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The impact of the financial crisis on health in Ireland and Greece: a quasi-experimental approach

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The impact of the financial crisis on Health in Ireland and Greece:

A quasi-experimental approach

Summary:

Objectives: Greece and Ireland suffered an economic recession of similar magnitude, but whether their health has deteriorated as a result has not yet been well established.

Study design: Based on five waves (2006-2010) of the European Union Statistics of Income and Living Conditions (EU-SILC) survey we implemented a difference-in-differences (DID) approach that compared trends in self-rated health in Greece and Ireland before and after the crisis with trends in a 'control' population (Poland) that did not experience a recession and had health trends comparable to both countries before the crisis.

Methods: Logistic regression using a difference-in-differences (DID) approach.

Results: A simple examination of trends suggests that there was no significant change in health in Greece or Ireland following the onset of the financial crisis. However, DID estimates that incorporated a control population suggest an increase in the prevalence of poor-self rated health in Greece (OR=1.216; CI=1.11 - 1.32). Effects were most pronounced for older individuals and those living in high-density

areas, but effects in Greece were overwhelmingly consistent in different population sub-groups. In contrast, DID estimates revealed no effect of the financial crisis on the prevalence of poor self-rated health in Ireland (OR=0.97; CI=0.81-1.16).

Conclusions: DID estimates suggest that the financial crisis led to higher prevalence of reporting poor health in Greece but not in Ireland. Although our research design does not allow us to directly assess the role of specific policies, contextual factors including policy responses may have contributed to the different effect of the crisis on the health of the two countries.

Introduction

One question that has attracted considerable attention among both policy makers and the public is how the recent financial crisis has affected population health. It has been argued that the combination of high unemployment rates, rising job insecurity and severe cuts in government social welfare and healthcare spending may have resulted in an emerging public health crisis.[1-5] In support of this view, several recent studies suggest that the crisis may have led to increases in adverse health outcomes, and in particular suicides, in different European countries.[1, 6-11] Critiques, however, argue that some of these variations may reflect random fluctuations rather than true worsening of population health attributable to the crisis.[12-14] A crucial limitation, however, is that most recent studies are based on single-country comparisons of trends before and after the crisis, without exploiting geographical variation by means of a control group. In a single-country comparison, it is difficult to distinguish autonomous trends in population health in one place from those attributable to the financial crisis. In addition, few studies have explicitly investigated whether the impact of the financial crisis differed across countries.

In this study, we assess whether the financial crisis led to a change of trends in self-rated health in Greece and Ireland. Appendix Table 1 shows several key macroeconomic characteristics of both countries before the financial crisis. We focus on Greece and Ireland as they are among the countries in Europe suffering most dramatically from the recent economic collapse. In Ireland, unemployment

increased from 4.7% in 2007 to 13.9% in 2010, while in Greece it increased from 8.3% to 12.6%. over the same period.[15] In Ireland, gross domestic product (GDP) fell by 2.2% in 2008 and 6.4 in 2009 while the Greek economy contracted by 3.1% in 2009 and 4.9% in 2010.[15]

There are compelling reasons to expect that these changes may have led to worsening health outcomes, for instance, due to increased number of Europeans experiencing financial hardship, involuntary job-loss or diminished access to healthcare.[16-19] However, studies suggest that the impact of economic recessions on health may depend on the policy and social context. Using data for OECD-countries from 1960 to 1997, for example, Gerdtham and Rhum found that economic downturns were associated with reduced mortality, but this effect was more pronounced in countries with weak social insurance systems.[20] Similarly, a study based on European data for the years 1970 to 2007 found that increased unemployment was associated with an increase in suicides, but this association was weaker when expenditures in active labor market programs were higher.[21] While cross-country comparisons do not enable us to identify specific policies responsible for differential effects of the crisis, they may provide clues on the role of context as it is likely that different countries will be affected differently by the crisis.[22]

Based on individual-level data from the European Union Statistics of Income and Living Conditions (EU-SILC), we used a difference-in-difference approach to examine how the recent financial crisis influenced population health in Greece and

