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Decomposing health inequality in the EU

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Abstract

Despite high living standards and a nearly universal healthcare provision, large cross-country differences in population health exist in the European Union. More than half of this variation remains unexplained after accounting for macro-level factors. In our paper, we aim to understand how individual-level differences in demographic characteristics, education, labour market factors and income shape the prevalence of poor self-assessed health in the EU. For this purpose, we use a semi-parametric decomposition approach, which relies on constructing synthetic distributions of health that would prevail in each country if they had the distribution of the analysed factors as in the country with the best self-assessed population health – Ireland. We find regional variation in the decomposition results. The analysed factors explain up to a third of the health inequality in the EU for Southern and Central and Eastern European (CEE) countries, but they fail to explain the health differences for the Western European countries. We suggest that cross-country variation in the reporting of self-assessed health may be partially responsible for this result. Finally, we find that the detailed decomposition results for some of the explanatory factors are sensitive to the decomposition sequence, which shows that interaction effects merit further investigation.

Keywords: health inequality, decomposition, socio-economic factors, EU-SILC, cross-country
JEL classification: I14, J00, N34

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1 Introduction

National income is a good predictor of population health at low levels of economic development but it fails to account for much of the cross-national variation among rich nations (Preston, 1975; World Bank, 1993). The Preston curve from 1975 can be used to tell the story of health in the EU, which comprises countries with high living standards, yet significantly different health profiles. For example, in 2010, an average person born in Lithuania was expected to live around 9 years less than an average Italian.[1] This does not mean that all Lithuanians are destined to live shorter lives: it rather signals that some of them will not achieve as high levels of health as their Italian counterparts. In other words, a part of the explanation for the observed variation in life expectancy lies in health inequalities within each country.

A number of studies have turned to analysing within-country health inequalities in order to understand population health. One of the first notable studies was the Black Report (1980), which exposed staggering differences in health across socio-demographic groups in Britain. Since then, it has been shown that systematic and persistent health inequalities exist across the globe, whereby individuals with lower income, education and occupational status tend to enjoy considerably worse health (Kunst et al., 2005; Mackenbach et al., 2008; Adler and Ostrove, 2006). Poor health lost to low socio-economic status can be considered not only unethical but also costly: due to loss in productivity, it may account for as much as 1,4% of GDP in the EU (Mackenbach et al., 2011). It has been postulated that reducing health inequalities between socio-economic groups will lead to better population health (Mackenbach, 2006), and thus higher social and economic returns.

Having high education, income and occupational status do not guarantee favourable conditions for health, but they are good predictors of life circumstances that affect health. First, one's socio-economic position often signifies command over resources that are important for good health, which can be material, behavioural, psychosocial and health-care related (Solar and Irwin, 2010). Second, high position is associated with a reduced exposure and vulnerability to adverse life circumstances and economic shocks (Solar and Irwin, 2010; WHO, 2013). The extent to which unfavourable life circumstances cluster together and accumulate over time among the most disadvantaged groups determines the size of socio-economic health inequalities, and consequently shapes population health in each country (Bartley et al., 1997; Korpi, 2001; Whitehead, 1992).

Cross-national differences in mortality and morbidity are well-documented, yet the factors responsible for this variation remain largely unexplained (Costa-Font and Hernández-Quevedo, 2013). Underlying reasons are often sought in within-country health inequalities. Studies have shown systematic income, education and occupation-related health inequalities in both physical and self-assessed health in the EU, yet the findings on the magnitude of these inequalities vary depending on the data and methodology used (van Doorslaer et al., 1997; Eikemo et al., 2008c; Marmot and Shipley, 1996). A number of studies have reported varying patterns of health inequalities and population health across different regions and welfare state regimes (Eikemo et al., 2008b,c; Popham et al., 2013; Espelt et al., 2008; Kunst et al., 2005; Cavelaars et al., 1998). While the complete cross-country rankings remain sensitive to research design, it has been commonly agreed that institutional and socio-economic factors play an important role in shaping population health. However, many studies focus on bi-variate distributions of health and socio-economic factors and thus do not allow an investigation into the relative effects of each factor in shaping population health and health inequality across countries. A more holistic approach is therefore needed that can disentangle these effects.

Since the Black Report, there has been a growing interest in national governments, scholars and international organizations in monitoring and tackling health inequalities and improving pop-

[1] Source: Eurostat.

ulation health. These priorities are the core of the European health policy framework *Health 2020*, which aims to "significantly improve the health and well-being of populations" and "reduce health inequalities" (WHO, 2012). With health inequality gaining more ground on the European agenda, this paper aims to provide more evidence on the social causes of health inequality. In particular, it aims to explain how inequality in population health across the EU is shaped by cross-national differences in the distribution of demographics, education, labour market characteristics and income. Our underlying hypothesis is that a part of the explanation why some countries fail to achieve good health lies in unfavourable distributions of socio-economic factors. To test the hypothesis, we decompose the differences in the prevalence of poor self-assessed health between each analysed country and Ireland – the country which has the lowest prevalence of poor subjective health in the EU in our study and elsewhere (Olsen and Dahl, 2007; Hildebrand and Van Kerm, 2009). We use data from the EU Statistics on Income and Living Conditions (EU-SILC) and classify countries into three regions to test for regional differences in the results.

We employ a micro-econometric decomposition approach in the spirit of Oaxaca (1973) and Blinder (1973), which relies on comparing the actual distributions of health with a series of counterfactual distributions that would prevail if one or several factors at a time were imported from one country to another. This approach has been initially used to explain wage differentials between different demographic groups. It has been extended to accommodate the differences in income and other outcomes between groups and over time beyond the mean, and more recently to incorporate the complexity of tax-benefit systems as explanatory factors (Bourguignon et al., 2007; Bargain, 2010; Sologon et al., 2017). In the health economics literature, the approach has been applied to explain income-related inequalities in self-assessed health across countries and in a country over time (Siegel et al., 2014; van Doorslaer and Koolman, 2004), socio-economic waiting time gaps (Johar et al., 2013) and malnutrition inequalities (Wagstaff et al., 2003). However, most of these studies rely on the decomposition of a single statistic rather than across the whole distribution of health, and where only ordinal measures of health are available, use cardinalised values to obtain a single index of inequality.

