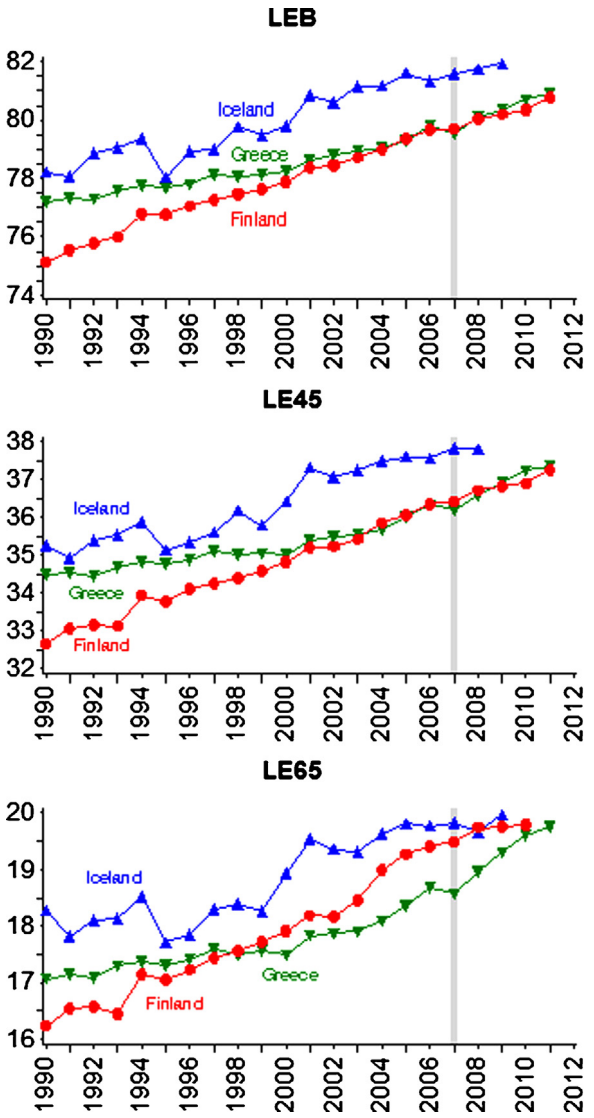

Fig. 2. Life expectancy (years) at birth (LEB) and ages 45 (LE45) and 65 (LE65) in Finland, Greece, and Iceland, 1990–2011.
Source: Authors elaboration from WHO data [22].

Considering cause-specific mortality for the most frequent causes of death (Fig. 4, top panels), the death rates for cardiovascular disease (CVD), malignant neoplasm and respiratory diseases continued falling, but cancer mortality declined faster in Greece ($P = 0.017$), and mortality due to respiratory disease accelerated its declined in Greece ($P = 0.001$) while slowed down in Finland ($P = 0.014$).

Considering less frequent causes of death, mortality due to mental diseases and diseases of the central nervous system kept steady in Greece and Iceland but significantly rose in Finland ($P = 0.047$). Mortality due to transportation injuries continued declining in the three countries but accelerated its decline in Greece ($P = 0.029$). Mortality caused by infectious and parasitic diseases declined after 2007 in the three countries, but the change in trend was significant only in Greece ($P = 0.032$) and Iceland ($P = 0.044$). The suicide rate slightly increased in Greece with a significant change in trend ($P = 0.044$), while it had no statistically significant changes in Finland and in Iceland. In this country the suicide rate has not been reported for most recent years (Fig. 4, bottom left panel).

The homicide rate rose in Greece after 2008 (Fig. 4, mid bottom panel) without significant change in trend ($P = 0.241$). Mortality due to ill-defined conditions also rose (Fig. 4, bottom right) and the increase is statistically significant ($P = 0.001$).

Besides mortality due to the nine causes of death presented here (Fig. 4) we explored many other cause-specific mortality rates reported in the HFA-database [22]. From such wide collection of mortality rates we could not find any other in which significant increases of mortality were observed during the period of the Great Recession in any of the three countries.

3.3. *Health care performance: causes of death amenable to medical care*

For many epidemiologists and public health experts health care has a relatively small effect on all-cause mortality [30–34]. For this reason it has been recommended that to assess the performance of the health system, analyses should focus on causes of death that are amenable to treatment; and since death is increasingly unavoidable at greater ages, the evaluation of the performance of the health system should focus on mortality for amenable causes excluding advanced ages [35]. Ischemic heart disease (IHD), cerebrovascular disease (stroke), diabetes, maternal causes of death, and female malignancies of the breast (breast cancer) are considered causes of mortality amenable to medical treatment [35]. The evolution of mortality for these five causes after 2007 does not show any major departure with respect to previous trends neither in Greece nor in Finland, though in Iceland there is a statistically significant increase ($P = 0.012$) in maternal mortality (Fig. 5). IHD mortality at ages below 65 is higher in Greece than in the other two countries, but it has been flat in Greece since the 1990s, and slightly declined after 2007. For the other four causes of death amenable to treatment, the trends show no significant change during the recession period in any country (Fig. 5).

Among less frequent causes of death, infectious diseases are often considered sensitive to medical treatment. A deterioration of the health care system might be more evidently revealed by greater morbidity or mortality due to infectious diseases. Data show that total mortality due to infectious and parasitic diseases declined after 2007 in the three countries (Fig. 4) and as it was noted above, there was a statistically significant decline in Greece and Iceland. Tuberculosis (TB) is also considered amenable to treatment and both TB incidence and TB mortality evolved after 2007 without any significant change in the three countries (Fig. 6, top panels). According to the figures reported by WHO, TB mortality increased in Iceland in 2007–2009 (2009 being the last year for which data are available), but the increase is not statistically significant.