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Ireland. We contrasted results from a comparison of trends before and after the onset of the crisis in Greece and Ireland, with an analysis that explicitly incorporates a control population that did not suffer a recession of the same magnitude, but had similar health trends as Ireland and Greece prior to the Global Financial crisis. While it is not easy to identify a control population, Poland was the only country in the European Union (EU) which did not experience a formal recession throughout the study period. Although in Poland the annual growth rate of GDP dropped from 5% in 2008 to 1.6% in 2009, it remained positive throughout this period and improved again in 2010 (3.9%). Domestic demand only dropped by half a percentage point between 2008 and 2009 and immediately increased by 4.5 percent in the next year. Compared to many other European countries, the labour market effects were substantially smaller in Poland.[15] For example, although unemployment increased from 7.1 to 8.2 percent between 2008 and 2009, the employment rate remained stable at around 64%. According to the OECD, Poland has been the best performing OECD country since 2007.[23] At the same time, GDP per capita as well as the total disposable household income increased in every single year between 2005 and 2010.[24] [23] In an earlier and preliminary analysis on the early effects of the crisis in Greece, we showed that by comparing health trends to those in a control population it is possible to assess whether a potential deterioration of health may indeed be attributable to the financial crisis.[25] We further exploit this approach and extend the years assessed to compare the health effects of the crisis in Greece and Ireland.

Methods

Sample

Data for this study came from the European Union Statistics of Income and Living Conditions (EU-SILC).[26] EU-SILC provides nationally representative and comparable individual-level data on living conditions, health and socio-demographic characteristics of the population living in private households aged 16 years and above. In Ireland and Greece, the survey is based on a stratified probability sample of households. In Poland, a stratified multi-stage sampling of addresses was used. In 2010, the average household response rate was 84% in Greece, 80% in Ireland and 85% in Poland.[27] Although differences in the sampling frame may impact the comparability of health levels between countries, our identification strategy is based on a comparison of health trends over time which should not be affected by sampling differences. We selected individuals aged 18 and above, as our focus was on the effects of the crisis in adult age. Data covered the years 2006-2010 in Greece and Poland and 2006-2009 in Ireland. We chose the year 2008 as the beginning of the financial crisis in Ireland due to the negative growth rate of (real) GDP (-2.2%) in this year.[15] Although provisional estimates indicate that the Greek economy marginally contracted already in 2008, with a GDP growth rate of -0.2%, we chose the year 2009 as it was the first year during which the economy contracted substantially. We conducted the analyses separately for Greece and Ireland because treatment (onset of the financial crisis) is defined by calendar year, which differed between the two countries.

We chose self-rated health as the key health outcome of interest as it is plausibly more sensitive to short-term shocks than other health outcomes such as disability or the onset of chronic conditions. In EU-SILC, self-rated health was measured using a 5-point scale with answer categories ranging from 'very bad' to 'very good'. We distinguished between respondents who stated that their health was 'bad' or 'very bad' from those who reported that their health was 'fair', 'good' or 'very good'. We also conducted sensitivity analyses using the full 5-item scale in supplementary models.

Statistical analysis

We first estimated the odds of reporting poor self-rated health before (2006-2008 for Greece and 2006-2007 for Ireland) and during the crisis (2009-2010 for Greece and 2008-2009 for Ireland). To distinguish potential effects of the financial crisis on health from autonomous trends, we used a DID approach that incorporates a control group which was not exposed to a recession in the same period but had similar health-trends in the time preceding the recession. Whereas levels of self-rated health vary substantially between Poland, Greece and Ireland, differences in levels between countries do not compromise the validity of this approach. The key assumption of the DID approach is that trends in health, rather than levels, would have been similar in the treatment groups (Greece and Ireland) and the control group (Poland) in the absence of the crisis. While this assumption can never be tested, our analyses of the pre-recession period generally indicate that Poland had similar health trends as Ireland and Greece in the years leading up to the crisis.

We used Poland as the control group since the latter was the only country in the European Union (EU) which did not experience a recession throughout the study period. Based on EU-SILC data, we examined whether in the years leading up to but before the crisis, Poland had similar trends to Greece and Ireland. The DID estimator relies on the assumption that in the absence of the crisis, Greece and Ireland would have had similar trends as Poland. While this assumption can never be directly tested, similar trends in the years immediately prior to the crisis are suggesting of similar underlying trends. For this purpose, we compared trends in poor and bad self-rated health before the crisis between Poland and Greece (2006-2008), and between Poland and Ireland (2006-2007). In addition, the common trend assumption can be relaxed by the inclusion of country-specific linear trends, which allows both groups to follow different trends.[28] Whereas the latter approach is regarded as more robust,[28] including country-specific linear trends yielded similar results to models without trends. We therefore focus the presentation of results on models without country-specific trends.