Our approach relies on the semi-parametric decomposition technique proposed by DiNardo et al. (1996) to estimate how the whole distribution of poor self-assessed health varies with the underlying factors across countries. First, we obtain the effects of each factor in the sequential decomposition. Second, since the proposed approach suffers from the problem of path dependence (the effects of each factor may vary depending on the order in which they are introduced), we analyse how the results compare under two additional scenarios. By doing this, we aim to contribute to the methodological debate discussed in Fortin et al. (2010) in regard to the path dependence in the detailed decomposition. Due to the likely overlap and interaction effects between the analysed factors, we expect the results to be sensitive to the decomposition order. While the findings of the study do not necessarily imply causality, uncovering the quantitative strength of these relationships across countries has the potential to inform policy makers on the key areas to focus on in order to reduce socio-economic health inequalities and improve population health.

We find that the analysed factors taken together explain a fair amount of health inequality for most of the EU countries, except the Western European countries. Differences in the reporting of self-assessed health are among the likely factors that could help explain the latter result. We also find a lot of regional variation in the detailed decomposition results. As expected, the results for most of the factors are sensitive to decomposition sequence, which confirms that interactions are important and merit further investigation.

2 Theoretical framework

Different frameworks exist to date that try to conceptualize the determinants of health and health inequalities (Graham, 2004; Solar and Irwin, 2010; Whitehead et al., 2001a). While theoretical foundations are at an early stage, many studies distinguish between upstream and downstream factors that shape population health (Galea et al., 2010; Whitehead et al., 2001b; Mackenbach and Bakker, 2003). *Downstream factors* are individual factors that directly affect health, such as nutrition, physical activity, working and living conditions. *Upstream factors*, on the other hand, are factors that occur as a consequence of social stratification processes that divide individuals into different positions by social status, wealth and income. These, in turn, shape access to material, psychosocial, behavioural resources and health-care (Solar and Irwin, 2010). Attention given in the literature to the downstream factors places the focus on individual agency, while the latter acknowledges the role of institutions, culture and societal values in shaping patterns of health and disease (CSDH, 2008).

Understanding population health requires complex thinking on how different resources enter the health production process, and how they cluster and interact with each other to produce differential health outcomes. The fact that much of health inequality in a country is systematic – individuals with higher socio-economic status enjoy considerably better health than those below – suggests that the upstream factors cannot be neglected. For example, it has been argued that low education, occupational status and income are linked to enhanced exposure to negative experiences shaping health, heightened vulnerability to these experiences and the likelihood to suffer worse consequences of disease (Diderichsen et al., 2001). Studying how population health varies with socio-economic factors across countries has the potential to inform policy makers on the priority areas to target in order to reduce health inequalities and improve population health.

This paper takes into consideration four groups of factors that shape cross-national variation in self-assessed health in the EU: demographics, education, labour market factors and income. In addition to this, it considers how the relative effect of each factor in explaining health variation varies across different regions in Europe. The following paragraphs discuss the proposed factors to analysing health inequality and the pathways through which they affect population health.

Demographic factors

First and foremost, population health is shaped by the distribution of the demographic characteristics, such as age, gender, marital status and ethnicity. Some demographic factors can be classified as the downstream factors because they directly affect health (age, for example) and others may be socially constructed (ethnicity) and therefore share some characteristics of the upstream factors. Various pathways exist that link demographic factors and health. For example, married individuals tend to enjoy better health, which could be explained either by selection effects (healthier individuals are more likely to get married) or an increased propensity to take action during illness while married (Verbrugge, 1979; Waldron, 1996). In addition to this, substantial health differentials have been found across ethnic and racial groups (Smith et al., 1998; Charasse-Pouélé and Fournier, 2006), which have been attributed to social exclusion, biology and lifestyles, among other factors (Smith et al., 2003). While such ethnic differences in health are found in many countries studied, they are not uniform and depend on complex histories that led to varying differentials of health and disease across countries (Smith, 2000). Finally, a somewhat controversial role is played by gender: females tend to report poorer health and more daily limitations, but enjoy significantly longer lives than males (Nusselder et al., 2010).

Education

Higher educational attainment affects individual health through a variety of factors (von dem Knesebeck et al., 2006; Mackenbach et al., 2015; Cavelaars et al., 1998). First, because education is commonly obtained early in life, it reflects early life circumstances and shapes income and job

prospects later in life (Lynch and Kaplan, 2000; Galobardes et al., 2006). Better educated people tend to have better economic conditions that lead to better health: they are more likely to be employed, have full-time and more fulfilling jobs, and higher paid jobs. Second, better educated people tend to be more receptive to health messages, have healthier lifestyles and be better able to find suitable health services (Galobardes et al., 2006; Adler and Newman, 2002; Cutler and Lleras-Muney, 2006). Finally, education is linked to a greater sense of control of one's life and higher levels of social support, which has been shown to affect health through increased immune response and lower risk of stress-related diseases (Ross and Mirowsky, 1995).

Education is typically measured by years of full-time education or the highest level achieved (Eikemo et al., 2008b; Shavers, 2007) and its effects tend to increase with the years of education (Cutler and Lleras-Muney, 2006). It is considered to be a more reliable indicator of socio-economic position than income and occupation, because it is achieved early in life and therefore is not subject to reverse causality in older ages (Mackenbach et al., 2015; Duncan et al., 2002). However, the importance of education for good health might be overlooked when indicators of income and occupational position are taken into account, because education to a large extent works through these two pathways (Lahelma et al., 2004).

Labour market factors

Like education, labour market factors are likely to affect population health both directly and indirectly through the distribution of income. Occupational grade and labour market status (in particular employment and unemployment) are among the factors most often studied in relation to physical and mental health and mortality (McKee-Ryan et al., 2005; Kunst et al., 1999).

Occupational grade has been found to be associated with a variety of health indicators, such as self-rated health, physical and mental health, presence of long-standing illness and a number of diseases (Lahelma et al., 2005). Lower occupation might affect health through working conditions, such as a higher exposure to occupational hazards and toxic compounds, health-damaging behaviours and psychosocial stress (Shavers, 2007; Kunst et al., 1999; Baum et al., 1999). The latter pathway received attention after the Whitehall study of British civil servants, which showed that a graded relationship between occupation and health exists even among white collar workers with well-paid and secure jobs (Marmot and Shipley, 1996). Work-based stress combined with a lack of autonomy over one's work are believed to be the psychosocial factors that can cause physiological changes, such as increased risk of cardiovascular diseases and reduced immune system response (Solar and Irwin, 2010). It has been shown that the gaps in mortality between different occupational grades persist in old-age and tend to widen with age (Marmot and Shipley, 1996).