HIV/AIDS is also listed as potentially amenable [35] and it has been claimed that the austerity-related cuts in

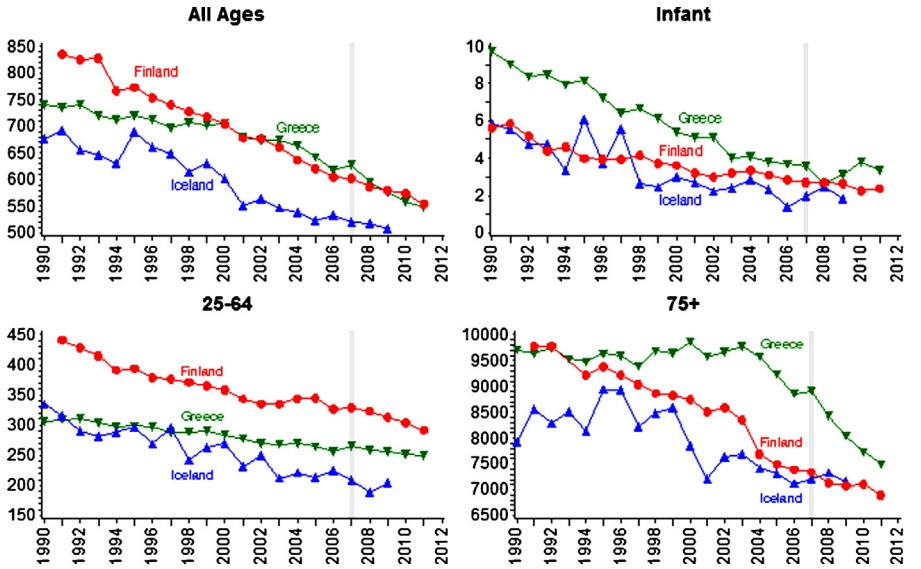

Fig. 3. Total mortality (all causes and ages), infant mortality rate and mortality at ages 25–64 and 75 and over. All age-standardized rates per 100,000 population, except infant mortality in infant deaths per 1000 live births.
Source: Authors elaboration from WHO data [22].

programs of prevention (distribution of syringes and condoms) and treatment for illicit drug use contributed to raise the frequency of these ailments in Greece [8]. The chronology is consistent with this story in what refers to HIV incidence, which starting in 2007 rose so that the trend change from the previous period is statistically significant ($P = 0.031$). In Iceland HIV incidence also rose after 2007, but the trend reversed after 2010 (Fig. 6, middle right panel).

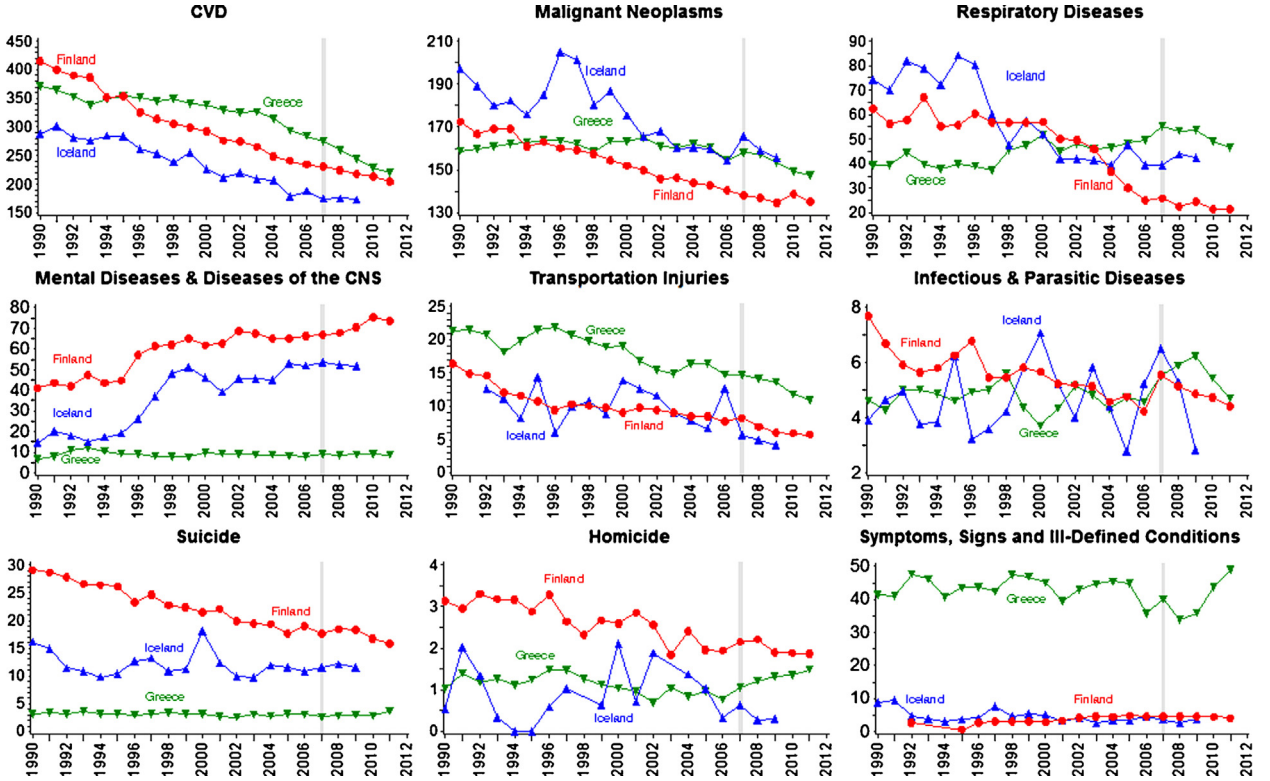

Fig. 4. Mortality rates due to nine causes of death. All are age-standardized rates per 100,000 population.
Source: Authors elaboration from WHO data [22,23].