To implement the DID approach, we used a logistic regression to compare differences in the odds of reporting poor self-rated health before and during the financial crisis in Ireland and Greece with the same odds in the comparison population (Poland), and subtracted the difference between the two groups. The DID estimate, defined as the difference between the treatment country (Greece or Ireland) and the comparison country, is captured by the interaction between the years of the financial crisis (2008-2009 in Ireland and 2009-2010 in Greece) and the respective treatment country. We run separate models for Greece and Ireland

due to the fact that the onset of the crisis differed for the two countries. In all models, we controlled for potential confounders including sex, age in 10-year age-groups, marital status (categorized as married, never married, divorced or widowed), degree of urbanization (categories in three groups based on densely, intermediate and thinly populated areas), and educational level measured based on six categories of the International Classification of Educational Degrees (ISCED).[29] Marital status and the degree of urbanization may be both confounders as well as mediators as they could have been directly affected by the crisis. We incorporated controls for urbanization to account for the fact that the economic crisis may differently affect individuals living in rural or urban areas, for example due to differences in the number of people employed in different sectors or the structure of local economies.[22] At the same time, generally lower costs of living as well as community, family and social support networks potentially available to those living in smaller villages and rural areas[30] could represent a buffer in times of hardship.

We estimated models separately by age group, sex, educational level and degree of urbanization to assess differential effects of the financial crisis on the health of these groups.

Analyses were conducted in Stata/SE 10 using appropriate sampling weights.

Results

Summary statistics for the three countries are presented in Table 1. The three countries differed with regard to their health and socio-demographic characteristics. 11% of Greek adults and 4% of Irish adults reported being in poor health, compared to 18% of Polish respondents. Respondents in Greece and Ireland were older than those in Poland, and Irish respondents were less likely to be married than their Greek or Polish counterparts. 23% if Irish respondents had a tertiary education, compared to 17% in Greece and 13% in Poland. These differences stress the need for a DID approach that controls for differences in levels, shifting focus towards comparisons in trends in self-rated health.

Table 1 should be about here

Figure 1 shows that before the onset of the crisis in 2009, trends in the prevalence of poor self-rated health were very similar between Greece and Poland, the control population. The prevalence of reporting poor health decreased modestly between 2006 and 2008 in both countries. Trends started to diverge in 2009 as the prevalence of poor health increased in Greece while continuing to decline in Poland. Trends in the years preceding the crisis were similar between Ireland and Poland as the prevalence of poor health declined modestly in both countries between 2006 and 2007. In contrast to Greece, however, there was no apparent change in the prevalence of poor self-rated health in Ireland after the crisis.

Figure 1 should be about here

Table 2 shows results from a naïve model that compares trends in self-rated health before and after the financial crisis in Greece and Ireland. Results from this comparison suggest that there has been no significant change in the odds of reporting poor health in Greece or Ireland following the onset of the financial crisis in each country. Odds ratios comparing the odds of poor health between 2006-2008 and 2009-2010 were 1.06 (95% confidence interval [CI] 0.98, 1.15) in Greece. In Ireland, the odds ratio of poor health between 2006-2007 and 2008-2009 was 0.92 (95%CI 0.78, 1.09).

Table 2 should be about here

Before implementing the DID approach, we assessed whether trends in self-rated health in Greece and Ireland differed from those in Poland prior to the financial crisis (Table 3). We estimated a 'placebo' DID estimate expressed as the interaction between county and year in the period before the crisis. The odds ratio associated with the dummy for the years 2006/07 compared to 2008 suggest that the odds of poor self-rated health declined by 7% in Greece between the two points in time (OR[Odds Ratio]= 0.93, 95%CI 0.88, 0.98). There was no evidence of a significantly different trend in Greece in comparison to Poland prior to the crisis (OR for interaction=1.01, 95%CI 0.88, 1.15). This conclusion was also confirmed when separately comparing trends between the years 2006-2007 and 2007-2008. Similarly, trends in poor health between 2006 and 2007 in Ireland did not differ from those in Poland (OR for interaction=0.89, 95%CI 0.69, 1.14). These results suggest that trends in self-rated health in Greece and Ireland were not significantly

different from those in Poland, suggesting a similar decline in the odds of poor self-rated health in both countries prior to the financial crisis and indirectly supporting the validity of the common trend assumption.