Labour market status can also be perceived as an outcome of social stratification as it depends on job opportunities, institutions, policies and and cultural values (Giavazzi et al., 2009). Entering unemployment is associated with a decline in income, social position and self-esteem, and prolonged periods of unemployment are believed to be the cause of chronic stress and in turn issues with mental and physical health (Bartley, 1994; Bartley and Plewis, 2002; Korpi, 2001). On the other hand, having secure employment with satisfying working conditions is related to slower development of limiting illness and shorter duration of illness (Bartley et al., 2004). Varied effects of unemployment on physical and mental health have been found across different socio-economic and occupational groups as well as across countries with different levels of income inequality and unemployment protection (Paul and Moser, 2009).

Income

Income is an economic asset that ensures access to material conditions important for health, such as proper nutrition, housing and in some cases access to healthcare (Adler and Newman, 2002). In addition, it has been suggested that income has indirect effects on health, such as through the ability to participate in society and feel in control of one's life circumstances, which act as protective systems against diseases caused by stress and immune system failures (Marmot,

2002). Material deprivation and financial strain, on the other hand, are associated with a decline in mental and physical health (Price et al., 2002).

The relationship between income and health has been analysed at both individual and country levels. On the individual level, a strong association between income and health has been found for a number of industrialized countries: US (Ettner, 1996; Braveman et al., 2010), Germany (Frijters et al., 2005), UK (Benzeval and Judge, 2001; Benzeval et al., 2000; Ecob and Davey Smith, 1999) and elsewhere in the EU (Mackenbach et al., 2005). It has been suggested that the shape of the relationship at high levels of income is curvilinear, with diminishing and sometimes reversing association between income and health (Ecob and Davey Smith, 1999; Mackenbach et al., 2005). On the country level, consistent health inequalities have been found both between different income groups and across the whole income distribution, but some variation in the strength of the gradient has been found across different welfare states (Jürges, 2009; Eikemo et al., 2008c; van Doorslaer et al., 1997). While most studies have produced conflicting results due to different methodologies and data used, income-related inequalities in health have not been found to be the smallest in Nordic countries, contrary to the expectation.

Health and the welfare state

In order to understand the pathways leading to cross-country differences in population health, recent studies have turned into analysing how population health and health inequalities vary across different welfare state regimes, social welfare and labour market institutions, and the level of social spending (Bergqvist et al., 2013). Studies using the former approach, often referred to as the *regime approach*, have produced somewhat consistent results for population health but not for health inequalities. Overall, Social Democratic and Anglo-Saxon countries have been found to have the best population health (Olsen and Dahl, 2007; Muntaner et al., 2011; Chung and Muntaner, 2007), yet health inequalities have not always been found to be the smallest in the Social Democratic welfare states (Popham et al., 2013; Eikemo et al., 2008a). One possible explanation may reside in differences in research design: various datasets, health measures and socio-economic indicators used (Cavelaars et al., 1998). The studies that have analyzed specific policies have been able to produce more consistent results: for example, eligibility-based unemployment benefits tend to mitigate the adverse effects of unemployment on health than means-tested social assistance (Rodriguez, 2001). Overall, a more generous welfare provision seems to produce smaller health inequalities and better population health (Brennenstuhl et al., 2012; Ferrarini et al., 2014).

The regime approach originally follows the classification by Esping-Andersen (1990) or similar classifications which group countries in terms of the degree of de-commodification, social stratification and welfare provision (Pega et al., 2013). The original approach distinguishes between three types of welfare states: the Liberal welfare state with minimal social welfare provision based on strict entitlement criteria and overall reliance on the market; the Corporatist regime with status-differentiating welfare programs and reliance on traditional family structures; and the Social Democratic regime with a generous universal welfare provision minimal relience on the market (Esping-Andersen, 1990). Many classifications have been developed which place more emphasis on the role of gender, politics and public services, and accommodates a wider range of countries, such as Southern European and post-communist countries (Bambra, 2007; Eikemo et al., 2008a).[2] However, welfare state typologies largely overlap with regional classifications (Eikemo et al., 2008a) and in some cases lack a theoretical explanation. For example, it has been argued that there is no Central and Eastern European welfare cluster as these countries have followed very distinct paths since the fall of communism (Hacker, 2009). In addition, countries undertook various consolidation measures in the face of the recent economic crisis, which might have affected the make-up of the traditional social welfare states. Therefore, we will abstain from

[2]The criticism towards the "Three worlds of Welfare" by Esping-Andersen and alternative approaches developed since are discussed in Bambra (2007).

using welfare state classifications. Instead, we will group countries by regions to take account of some of the differences in economic and social aspects across the EU.

Following the discussion on how socio-economic and demographic factors shape health and health inequality, Figure 1 summarizes how these factors come together to produce differences in population health across countries. The top part of the figure shows the upstream factors, which arise as a consequence of social stratification processes induced by social, cultural and institutional context. These upstream factors, in turn, shape the distribution of the downstream factors that directly affect health. Welfare state acts as a mediator between the upstream and downstream factors, offering differing degrees of protection to different population groups across countries and thus shaping cross-country health inequality.