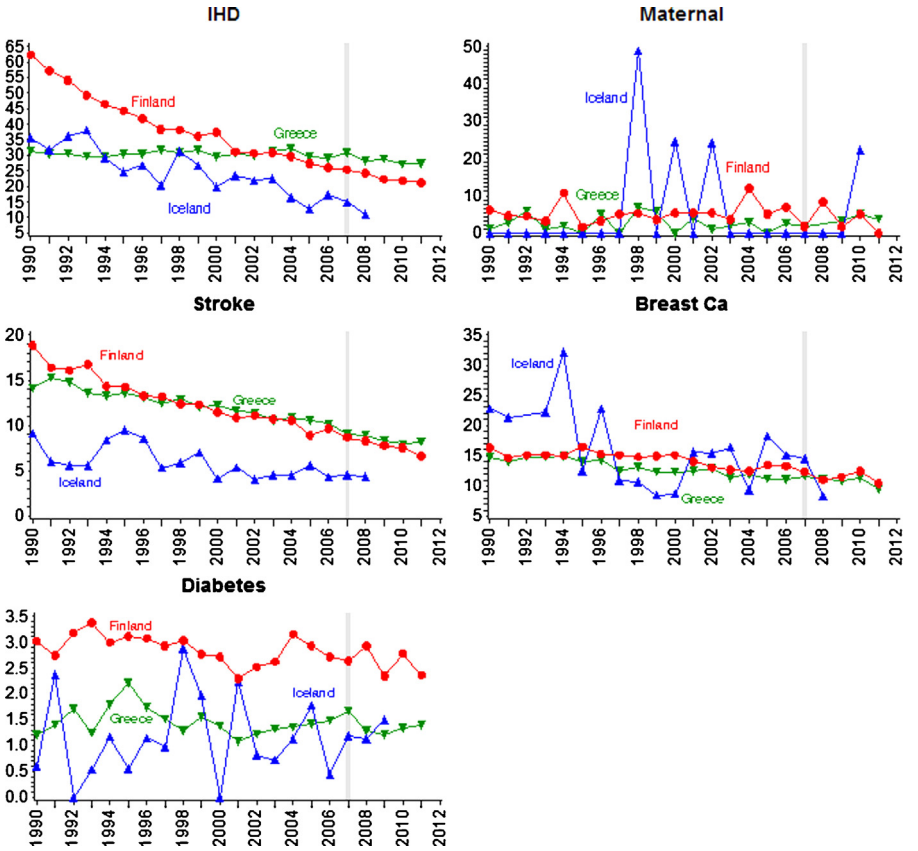

Fig. 5. Mortality due to five causes of death considered amenable to medical treatment: ischemic heart disease (IHD), cerebrovascular disease (stroke), diabetes, maternal causes and female breast malignancies (breast cancer). All are age-standardized mortality rates at ages below 65, except maternal mortality in maternal deaths per 100,000 live births.
Source: Authors elaboration from WHO data [23].

However, neither AIDS incidence nor HIV/AIDS mortality departed significantly from trend in any of the three countries (Fig. 5, bottom panels).

Malaria incidence (Fig. 6, right bottom) increased during the period after 2007 in Greece but rose more in Finland (there are no recent data for Iceland). This variable is very volatile and the changes are not statistically significant in any country.

WHO data on the incidence of measles and whooping cough (*pertussis*) [22] show that since the late 1990s the incidence rate of these infections has been very close to zero in the three countries and without changes in trend since 2007 (data not shown).

3.4. Health care performance: vaccinations

Vaccinations of children are a critical responsibility of the health care system. A deterioration of health services could imply a drop in vaccination rates. Vaccination rates for diphtheria/whooping cough (*pertussis*), measles, and poliomyelitis dropped in Iceland to levels slightly below 90% during recent years. However, after 2008 they stayed stable and very close to 100% in Greece and in Finland (Fig. 7).

4. Discussion

Our examination of available indicators of population health and of performance of the health care system reveals changes in specific aspects in each of the three countries, but not an important deterioration of health or health care in any of them. The general pattern is that health indicators improved in the three countries after 2007 at similar or faster rates than in previous years. Table 1 summarizes the evolution of the 30 health indicators we have reviewed comparing the years after the start of the recession with the previous years. Twenty indicators in Finland and Greece and 21 indicators in Iceland had no significant change. While in Finland there were 3 indicators improving at standard ($P < 0.05$) or marginal levels of significance ($P < 0.1$), there were 5 in Greece, and 1 in Iceland. Indicators with a significant or marginally significant deterioration were 7 in Finland, 5 in Greece, and 2 in Iceland. Overall, the data are not indicative of a health crisis in Greece.