Table 3 should be about here

Table 4 shows DID estimates examining the impact of the financial crisis in Greece and Ireland relative to the control population, expressed as the interaction between country and financial crisis year. Results provide evidence of a statistically significant negative effect of the financial crisis on self-rated health trends in Greece. While Poland witnessed a continuing decline in the odds of poor health after the financial crisis, trends were significantly less favorable in Greece as indicted by the DID estimate that compared health between 2006-2008 and 2009-2010, (OR=1.22, 95%CI 1.11, 1.33). In contrast, there was no evidence that the financial crisis influenced health trends in Ireland. The DID estimate was 0.98 (95%CI 0.82, 1.17) for a comparison of health between 2006-2008 and 2009-2010 with respect to the control population.

Table 4 should be about here

DID-estimates for different population sub-groups in each country are summarized in Figure 2. In Greece, effects were slightly more pronounced among those aged 65+, men, those with only primary or secondary education, and those living in more densely populated areas. However, the financial crisis had a negative effect on the health of all population sub-groups, without significant differences in magnitude

across groups. In contrast, in Ireland, there was no significant effect of the financial crisis on trends in self-rated health in any specific sub-group.

Figure 2 should be about here

Discussion

Our aim was to assess whether the onset of the financial crisis was associated with an increase in poor self-rated health in Greece and Ireland, and to examine whether specific population groups were particularly vulnerable to the health effects of the crisis. A comparison of trends in self-rated health within each country without a control population revealed no evidence of significant changes in the prevalence of poor health. In contrast, using a DID approach that explicitly incorporates a control population, we found that the financial crisis did lead to worsening trends in self-rated in Greece, while it had no effect on the prevalence of poor health in Ireland. Our results highlight the importance of incorporating a control population, and raise questions about differences between Ireland and Greece in social and policy contexts which may explain why the health effects of crisis differed between the two countries.

Explanation of results

Results for Greece confirm those from our previous study using preliminary data until 2009.[25] Incorporating recent data for 2010, our findings further suggest that

the health effects of the recession have remained and may have strengthened. Contrary to previous studies comparing within-country trends in self-rated health in Greece,[1, 31] we found no evidence of an increased prevalence of poor health in Greece despite the steep decrease in economic output in Greece between 2008 and 2009 (8%). However, health trends showed a weaker tendency to decline in Greece relative to the control population. These discrepancies between a DID and a naïve comparison of trends caution on the interpretation of single-country trends without explicitly incorporating a control group. Most likely, such comparisons may underestimate the impact of the crisis, particularly in a context of health improvements and secular mortality declines in most high-income countries during recent decades.

Our disaggregation of effects suggests that older Greeks were at least as vulnerable as their younger counterparts to experience a decline in health as a result of the crisis, despite their lack of labour market attachment. The finding that the recession affected health trends in Greece but not in Ireland is unlikely to be due to differences in (net) pension replacement rates as the latter are above the OECD average in Greece, but below the average in Ireland.[32] Earlier studies have raised the possibility that the health effects of economic downturns are not specific to the working population, but in fact may be particularly relevant for the older population.[33] Because most individuals aged 65+ in Greece are out of the labour market, this suggests that the effect of economic downturns may not only reflect the impact of job loss or other labour market related mechanisms but also changes

in pollution and decreases in the quality, quantity and nature of health care inputs.[33]

We found that Greeks with only secondary or less education experienced a substantial health decline relative to the control population. Recent evidence from the US suggests that the impact of economic recessions on labour market outcomes is born disproportionally by men, black and Hispanic workers, youth, and lower educated workers, partly due to the demographic composition of workers across industries and occupations which are differentially affected by economic downturns.[34] Less educated individuals may not only be more likely to lose their job during difficult economic times,[34] but they may also face larger job uncertainty, and greater difficulties in meeting mortgage or other debt payments. Our findings also suggest that individuals living in thinly populated areas are less vulnerable to the effects of the crisis than those living in urban and more populated areas. A possible explanation of this finding refers to the lower costs of living as well as community and social support potentially available to those living in smaller villages and rural areas,[30] where individuals may more easily rely on family and friends in times of hardship than individuals living in urban areas.