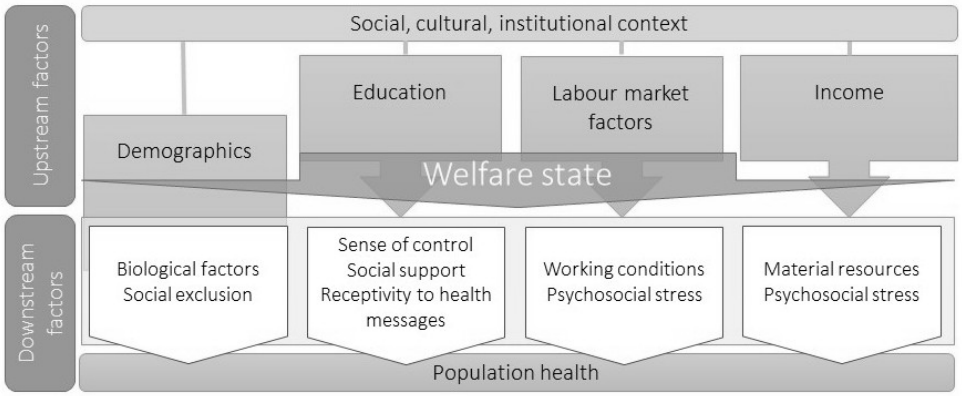


Figure 1: Theoretical framework

3 Decomposition approach

Various micro-econometric decomposition approaches in the spirit of Oaxaca (1973) and Blinder (1973) can be used to decompose the difference in the prevalence of poor health into the underlying factors between any two countries. The basic idea relies on constructing a synthetic distribution of health that would prevail in country B had it had a set of observable characteristics as in country A. In an aggregate decomposition, the overall difference between the two distributions of health (1) can then be decomposed into the part explained by all factors of interest taken together (2) and the other factors (3) in the following manner:

$$H_B - H_A = \tag{1}$$

$$[H_B - H_B^{cf}] \tag{2}$$

$$+[H_B^{cf} - H_A^{cf}] \tag{3}$$

Where:

- H_A – prevalence of poor health in country A
- H_B – prevalence of poor health in country B
- H_B^{cf} – prevalence of poor health in country B had it had observable factors as in country A.

In our case, country A represents the country with the lowest prevalence of poor health – Ireland – which serves as a benchmark in evaluating country performance in terms of self-assessed health. Counterfactual distributions can be obtained either parametrically (by estimating a series of equations that represent the labour market, income and health) or non-parametrically

(re-weighting) (Fortin et al., 2010). It has been argued that in some cases the two approaches can be genuine substitutes (Bourguignon et al., 2007).

We employ a semi-parametric decomposition technique proposed by DiNardo et al. (1996), which was first used to estimate the effects of unions on wage inequality. The approach relies on estimating a re-weighting factor $\Psi(X)$ which, when applied to country B, produces a synthetic distribution of the underlying factors mimicking that of country A, but retaining the health function from country B. The resulting counterfactual distribution of health H_B^{cf} is then used to decompose the cross-country differences in health into the underlying factors. It has been shown than the re-weighting factor $\Psi(X)$ can be constructed from pooled data as a product of the ratios of conditional and unconditional probabilities of each observation belonging to country A and B in the following way:

$$\Psi_i(x) = \frac{Pr(C_i = A|x)}{Pr(C_i = B|x)} * \frac{Pr(C_i = B)}{Pr(C_i = A)},$$

where x are individual attributes (age, sex, education, etc.), C_i denotes country and the conditional probabilities are estimated using a logistic regression. When using survey data, the obtained re-weighting factors $\Psi_i(x)$ are interacted with the sample weights.[3] The proposed approach has several advantages over the original Oaxaca-Blinder decomposition: first, one can decompose statistics other than the mean; second, it does not require a parametric model to relate the outcome of interest to the explanatory factors. Most importantly, the original Oaxaca-Blinder decomposition approach relies on the linear model specification, which is problematic with binary dependent variables, such as poor self-assessed health in our case.

By using this approach, we are able to answer the following question: "How would the distribution of health in each country look like if it had the distribution of demographic and socio-economic factors as in Ireland, but the health function conditional on these characteristics remained unchanged?" Ultimately, we are interested in the part of the difference in the prevalence of poor health between the two countries that can be explained by each of the analysed factors.

Several things are worth noting about the semi-parametric re-weighting method. First, cross-country differences in factors like quality of education and the extent of decommodification provided by the welfare state makes it unlikely that the elasticity of health to the analysed factors would be the same across countries. In other words, the decomposition approach is path-dependent, meaning that if we were to re-weight the Irish population based on the observed characteristics of other countries, we are likely to obtain different results (Fortin et al., 2010). Thus, by keeping the health function constant, we are potentially overlooking a part of the explanation of the observed differences in population health across countries. Second, the re-weighting approach cannot be directly extended to the detailed decomposition without imposing further assumptions (Fortin et al., 2010). Due to the overlap and interactions between the underlying factors, the sequence with which the factors are introduced is likely to change the detailed decomposition results.

Some of the proposed solutions to the latter problem are the following: 1) to average the effects of each factor over all possible sequences in the spirit of Shorrocks (1999); (2) to employ an additive decomposition approach proposed by Biewen (2012) by calculating *marginal* effects of each factor and all the possible interaction effects. The drawback of the former approach is that it may mask much of the variation of the effects and their interactions. The results of the latter approach, on the other hand, may be difficult to interpret when many factors are taken into account. Ignoring the interactions and considering marginal effects alone may produce biased estimates when the effect of each factor is obtained without controlling for other factors (Gelbach, 2009).

[3]The survey weights are normalized before the decomposition for each country. The final weights used to obtain counterfactual distributions are capped at a maximum of 25 in order to reduce the sensitivity of the results to model specifications.

For example, re-weighting the population of country B according to the income distribution of country A without controlling for education might overestimate the effects of income, if high income individuals are also individuals with higher educational achievement and thus are more likely to have better health even in the absence of high income.

It has been proposed that the true effect of each factor can be estimated by comparing the following distributions: (1) the counterfactual distribution that would be obtained from country B if all the other factors but factor x_k were distributed as in country A; (2) the counterfactual distribution that would prevail in country B if all the observed factors were distributed as in country A (Fortin et al., 2010). In other words, it has been suggested that obtaining *conditional* rather than marginal distributions of health solves the omitted variable problem in the detailed decomposition. However, the effects obtained using the conditional decomposition approach do not add up to the aggregate effect and are likely to underestimate some of the effects in cases with large overlap between the explanatory factors.

Alternatively, in the cases where following a particular sequence of factors added one by one can be justified, the *sequential* decomposition approach might be in order (Fortin et al., 2010). This approach has been applied, for instance, to study the effects of the changes in the characteristics of American youth on the distribution of wages, where the authors first accounted for parental background and then sequentially added variables related to education and transition to the labour market (Altonji et al., 2008). Similarly, in our paper we consider a set of factors that occur one after another in sequence: demographics, education, labour market factors and income (Figure 2). By doing this, we are able to obtain economically interpretable results using the sequential decomposition approach.