Available evidence indicates that in the recession years mortality among older adults declined faster in Greece than in Finland and Iceland; Greece got closer to the other two countries in LE65 and in mortality at ages 75 and older (Figs. 2 and 3). In Greece there were statistically significant increases in the suicide rate, and in mortality due to

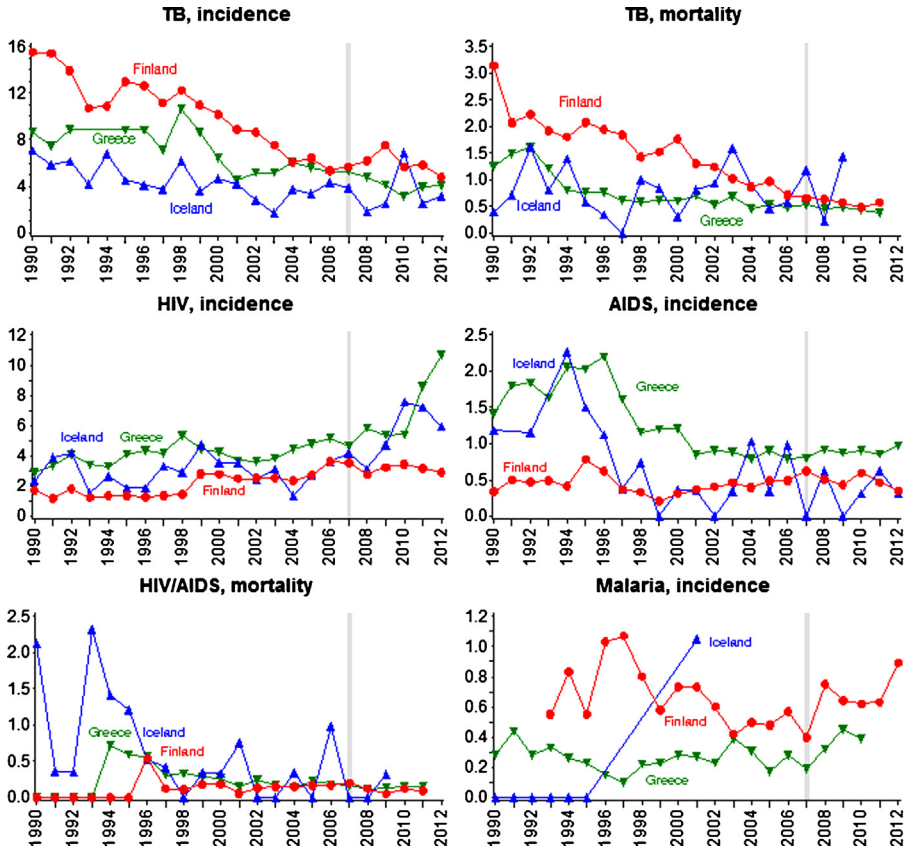

Fig. 6. Incidence (new cases per 100,000 population) and mortality (age-standardized rate per 100,000 population) for TB, HIV/AIDS, and malaria. *Source*: Authors elaboration from WHO data [22].

ill-defined conditions, and a marginally significant increase in infant mortality, while there were statistically significant decreases in mortality due to malignancies, respiratory diseases, infectious and parasitic diseases, and transportation injuries. In Finland there was a significant increase of mortality due to respiratory disease, cancer and mental and neurological disorders. In Iceland infectious disease mortality significantly declined while maternal mortality significantly increased.

It can be considered puzzling that in Greece infant mortality rose in 2009 and 2010 (Fig. 3) while LEB grew steadily between 2007 and 2011 with a substantial gain of 1.3 years of LEB (from 79.6 to 80.9, Fig. 2) in this period. In general, changes in infant mortality have an important impact on LEB, but in the case of Greece the strong decline between 2007 and 2011 in all other age-specific mortality rates (Fig. 3) as well as in CVD mortality and other major causes of death (Fig. 4) seems to have been more than sufficient to compensate the slight increase in infant mortality which, in Greece as in the other two countries, is at very low levels. Indeed, in Greece all mortality rates reported by WHO for ages 0–14, 15–29, 30–44, 45–59, 60–74, and 75+ were in 2011 lower than in 2007 (Online Appendix, Table A3).

Given that the probability of finding statistically significant differences increases when more comparisons are done at the same time, it is important to note that just by random variability, it is to be expected that differences in trend which are statistically significant at standard ($P<0.05$) or marginal levels ($P<0.10$) will be found in approximately 10% of all comparisons. Furthermore, a statistically significant difference does not necessarily mean an important difference from a practical point of view, which is a public health point of view in this case. This is often revealed when statistics are put in context. For instance, the Icelandic peak in maternal mortality in 2010 (Fig. 5) is statistically significant but practically irrelevant. The Icelandic maternal mortality peak in 2010, 22.3 deaths per 100,000 live births represents indeed a high maternal mortality rate, as the mean maternal mortality in the European Union in 2010 was 5.6 deaths per 100,000 live births. However, in 2010 there were 4492 live births in Iceland [22], so that the rate of 22.3 maternal deaths per 100,000 live births represents just one mother who died of pregnancy-related causes. In former years, the maternal mortality rate was zero.

The rise in infant mortality observed in Greece during the crisis (Fig. 3) is marginally significant and has been considered by some authors as part of the evidence revealing a health tragedy attributable to the economic crisis and the austerity policies. However, at its peak in 2010 the Greek rate of infant mortality, 3.8 infant deaths per 1000 live births, was the same rate observed in Greece in 2005, when the economy was buoyant and austerity policies were still several years away in the future.