A striking finding from our paper is that despite experiencing a financial crisis of similar magnitude, Ireland did not suffer a significant change in the prevalence of poor self-rated health after the financial crisis. This finding raises the question of whether specific features of the Irish context may have protected their population

from declines in population health. While our study does not enable us to make inferences about the role of policy, we speculate that one potential explanation may be the different austerity policy response between the two countries. Compared to Greece, cuts in the healthcare budget in Ireland have been less dramatic until 2010 and have had a smaller effect on the access to and quality of health services due to substantial investments in the years prior to the crisis.[35, 36] On the other hand, it is uncertain whether recent budget cuts would be a plausible explanation for immediate overall population health decline as they have been very recently implemented, and would most likely have an effect over the medium- to long-term.

Another possible explanation for the stronger health effects of the crisis in Greece as compared to Ireland might be attributable to the more generous social safety nets in the latter. While provisions for unemployment benefits, disability benefits and other forms of social assistance are considered ungenerous in Ireland, they are generally more generous than in Greece. For example, the average unemployment replacement rate (the percentage of previous earnings which is replaced by benefits) for a single-earner in a marriage with two children in 2010 was 43% in Greece as opposed to 70% in Ireland. Most dramatically, replacement rates for long-term (5-year) unemployment was 4% in Greece as opposed to 85% in Ireland.[37] Labour markets also differ greatly with substantially higher levels of employment protection in Greece than Ireland.[38] These higher levels of employment protection may have protected the employed population in Greece from losing their jobs, but at the same time it may have prevented new entrants

from accessing the labour market.

Although our research design did not allow us to assess the role of specific policies in altering the potential effects of the economic crisis of health, our results highlight the importance of geographical context in altering this relationship. The latter is in line with the observation, that the effects of the crisis will likely be shared unequally among people from different countries or regions within a country due to the unequal distribution of incomes, housing conditions, educational opportunities and other aspects of the physical environment.[22] The financial crisis presents an opportunity to further investigate which factors may explain the higher resilience of specific countries or areas to macroeconomic shocks.

Limitations

Despite several strengths, this study has some limitations. One limitation with the quasi-experimental design used in this study is the difficulty of identifying an appropriate control group. Ideally, the latter should not have been affected at all by the financial crisis and show similar trends in health after as well as before the crisis. In the present study we use Poland as the control group because it was the only country within the European Union which did not suffer a formal recession. Whereas many key macroeconomic indicators besides GDP suggest that Poland did not experience a contraction in the economy, the strong growth which the Polish economy enjoyed in the years prior to 2008/09 decelerated. It is interesting

to note that the prevalence of poor self-rated health decreased disproportionally between 2009 and 2010 despite the slowing down of economic growth. Although the latter may be a partial explanation for the significant worsening in health trends in Greece compared to Ireland, the results are similar when only including years until 2009. In general it would have been desirable to assess the trends in self-rated health during a longer period before the onset of the financial crisis. Although we were unable to include a substantially longer time period due to the lack of comparable micro-data, the existence of a trend of health improvement in all countries seems to suggest that those trends would have continued in the absence of the financial crisis.

In our analyses, we used a dichotomous version indicating poor self-rated health to capture potentially serious deterioration of health over time. However, this approach does not capture changes across the more positive points of the scale. In supplementary models, we also used the original 5-point scale of self-rated health as outcome in an ordered logistic model. Whereas the results for Greece are very similar to those using the binary indicator of good vs. poor self-rated health, the results from the ordered logistic model suggest a small but negative effect of the financial crisis on health trends in Ireland (Appendix Table 2). Although this finding indicates a negative effect of the financial crisis on health trends in Ireland, the latter did not lead to an increase in the prevalence of poor self-rated health and was less dramatic than that in Greece. We therefore interpret these findings as indicative of a weaker effect of the crisis in Ireland compared to Greece.

A final limitation of our study is that we are not able to directly assess the effect of specific policies in mitigating potential health effects of the financial crisis. This would require a specific design focusing on specific reforms in each country. Our study, however, further points towards the policy relevance of examining the role of specific policies in explaining the different effects of financial crisis on health.[39]

Conclusion

Our results highlight the importance of incorporating a control population in assessing the impact of the recent financial crisis on health. A single-country analysis of trends without a control group can yield biased estimates of the effect of the financial crisis on health. Based on a difference-in-difference approach, our estimates suggest that the financial crisis has led to an increased prevalence of poor health in Greece but not in Ireland. We speculate that specific policies within each country, such as unemployment benefit generosity and labour market flexibility, may have contributed to the stronger effect of the crisis in Greece compared to Ireland. Although we found no consistent short-term effects of the financial crisis on health in Ireland, the long-term effects may well be different. Both countries continue to face severe financial problems, and the real effects of the crisis on health may only be visible many years or decades later [36]. Future investigations should therefore focus on assessing long-term effects and the role of specific policy responses in buffering the impact of the recent financial collapse on

health.