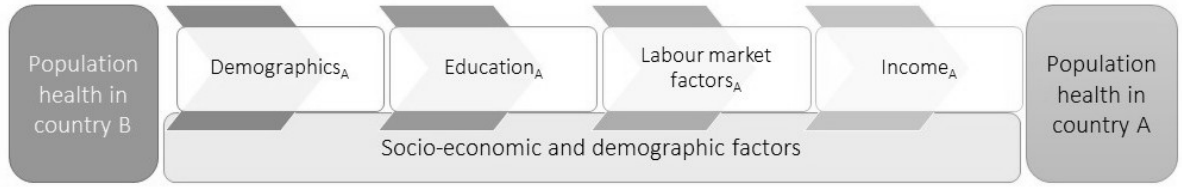


Figure 2: Sequential decomposition

Following the aforementioned debate, we present the detailed decomposition results for cross-national differences in population health in the EU as follows. First, we estimate the contributions of the underlying factors across different welfare states in the EU using the sequential decomposition approach. Second, we show how the results of the sequential decomposition fare in relation to the results obtained using marginal and conditional decomposition approaches. By doing this, we aim to contribute to the methodological debate on the path dependence problem in the detailed decomposition discussed in Fortin et al. (2010). The overall difference in the prevalence of poor self-assessed health between Ireland and each analysed country is decomposed as follows:

$$
\begin{aligned}
&H_B - H_A = \\
&= H_B - H_B^{d_A} && (demographics) \\
&+ H_B^{d_A} - H_B^{d_A e_A} && (education) \\
&+ H_B^{d_A e_A} - H_B^{d_A e_A l_A} && (labour\ market\ factors) \\
&+ H_B^{d_A e_A l_A} - H_B^{d_A e_A l_A i_A} && (income) \\
&+ H_B^{d_A e_A l_A i_A} - H_A && (other\ factors)
\end{aligned}
$$

Alternatively, the results for marginal and conditional decomposition approaches are obtained in the following manner:

Table 1: Marginal and conditional decomposition effects

Marginal effects	Conditional effects	Explanatory factors
$H_B - H_B^{d_A}$	$H_B^{e_A l_A i_A} - H_B^{d_A e_A l_A i_A}$	demographics
$H_B - H_B^{e_A}$	$H_B^{d_A l_A i_A} - H_B^{d_A e_A l_A i_A}$	education
$H_B - H_B^{l_A}$	$H_B^{d_A e_A i_A} - H_B^{d_A e_A l_A i_A}$	labour market factors
$H_B - H_B^{i_A}$	$H_B^{d_A e_A l_A} - H_B^{d_A e_A l_A i_A}$	income

Like many of the decomposition approaches currently available, the semi-parametric decomposition approach by DiNardo et al. (1996) suffers from two additional drawbacks. First, to keep the estimation manageable, the approach ignores the general equilibrium effects; second, the obtained effects do not imply causality (Fortin et al., 2010). However, due to the complex interplay between socio-economic factors and health, the direction of causality is difficult to prove even in longitudinal studies (Goldman, 2001). Decomposition methods helps to uncover the quantitative strength of these relationships and advise on factors to be investigated in depth (Fortin et al., 2010).

4 Data

Micro-econometric decomposition approach requires detailed data on health and related socio-economic factors. We use the European Statistics on Income and Living Conditions (EU-SILC), a micro-level survey that contains information on living standards, housing, social exclusion, labour market participation and health. EU-SILC provides both cross-sectional data collected every year and panel data for duration of 4 years for all EU member states and Iceland, Norway, Switzerland, Turkey and Croatia.[4] EU-SILC data is one of the major data sources in Europe for cross-national research and social reporting in the EU, with large country samples and harmonized data collection concepts, guidelines and procedures. The richness of the dataset in providing information on demographic and socio-economic factors and availability of health information are some of the main advantages of using it to understand the sources of health inequality in the EU. We use the cross-sectional dataset from year 2010.

EU-SILC collects information on three variables related to health status: self assessed health (5 categories from very good to very poor health), chronic morbidity and limitations in activities due to health issues. In this paper, we focus on the measure of self-assessed health as our main dependent variable. Self-assessed health (SAH) is a widely used indicator in cross-country analysis of health inequalities and is available in a number of socio-economic surveys, which helps to ensure some degree of comparability across different studies. Self-assessed health has been shown to be a good predictor of functional and cognitive impairment later in life (Bond et al., 2006) and mortality (Idler and Benyamini, 1997). In addition, it has been found to be reliable compared to some other health indicators available in household surveys (Lundberg and Manderbacka, 1996). Self-assessed health is largely reflective of the state of mental and physical health, such as long-standing illness, mobility and depression (Jylhä et al., 1998).

One of the challenges of using self-assessed health are potential variation in response patterns across different countries and socio-demographic groups (Bago d'Uva et al., 2008; Crossley and Kennedy, 2002; Lindeboom and van Doorslaer, 2004). In addition to this, problems with aggregation arise due to the ordinal nature of the self-assessed health indicator. Normative decisions used to cardinalise the values may be responsible for a lot of heterogeneity in the cross-country comparisons of health and health inequality (Costa-Font and Hernández-Quevedo, 2013). Due

[4]EU-SILC 2010.

to this, we will limit the analysis to two categories: good health, which includes *good* and *very good* response categories, and poor health, which comprises *very poor*, *poor* and *fair* health. We use the prevalence of poor self-assessed health as an indicator of population health. While dichotomizing the variable solves the problem with aggregation, it will not allow to explore the full range of cross-country variation in self-assessed health.

In order to explain the variation in population health across countries, we consider demographics, education, labour market characteristics and income. As it has been explained in the theoretical section, some of these factors might have a direct influence on health (age and gender, for example), while others act as indicators of various material, behavioural and psychosocial factors that shape health.

Demographic factors include age, sex, marital status (married and not married) and the country of birth (local or foreign born). Education is measured by the highest ISCED level attained, grouped into three categories – lower secondary or below, ISCED levels 0-2; upper secondary and post-secondary non-tertiary, ISCED levels 3-4; and tertiary education, ISCED level 5. Labour market factors are represented by two sets of variables, namely: self-defined economic activity status (employed/student, self-employed, unemployed, retired, disabled and inactive) and occupational grade (10 categories from legislators to elementary occupations, including a category for individuals with no work experience). To account for differences in income, two sets of measures are used: an objective measure denoting the individual's position in income distribution in relation to country's median income (5 categories derived from the Irish distribution[5]), and a subjective measure of reporting difficulties in making ends-meet (with difficulty and great difficulty). We include a self-assessed measure of poverty due to two reasons: first, income may not reflect purchasing power differences across regions and countries; second, subjective measure might be a proxy for stress related to financial strain that might have an indirect effect on health. Explanatory factors and indicators used are summarized in Table 2.