Table 1
Results of tests comparing the evolution of health indicators during the years 2003–2007 and 2008–2012 (or until the last year that data are available). "No change" means that there was no statistically significant change in the trend. "Deterioration" or "Improvement" means that there was a statistically significant ($P < 0.05$) increase or decrease (depending on the indicator) in the trend, such that the health indicator evolved worse or better, respectively, in the period 2008–2012 compared to 2003–2007 (a question mark following "deterioration" or "improvement" means that the trend change is only marginally significant, i.e. $P < 0.1$, but $P > 0.05$). Empty cells mean insufficient data for the test.

Health indicator	Finland	Greece	Iceland
Life expectancy at birth	No change	No change	No change
Life expectancy at age 45	No change	No change	No change
Life expectancy at age 65	Deterioration?	No change	No change
Mortality rates			
All-cause	No change	No change	No change
Infant mortality	No change	Deterioration?	No change
Ages 25–64	Improvement	No change	No change
Ages 75+	Deterioration?	No change	No change
Cardiovascular disease	No change	No change	No change
Neoplasms	Deterioration	Improvement	No change
Respiratory disease	Deterioration	Improvement	No change
Mental disease	Deterioration	No change	No change
Transportation injuries	No change	Improvement	No change
Infectious and parasitic diseases	No change	Improvement	Improvement
Suicide	No change	Deterioration	No change
Homicide	No change	No change	No change
Ill-defined conditions	Improvement	Deterioration	No change
Ischemic heart disease	Deterioration	No change	
Maternal mortality	No change	Deterioration?	Deterioration
Cerebrovascular disease	No change	No change	
Breast cancer	No change	No change	
Diabetes	No change	Improvement?	
Incidence and mortality of specific infectious diseases			
Tuberculosis incidence	No change	No change	No change
Tuberculosis mortality	No change	No change	No change
HIV incidence	No change	Deterioration	No change
AIDS incidence	Improvement?	No change	No change
HIV/AIDS mortality	No change	No change	No change
Malaria incidence	No change	No change	
Measures of self-reported health			
% self-reporting good health	No change	No change	
% self-reporting fair health	No change	No change	No change
% self-reporting bad health	Deterioration?	No change	Deterioration

The peak of 3.8 infant deaths per 1000 live births is a very low rate of infant mortality, lower than the European Union mean of 4.1, and just a little bit over the Finnish infant mortality rate of 2.4. Another consideration is that blaming the Greek increase in infant mortality between 2008 and 2010 to the crisis and austerity seems inconsistent with the decrease in infant mortality in 2011. All evidence shows that in Greece unemployment, financial stress and austerity policies (Fig. 1) were worse in 2011 than in 2010. It is to be expected that infant mortality data for more recent years will help to clarify this issue.

The rise of suicides in Greece during the recession (Fig. 3) is statistically significant, and considering a large body of literature and wide consensus on the link between suicide rates and stressful economic conditions [16,36–38] it seems very likely attributable to the crisis. However, given the very low levels of suicide in Greece, its relevance from the point of view of public health seems only moderate, as the Greek suicide rate at its peak in 2011 (3.7 suicides per 100,000 population) was about one fifth of the Finish suicide rate for 2011 (15.9), less than half of the most recently reported suicide rate of Iceland (11.5 in 2009), and about a third of the mean suicide rate in the European Union in 2011 (10.2).

More frequent suicides suggests an increase in the frequency of depression and psychological distress, but we have been unable to find data (e.g. frequency of this type of disorders in the population in recent years, rates of hospitalization, or hospital discharges or medical consultation because of psychological distress) that show that mental health has seriously deteriorated in Greece as compared to Finland or Iceland. Mortality because of mental and neurological diseases is much lower in Greece than in Finland and Iceland, and in Finland this type of mortality significantly increased between 2007 and 2011 (Fig. 4). On the other hand, in Greece and Finland there has been a clear decrease in mortality attributed to alcohol-related causes in 2007–2011, while in Iceland this type of mortality declined slightly between 2007 and 2009, and there are no more recent data [22].

Major indicators of performance of health services such as vaccination rates or mortality due to amenable causes of death do not show any Greek disadvantage with respect to Iceland and Finland. In terms of vaccination rates, with falling rates of vaccination after 2007, Iceland seems to be doing worse than Greece and Finland (Fig. 7).

Reports claiming that Greece is going through a health tragedy mentioned that the incidence rates of malaria and tetanus have increased under austerity [8]. This is