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Declarations

Ethical approval: Ethical approval for this study was not required since it is entirely based on publicly available survey data collected on behalf of national governments.

Competing interests: None.

Table 1. Summary statistics, EU-SILC data, ages 18+, 2006-2010

	Obs.	%	Obs.	%	Obs.	%
	Greece		Ireland		Poland	
N	68,021		41,266		164,566	
Bad or very bad self-rated health	7,354	10.81	1,501	3.64	27,866	18.08
Self-reported health						
very good	32,341	47.55	16,316	39.55	22,578	14.65
good	16,996	24.99	16,285	39.48	59,158	38.38
fair	11,330	16.66	7,147	17.33	44,554	28.9
bad	5,048	7.42	1,222	2.96	22,867	14.83
very bad	2,306	3.39	279	0.68	4,999	3.24
Age						
18-24	6,107	8.98	4,410	10.69	22,640	13.76
25-29	4,971	7.31	2,304	5.58	13,941	8.47
30-34	5,314	7.81	2,354	5.70	13,103	7.96
35-39	5,689	8.36	2,875	6.97	12,313	7.48
40-44	5,927	8.71	3,574	8.66	12,613	7.66
45-49	5,583	8.21	3,702	8.97	14,826	9.01
50-54	5,512	8.10	3,634	8.81	16,815	10.22
55-59	5,182	7.62	3,715	9.00	15,604	9.48
60-64	5,144	7.56	3,425	8.30	11,590	7.04
over 64	18,592	27.33	11,273	27.32	31,121	18.91
Males	32,616	47.95	19,626	47.56	77,774	47.26
Married	43,206	63.52	22,213	53.83	95,560	61.99
Urbanization						
Densely populated area	23,979	37.03	11,677	32.93	56,730	34.47
Intermediate area	7,402	11.52	10,237	28.87	24,734	15.03
Thinly populated area	33,062	51.45	13,546	38.20	83,102	50.5
Educational level						
Pre-primary	2,918	4.44	-		3,170	2.06
Primary	21,478	32.67	11,508	28.48	29,330	19
Lower secondary	7,363	11.2	7,155	17.71	6,430	4.18

Upper secondary	19,569	29.77	9,072	22.45	88,403	57.49
Post-secondary (non-tertiary)	2,734	4.16	3,020	7.47	6,071	3.95
Tertiary education	11,674	17.76	9,657	23.90	20,484	13.32

Table 2. Odds Ratio (OR) and 95% Confidence Intervals (95%CI): Comparison of health levels before and during the crisis in Greece and Ireland[α]

	Greece		Ireland	
	2006/07/08 vs. 2009/10		2006/07 vs. 2008/09	
	OR	95%CI	OR	95%CI
Dummy for crisis year(s)	1.060	(0.978 - 1.149)	0.9220	(0.779 - 1.091)
Observations		62,126		26,137

[α] All models include controls for sex, age, education, marital status and degree of urbanization.

Table 3. Trends in poor-self rated health prior to the financial crisis: 'Placebo' Difference-in-Differences (DID) logistic regression-based Odds ratios (ORs) and 95% Confidence Interval (95%CI) before the financial crisis (2006–2007/08)[α]

	Greece		Ireland	
	2006/07 vs. 2008		2006 vs. 2007	
	OR	95%CI	OR	95%CI
DID estimate (country of treatment x year(s))	1.011	(0.885 - 1.156)	0.890	(0.693 - 1.142)
Dummy for country of treatment	0.300	(0.274 - 0.330)	0.123	(0.106 - 0.142)
Dummy for year	0.933	(0.885 - 0.983)	0.964	(0.916 - 1.014)
Observations	215,904		84,495	

[α] All models include controls for sex, age, education, marital status and degree of urbanization.

Table 4. Difference-in-differences (DID) logit regression-based Odds Ratio (OR) and 95% Confidence Interval (95%CI): change in self-rated health during the financial crisis in Greece and Ireland relative to Poland (control population)[α]

| | Greece | | Ireland | |
| | 2006/07/08 vs. 2009/10 | | 2006/07 vs. 2008/09 | |
	OR	95%CI	OR	95%CI
DID estimate (country of treatment x crisis year(s))	1.216	(1.115 - 1.327)	0.977	(0.817 - 1.168)
Dummy for country of treatment	0.298	(0.282 - 0.315)	0.115	(0.102 - 0.130)
Dummy for crisis year(s)	0.870	(0.838 - 0.902)	0.928	(0.894 - 0.965)
Observations	215,904		160,437	

[α] All models include controls for sex, age, education, marital status and degree of urbanization.