Table 2: Explanatory factors

Explanatory factors	Variables	Values
Demographics	Age	30-79
	Gender	male, female
	Marital status	married, single
	Country of birth	local, foreign-born
Education	Highest ISCED level attained	tertiary, upper secondary, other
Labour market factors	Labour market status	employed/student, self-employed, unemployed, retired, disabled, inactive
	Occupation	10 categories (incl. people with no work experience)
Income	Difficulty in making ends meet	yes/no
	Position of equivalised disposable income in relation to median income in each country	5 categories derived from the Irish income distribution

To ensure cross-country comparability and avoid potential bias due to non-response, we select countries with sufficient information on health and explanatory factors. We found a large variation in response rates to the question of self-assessed health across countries with different modes of data collection. Most of the countries that largely rely on national registers to collect informa-

[5]Individual income is based on household disposable income equivalised using the OECD modified equivalence scale. It assigns a weight of 1 to the first adult, 0.5 to the second adult and 0.3 to children below 14 years of age. Income categories are calculated based on the Irish income distribution, where cutoff points are calculated by dividing income of each quintile by median income. The obtained cutoff points (0.64, 0.86, 1.15, 1.57 of median income) are later used to divide incomes in 5 categories in each country.

tion (excluding Latvia and Ireland) have response rates for self-assessed health ranging between 44.9% in the Netherlands to 60.1% in Slovenia (Annex, Table 5).[6] These countries collect the remaining information by interviews of selected respondents. It is advised to view the cross-country results between countries with different modes of data collection with caution, in particular in the case of variables with high non-response (Katchadourian and Cambois, 2013). Therefore, we exclude these countries from our sample. In addition to this, we exclude Malta due to around 80% of non-response to the question about occupation and Romania due to the differences in the coding of the occupational grades. we also exclude the UK due to high non-response in the question on the highest education level attained.

To avoid potential bias resulting from relatively larger non-response among the young and old individuals, we limit our sample to individuals of 30 to 79 years old. Missing out on some of the economically active population might lead to an overestimation of poor health among the young, whereas non-response among the old-age individuals due to inability to respond to questions might underestimate the extent of activity limitations among the old. [7] Finally, in order to have a balanced sample throughout the decomposition, we drop the observations for which there is missing data for any of the explanatory variables. We compare the prevalence of poor health before and after selecting observations with full information on self-assessed health and explanatory factors in Table 6 in the Annex, which confirms that we do not have significant difference. However, we do not know whether any bias may result for countries with some missing data for self-assessed health (namely, Czech Republic, Lithuania and Estonia). Therefore, results for these countries should be viewed with some caution.

5 Results

This section consists of two parts. First, we discuss how self-assessed health varies with country-level indicators of health and healthcare performance, income, education and labour market situation. Second, we review the decomposition results in order to shed light on how the distribution of demographic and socio-economic factors can help explain some of the variation in the prevalence of poor self-assessed health across the EU.

To take into account some of the regional differences with respect to economic and social conditions, we classify countries into three regions: Western European countries with well-established social welfare states, Southern European countries with a mix of extensive and limited social welfare provisions and important role of family in social care and Central and Eastern European (CEE) countries that have undergone massive liberal reforms and are struggling with ensuring adequacy in social welfare provisions (Table 3). Western countries consist of mainly Bismarckian welfare states with more generous status-differentiating social welfare provisions and Ireland characterised by a larger role of the market and means-tested social benefits (Eikemo et al., 2008a). While these typologies reflect some of the variation in terms of economic performance and social welfare provision, they are by no means universal and mask some cross-country variation, especially with respect with austerity policies undertaken in response to the recent economic crisis (Quaglio et al., 2013).

[6] EU-SILC 2010, own calculation.

[7] Recommendation by Katchadourian and Cambois (2013).

Table 3: Country classification

Region	Characteristics	Countries
Western Europe	Countries with long-established social welfare provisions to tackle poverty and inequality with differing balance between the role of the market and the state (Mackenbach, 2012; Eikemo et al., 2008a)	Ireland, Germany, France, Austria, Belgium, Luxembourg
Southern Europe	Countries with a combination of basic and generous social welfare provisions, limited or partial health care coverage, important role of family in social care (Eikemo et al., 2008a)	Greece, Italy, Portugal, Spain, Cyprus
Central and Eastern Europe (CEE)	Post-soviet economies that have undergone systematic shift from universalism towards decentralisation, with often inadequate financial resources that result in rudimentary welfare provision, underperforming health care systems and significant role of the family in social care (Hacker, 2009; Eikemo et al., 2008a)	Czech Republic, Slovakia, Hungary, Slovenia, Poland, Estonia, Lithuania, Latvia, Bulgaria

5.1 Country-level characteristics and self-assessed health

Analysis of health differences cannot be undertaken without paying attention to the performance of healthcare systems, which can be summarized looking at some of the indicators of healthcare coverage, funding and health outcomes. Several things emerge from Table 4. First, some cross-country variation exists in terms of population coverage of health insurance, which ranges from 83% in Cyprus to full coverage in half of the countries analysed. Services covered under the basic health insurance usually include doctor visits, medical examinations and hospital care (OECD, 2012b). In countries where health insurance is not mandatory, individuals may seek healthcare at their own expense. However, coverage is not a perfect indicator of healthcare access due to the differences in the benefits covered under health insurance and cost-sharing arrangements, which can range from full reimbursement to user fees (OECD, 2012b). The share of out-of-pocket payments is a good indicator of accessibility to healthcare services provided by the state. These include co-payments for health services and private providers, pharmaceuticals and in some cases informal payments incurred by the patients. Some regional patterns emerge from Table 4: Western European countries have on average the lowest share of out-of-pocket payments (from 7.3% in France to 19.4% in Belgium), compared Southern and Central and Eastern European region where the rates vary from 14.9% in Czech Republic to alarming 43.4% and 49.4% in Bulgaria and Cyprus, respectively. These figures go in line with healthcare expenditure per capita and as a share of GDP, which are highest in the Western European countries and lowest in the CEE region.