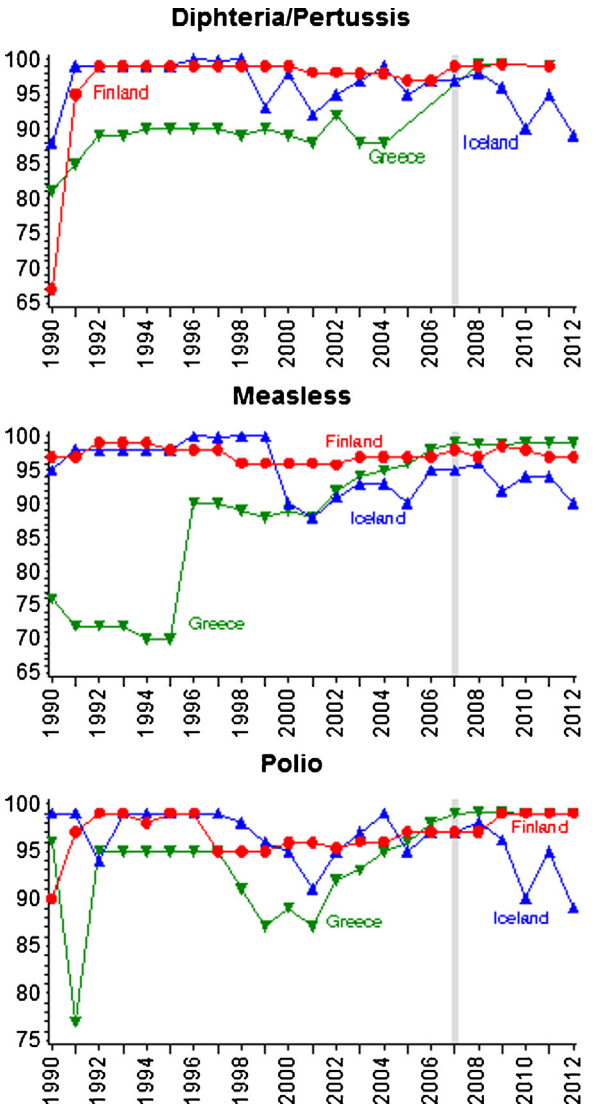

Fig. 7. Percentage of infants vaccinated against diphtheria/whooping cough (*pertussis*), measles, and poliomyelitis.
Source: Authors elaboration from WHO data [22].

consistent with the available data. However, the rise in malaria incidence after 2007 is not statistically significant in Greece and the increase during these years was even greater in Finland (Fig. 6, right bottom). Concerning tetanus, the increase in the incidence rate in Greece is trivial, as according to WHO there were 7 cases of tetanus in 2006, 7 in 2008, 2 in 2009, 5 in 2010, 11 in 2011 and 7 in 2012 (for reference, in 2000 there had been 16 cases of tetanus) [22].

The doubling of the incidence of HIV infection between the pre-crisis years and 2012 is another change presented as evidence of a Greek health tragedy. The statistically significant upturn in HIV incidence (Fig. 6, left mid panel) confirms a worsening of the HIV epidemics in Greece. However, to present it as evidence of a health crisis seems a statement out of context. The highest HIV incidence reached in Greece, in 2012, 10.7 new cases of HIV infection per 100,000 population, is a rate quite similar to the incidence rates observed that year in countries such as the UK, 10.1, or Belgium, 11.0, and quite below such rates as those of 15.6 in Luxemburg, 16.7 in Latvia, 24.4 in Estonia, or 37.1 in Ukraine [22].

Health statistics presented out of context may convey a general picture of tragedy in the conditions of health care and population health in Greece, but a systematic consideration of the major indicators of health in that country does not reveal a health tragedy. Decontextualized health statistics may lead to the polarization of the research agenda, and of researchers as well. For example, Kentikelenis et al. have accused of denialism, "which refuses to acknowledge, and indeed attempts to discredit, scientific research" [8] to those who do not share their views. The data presented here show that the existence of a health tragedy is not supported by a thorough examination of major indicators of population health and health care performance. The existence of "denialism" seems equally unproved.

A large body of research [14–19,39–47] has shown that in established market economies recessions are usually associated with improvements in population health. This is in spite that the associated increases in joblessness, business failures, and drops in tax returns often involve social service cuts, deterioration of health services, general social distress, and income reductions with financial problems for many. All of these factors are often associated with adverse health outcomes in analyses at the individual level. Historical evidence shows however that excepting suicide increases, during recessions population health does not deteriorate. For example, population health did not deteriorate in Western Europe during the important recessions of the early 1980s (when for instance in Spain the unemployment rate reached 22%) and early 1990s (when for instance joblessness reached 17% in Finland, see Fig. 1, top panel). It seems paradoxical, but compared with periods of business prosperity, recessions tend to be associated with faster declines of general mortality. In Finland, LEB quickly increased and CVD mortality had a sharp drop in the early 1990s, when the Finnish economy was deeply depressed (Figs. 2 and 3).

The increase of general mortality during economic expansions, and its corresponding decrease in recessions, was discovered almost a century ago [39]. The phenomenon has been reaffirmed by a growing body of current research, but it has been frequently ignored, though the Great Recession in Europe is revealing it once again [2–4]. Of course recessions, even including major ones like the one going on in Greece, neither in health nor in other aspects are comparable to the major disruption of social and economic life that occurred in Eastern Europe and the countries of the old USSR in the 1990s, during their transition to a market economy. At that time a real health tragedy occurred, as mortality rates skyrocketed [48,49] and in many countries of the old Soviet bloc death rates continued at high levels for many years.

Regretfully, exaggerations about a health tragedy do not help the Greek population, which is not suffering of bad health but of financial stress, lack of income and jobs, and shrinking wages. Social reality is multidimensional.