APPENDIX Table 1. Overview of macroeconomic and demographic indicators in Greece, Ireland and Poland before the financial crisis (2007)[α]

| Indicator/Country	Poland	Ireland	Greece
GDP & inflation			
GDP per capita (PPP)	15.057	44.969	27.743
Real GDP growth (%)	6.8	5.0	3.5
Inflation (all items) (%)	2.4	4.9	2.9
Economic structure (share of real value added as % of GDP)			
Agriculture, forestry, fishing	4.3	1.5	3.5
Industry	24.4	21.7	12.7
Finance, insurance, real estate, business	17.9	27.1	22.8
Expenditure (% of GDP)			
Public expenditure on health	4.5	6.0	5.9
Private expenditure on health	1.9	1.9	3.9
Public social expenditure	19.7	16.7	21.6
Public expenditure on pensions	10.6	3.6	12.1
Employment			
Civilian labour force: males % of population 15-64	61.1	57.0	55.1
Civilian labour force: females % of population 15-64	54.2	43.0	44.9
Unemployment rate: total labour force (%)	9.6	4.7	8.3
Long-term unemployment: total unemployed (%)	45.9	29.5	50.0
Strictness of employment protection (index)	2.23	1.27	2.80
Population & health			
Total population (in thousands)	38.116	4.357	11.193
Life expectancy at birth	75.4	79.7	79.5

[α] All data refer to the year 2007 and are derived from the Organization of Economic Cooperation and Development (OECD) Country statistical profiles: Key tables of OECD countries, URL: http://www.oecd-ilibrary.org/economics/country-statistical-profiles-key-tables-from-oecd_20752288.

APPENDIX Table 2. Difference-in-differences (DID) ordered logit regression-based Odds Ratio (OR) and 95% Confidence Interval (95%CI): change in self-rated health after the financial crisis in Greece and Ireland relative to Poland (control population)[α]

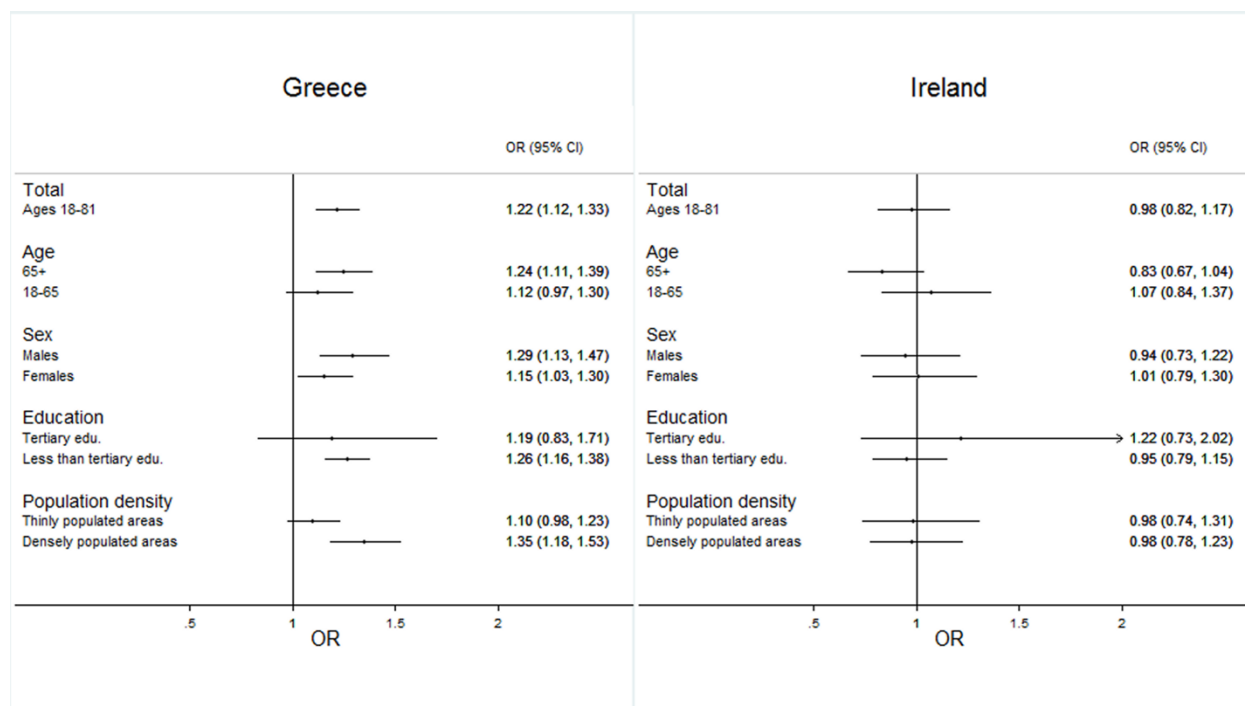|	Greece		Ireland	
	2006/07/08 vs. 2009/10		2006/07 vs. 2008/09	
	OR	95%CI	OR	95%CI
DID estimate (dummy for country of treatment x crisis year(s))	1.330	(1.258 - 1.407)	1.168	(1.073 - 1.272)
Dummy for country of treatment	0.107	(0.103 - 0.111)	0.151	(0.142 - 0.161)
Dummy for crisis year(s)	0.847	(0.828 - 0.866)	0.874	(0.853 - 0.895)
Observations	215,904		160,437	