Table 4: Indicators for health and health care

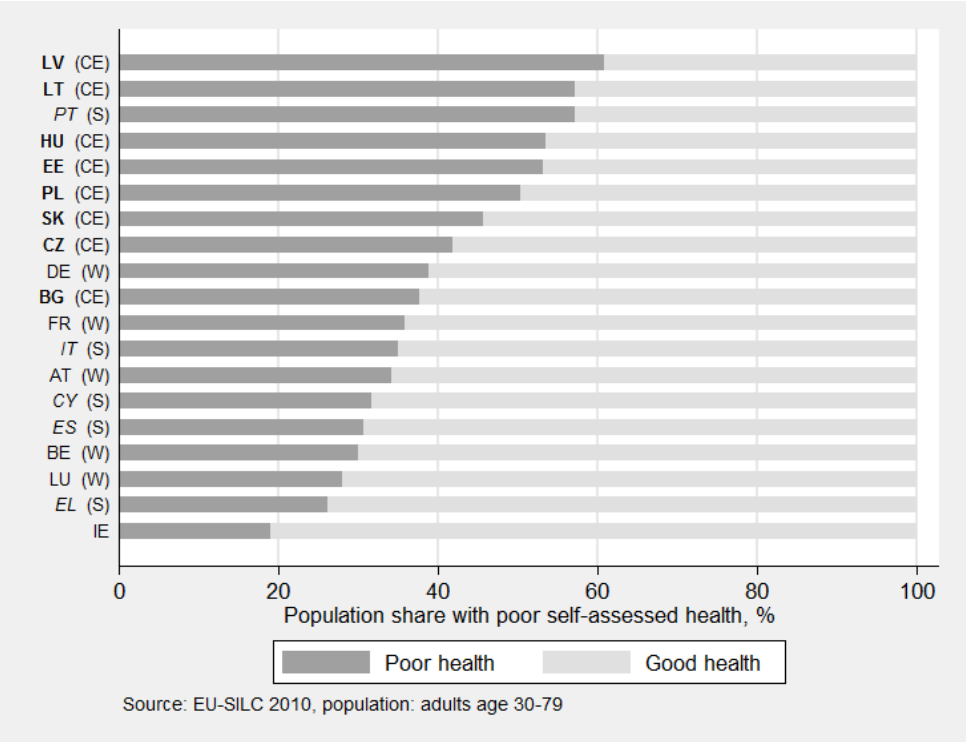
	Health insurance coverage*	Share of OOPs*	Total health expenditure per capita, EUR PPP*	Total health expenditure / GDP*	Health policy performance scores**	Total mortality rates*	Chronic illness***	Limited activity***	Unmet need***
Western Europe									
Austria	99.3	16.8	3382.5	11.0	48.0	562.7	37.8	31.2	2.4
Belgium	99.0	19.4	3052.4	10.5	17.0	601.0	28.4	25.1	0.7
Germany	100.0	13.2	3337.0	11.6	35.0	565.3	39.5	34.4	7.0
France	99.9	7.3	3058.1	11.6	52.0	509.6	40.2	26.6	4.8
Ireland	100.0	17.4	2862.1	9.2	38.0	545.0	30.5	19.3	2.9
Luxembourg	97.6	11.6	3607.2	7.9	25.0	524.5	24.4	22.1	3.4
Southern Europe									
Cyprus	83.0	49.4	1782.6	7.4	33.0	531.6	41.2	22.4	8.0
Greece	100.0	38.4	2244.3	10.2	16.0	577.4	24.0	19.4	8.2
Spain	99.2	19.7	2345.4	9.6	35.0	487.6	31.8	24.1	7.6
Italy	100.0	17.8	2282.2	9.3	31.0	495.6	22.4	19.9	7.7
Portugal	100.0	26.0	2096.7	10.7	19.0	602.2	38.0	34.4	3.0
Central and Eastern Europe									
Bulgaria	88.5	43.4	745.0	7.2	-33.0	970.2	21.2	16.4	15.6
Czech Republic	100.0	14.9	1450.1	7.5	12.0	724.1	30.9	23.3	3.5
Estonia	93.7	18.6	995.1	6.3	-32.0	839.8	49.5	35.1	6.8
Hungary	100.0	26.2	1231.3	7.8	-28.0	898.0	41.5	32.7	8.9
Lithuania	100.0	27.2	971.9	7.0	-28.0	964.0	32.4	25.5	4.2
Latvia	100.0	36.1	821.2	6.8	-32.0	951.3	39.8	34.8	24.7
Poland	97.5	22.1	1067.5	7.0	-4.0	775.6	38.7	26.9	16.5
Slovakia	94.8	25.9	1614.4	9.0	-17.0	855.0	36.6	41.2	6.5

* OECD (2012b) (2010 or nearest year); ** Mackenbach et al. (2013); *** EU-SILC 2010; Population: adults age 30-79

The level of healthcare funding and the share of expenses covered by the public budget seems to translate directly into differences in health achievement. From the mortality rates per 100 000 population, it is evident that Western and Southern European countries highly outperform Central and Eastern European countries. For example, age-adjusted mortality rates in Lithuania are almost twice as large compared to that of Spain. A similar picture emerges from the health policy performance scores proposed by Mackenbach et al. (2013). The performance scores are composed of 27 indicators from 11 areas (tobacco, alcohol, food and nutrition, fertility, pregnancy and childbirth, child health, infectious diseases, hypertension, cancer screening, mental health, road traffic safety and air pollution) and include performance, outcome and impact indicators, such as country's policy score on Tobacco Control Scale, smoking prevalence rate and lung cancer mortality rate. The performance scores reveal large regional differences. Western countries show above-average performance, with France and Austria having the highest scores among the analysed countries. From the Southern European countries, Spain ranks best with a performance score similar to that of Germany, followed by Cyprus and Italy. All the Central and Eastern European countries have below average performance. Bulgaria and Latvia have the lowest performance scores, and they are also among the three countries where more that 15% of the population reports unmet need in healthcare and over one third of costs are covered by the OOPs (Table 4). Chronic illness and limited activity, on the other hand, seem to be rather evenly distributed across regions.