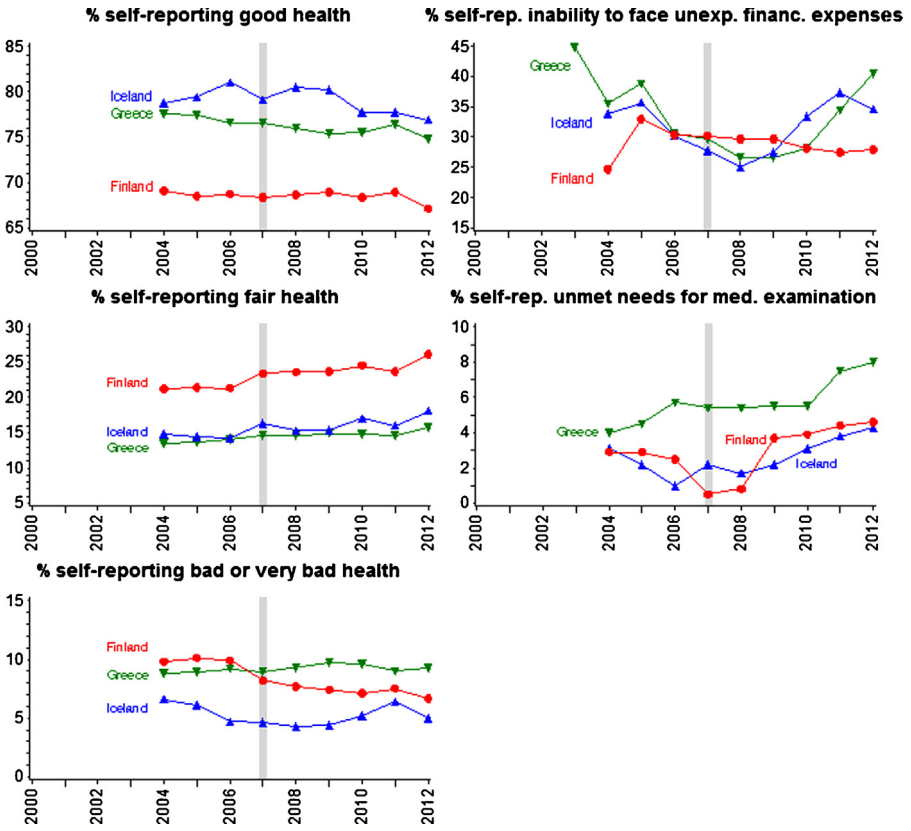

Fig. 8. Percentage of population self-reporting health as good/very good, fair ("not good, not bad"), or bad/very bad, or reporting inability to face unexpected financial expenses or unmet need for medical examination.
Source: Authors elaboration from Eurostat data [25].

Previous research has shown that physical health as measured by objective indicators of mortality and morbidity can evolve quite different from mental health and individual and social distress indexed by rates of depression, homicide, unemployment, foreclosure or levels of self-assessed health. There are reports that self-reported health—which to a large extent is inversely correlated with psychological distress—has deteriorated in Greece during the economic crisis [50]. Available statistics show that, since 2007, in Greece and Iceland the percentage of individuals self-reporting bad or very bad health has increased (Fig. 8, left bottom panel), but the increase is significant ($P = 0.011$) only in Iceland. The percentage self-reporting good or very good health is still much higher in Greece than in Finland, it has declined in the three countries since 2007 (Fig. 8, left top panel) but the decline is statistically significant ($P = 0.003$) just in Iceland. The proportion of people self-assessing their health as fair (not good, not bad) has also increased in the three countries (Fig. 8, left mid panel), but the increase is not significant in any. Thus self-assessed health has deteriorated in the three countries since 2007, but there is no evidence that has deteriorated more, or particularly, in Greece.

It is important to mention, though, that self-assessed health is not a very solid measure of population health. For example, the percentage of individuals self-rating their health as good may fall during periods in which objective measures of population health are improving. This is what has been observed in recent years in European countries such as Denmark, France, Belgium, Malta, and the Netherlands, where mortality rates are falling and LEB is rising at the same time that a decreasing percentage of citizens self-asses their health as good [23,24]).

We have shown that the comparison of Greece with Finland and Iceland does not reveal at all that Greece is doing worse in terms of population health and performance of the health care system. It could be thought nevertheless that the comparison is not relevant, as Greece is a Southern Mediterranean country very different from the Northern Finland and Iceland. May be the Greek performance looks relatively good only when compared to Finland and Iceland? It could be the case that mortality rates had declined faster in Greece in the absence of austerity? Though answering these questions entails major problems, and to provide a definite answer is probably impossible, we can try addressing these queries by extending the comparison of Greece, Finland and Iceland to other Mediterranean countries. It is probably uncontroversial that in Southern Europe, during the Great Recession Italy did the least austerity, while Spain and Portugal did considerably more austerity, but less than Greece. So which of these countries did better after the recession started? To do this comparison systematically is out of the scope of this paper, but we have done an abridged attempt of

comparison by using LEB as summary measure of population health, as increasingly done by the United Nations Development Program and many other institutions and authors [32,51,52]. Thus in the period 2007–2011 the countries which had a bigger gain in LEB were Portugal and Greece that gained 1.4 years, followed very closely by Spain with 1.3 years and by Finland with 1.1 years [22]. The LEB gain of Italy and Iceland for this period cannot be computed by the lack of data for 2010 for both, but considering the period 2007–2010 the biggest gain is that of Greece and Spain with 1.1 years, while Italy and Portugal follow with 0.8 and then Finland with 0.6 years. Thus the Greek performance in recent years is quite favorable also when compared with other Southern European countries.