[α] All models include controls for sex, age, education, marital status and degree of urbanization.

Figure 1. Probability of reporting poor self-rated health in Greece, Ireland and Poland (2006-2010)[α]
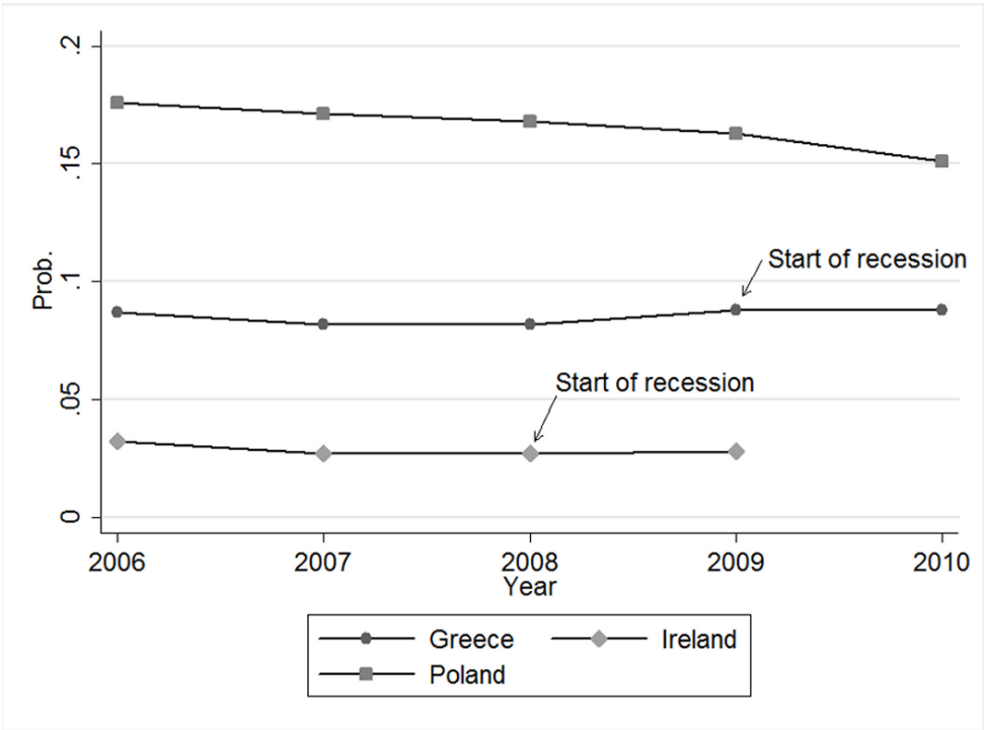
[α]Adjusted by age and sex.

Figure 2. Odds ratio (OR) for the effect of financial crisis on health (DID estimates) by sub-groups[α]

[α] Difference-in-difference logistic regression-based odds ratios: trends in poor self-rated health after the financial crisis in Greece (2006/07/08 vs. 2009/10) and Ireland (2006/07 vs. 2008/09) relative to Poland separately for different groups. Odds ratios are from a logistic regression that controls for age, sex, marital status, degree of urbanization and educational level.