Three years ago the existence of a health crisis in Greece was formerly rejected as unproven [7] and the evidence presented here builds up against the claim that there is a Greek health tragedy. That does not mean that there are no problems to solve in Greece, and also in other countries. The Great Recession has had a major impact on the economic welfare of European populations, and Greece is a special case. The percentage of people reporting inability to face unexpected financial expenses quickly rose in Greece after 2007, but also in Iceland (Fig. 8, right top), though not in Finland. There has been also a clear increase in the percentage of people who reports unmet needs for medical examination in the three countries (Fig. 8, right bottom), though the percentage is the highest in Greece (8.0%, vs. 4.3% and 4.0% in Finland and Iceland, respectively), which is consistent with reports that indicate rationing of health services, increased co-pays, limited access, and reduced health insurance coverage in Greece under austerity.

If the acceleration of the HIV epidemics in Greece may well be related to the interruption of prevention programs caused by austerity—though it might also be a consequence of increasing risky sexual behaviors of persons under serious financial stress—the increase in mortality attributed to signs, symptoms and ill-defined conditions—often associated with poor performance of the health care system—might be also a consequence of the deterioration of health services, particularly hospital services. In this aspect Greece reveals a health care system performing worse than Iceland or Finland since long ago (Fig. 4, bottom right panel).

The comparison between the three countries also reveals that even though the Greek per capita expenditure on health is about half of Iceland and about a third of Finland (Fig. 1, right top panel), Greece spends much more in pharmaceuticals both in relative and absolute terms (Fig. 1, mid and center bottom panels) than the other two countries. It has been reported that in the five years before the crisis, total pharmaceutical expenditure in Greece nearly doubled, from 4.3 billion euros in 2004 to 7.8 billion in 2008, with a per capita pharmaceutical expenditure reaching almost 700 euros in 2008, the highest level in the European Union that year. This has been considered as representing overuse (for example, Greece had in 2008 the highest per-capita consumption of antibiotics of all OECD countries) and overpriced purchase of drugs to the pharmaceutical sector [53,54]. Though in absolute terms the trend appears to have improved after 2009 (Fig. 1, center bottom panel), in relative terms the situation has deteriorated, as Greece spent in 2012 28.5% of its total health expenditure on pharmaceuticals (Fig. 1, right bottom). This is about three times the proportion spent by Iceland and more than twice what Finland spent that year.

Asides from what we have reported, we have tried to compare the three countries by examining all the indicators of health care utilization and financing available in the HFA database [22]. These include inpatient care discharges, inpatient surgical procedures per year, average length of stay in hospitals, outpatient contacts per person per year, autopsy rates for hospital deaths and for all deaths, surgical wound infection rate, case-fatality rates for surgical operations, adverse effects of therapeutic agents, and many other indicators. For all these indicators either the comparison is impossible because there are no data for the proper period, or the trends reveal no changes in recent years. Available statistics [22] show however that as some observers have mentioned [55], in Greece there is an oversupply of doctors, and an undersupply of nurses, but these are long-term issues that have no relation with the effects of the crisis. These, as well as an excess of MRI and CT scanners has been considered largely a function of inefficient resource allocations within the private sector of health care services in Greece [55].

5. Conclusion

Comparing Greece, Finland and Iceland does not reveal the existence of a health tragedy in Greece. In terms of population health and performance of health care services the evolution of Greece has been overall as good as that of Finland and Iceland.

What we have analyzed are the available health data, which in no case go beyond 2012. Our findings do not prejudge future trends, though considering what occurred after previous recessions, we do not expect a recession-related deterioration of population health in any of these three countries. In the 1980s it was often argued, mostly by Brenner [56,57], that recessions have harmful lagged effects on morbidity and mortality. However, these studies received a variety of criticisms which led to considerable skepticism about the data and the conclusions [58]. Other authors who intently looked for harmful effects of recessions on mortality, either with a short or a long lag, could not find them [46,59–65]. In the past two years, probably under the stimulus of the Great Recession, some studies have been published suggesting harmful effects of past recessions on health in the long-run. These studies [66–68] found worst self-assessed health or higher mortality in cohorts that were exposed to recessions many years before, at particular times in life (e.g., birth or high school graduation). These studies have produced inconsistent findings. For instance, leaving school at recession time was found beneficial for men and detrimental for women in one of these studies, and detrimental for men and beneficial for women in other studies [67,68]. Overall, we believe the evidence that recessions have lagged harmful health effects *on the population exposed to them* is inconsistent and weak. This contrasts with the body of literature revealing quite consistent and strong evidence

that (a) during business-cycle recessions population health tend to deteriorate [3,4,14–21,39,47,65,69,70], and (b) that *to be unemployed* has both in the short and in the long term harmful effects on health [13,14,71–74].

Our data do not go beyond 2012 in any case, but strong financial stress and austerity policies in the past two years make further deterioration and cuts of health care very likely to have occurred in 2013 and 2014. It is yet to be seen whether in due time statistics show that that has been the case, and whether there has been any effect on some specific health outcome.

Our investigation shows that specific health indicators in Greece deserve particular attention. Rather than an across-the-board increase in health spending which seems both difficult and unneeded, what seems needed is a set of targeted policies and programs to ameliorate specific worsening trends. That is the case with HIV and suicide prevention, with policies to keep infant mortality low, to rationalize pharmaceutical spending and health expenditure in general, and to improve the performance of the health system in determining the causes of death. It does not seem, however, that any of these tasks are comparable in difficulty to the formidable tasks the new Greek government confronts in the economic and financial sectors, with a Greek economy still deeply depressed and a precarious and contentious relation of Greece with the European Union and the international financial institutions. That the health of the citizenry is good shall be an asset for Greece overcoming the economic crisis that has burdened the country for so long.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.healthpol.2015.04.009.

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