The descriptive results so far suggest a clear division in health and healthcare performance between the East and the West. This contrast is also seen in the distribution of the prevalence of poor health (Figure 3). This phenomenon, known as the East-West divide (Carlson, 2004; Nolte and McKee, 2004; Zatonski and Bhala, 2012), has been attributed to the recent political history, differences in economic performance, behaviours, health policies and culture (Mackenbach, 2014).

Most of the CEE countries have above average prevalence of poor health ranging from 60.8% in Latvia to around 38% in Bulgaria. No clear rankings can be made between the Southern and Western European regions. Surprisingly, Portugal is one of the countries with a very large share of individuals reporting poor health, yet Greece stands out as one of the countries with the best subjective health. The most striking are cross-country differences in self-assessed health: for example, the Irish population is three times less likely to report poor health than than of Latvia (19% compared to 60.8%).



Notes: CE - Central and Eastern Europe, S - Southern Europe, W - Western Europe

Figure 3: Prevalence of poor self-assessed health in the EU

We find that high levels of poor self-assessed health are good predictors of overall mortality rate, as previously suggested (Idler and Benyamini, 1997). However, the relationship is much less clear for countries with below average prevalence of poor health, namely Western and Southern European countries. In addition, two countries emerge as outliers: Bulgaria with one of the highest mortality rates but around average rates of poor health and Portugal with high prevalence of poor health and around average mortality rate. The results for Bulgaria are particularly surprising: it is a country that ranks poorly in terms of both healthcare and health achievement, namely low funding, high out-of-pocket payments, low health performance score and high reporting of unmet need in healthcare (Table 4).

Overall, country-level indicators on healthcare performance are somewhat predictive of the prevalence of poor self-assessed health in the EU, yet significant unexplained variation remains. Total healthcare expenditure seems to matter most for self-assessed health out of all the macro indicators analysed, including GDP per capita (see Figure 4 below and Figure 9 in the Annex). However, looking within regions in Europe, healthcare expenditure is a good predictor of self-assessed health only in the Central and Eastern Europe, but not in other regions (Figure 4). Southern European countries seem to be better at achieving good self-assessed health with lower total spending and higher out-of-pocket payments. The descriptive results suggest that individual level factors may play a role in explaining differences in population health. It has been proposed that such factors may account for more than half of the cross-country variation in

health (Olsen and Dahl, 2007).

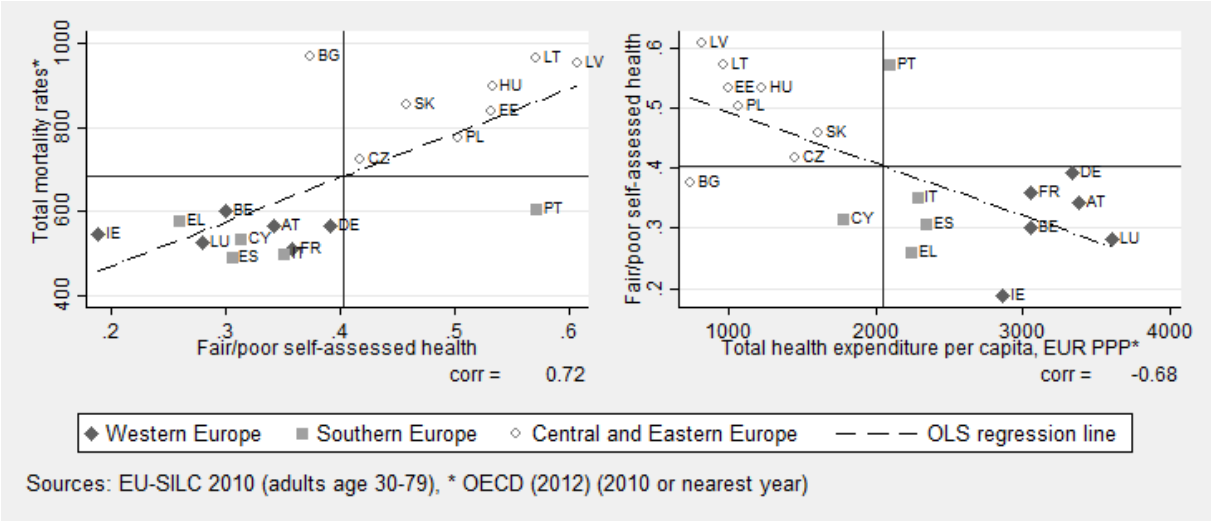


Figure 4: Self-assessed health, all-cause mortality and healthcare expenditure

Table 7 in the Annex shows the distribution of demographics, education, income and labour market factors across countries. In terms of the demographic structure, Ireland has a relatively younger population, especially compared to other Western European countries (Figure 10 in the Annex). Since young individuals are less likely to report poor health than older individuals (Tables 8 and 9 in the Annex) and the distribution of other demographic factors does not vary much across countries, the effects of demographics in explaining health inequality are likely to be more pronounced in the Western Europe. With regards to the labour market factors, it is hard to predict what can be expected: Ireland has a rather large share of the unemployed and inactive who tend to report worse health than employed individuals, but it has a higher proportion of individuals concentrated at higher occupational grades (Figures 11 and 12 in the Annex).

At the first glance, the effects of education are also not entirely clear. Ireland stands out as one of three countries with nearly a third of the adults of ages 30-79 with a university degree (next to Belgium and Estonia), but at the same time it has a relatively large share of individuals with low education level (Figure 5). Given the high prevalence of individuals with low educational attainment in Ireland compared to most of the Western and CEE countries, it is unlikely that education will play a role in explaining cross-country differences in self-assessed health in these regions. On the other hand, it may be important in explaining some differences in health between Ireland and the Southern European countries, because the latter countries have a less favourable distribution of education levels compared to Ireland irrespective of the cutoff point (in particular in Greece, Italy, Spain and Portugal). There, the share of individuals with less than upper secondary education varies between 44.4% in Greece and 78.6% in Portugal. In addition, we can expect to explain more inequality for countries with a higher elasticity of health to education, such as Portugal, where the odds ratio for reporting poor health among individuals with tertiary education compared to individuals with up to lower secondary education is 0.39 as opposed to up to 0.72 in countries like Slovakia (Table 9 in the Annex).[8]

[8]Large education-related health inequalities in Portugal are also found in von dem Knesebeck et al. (2006).

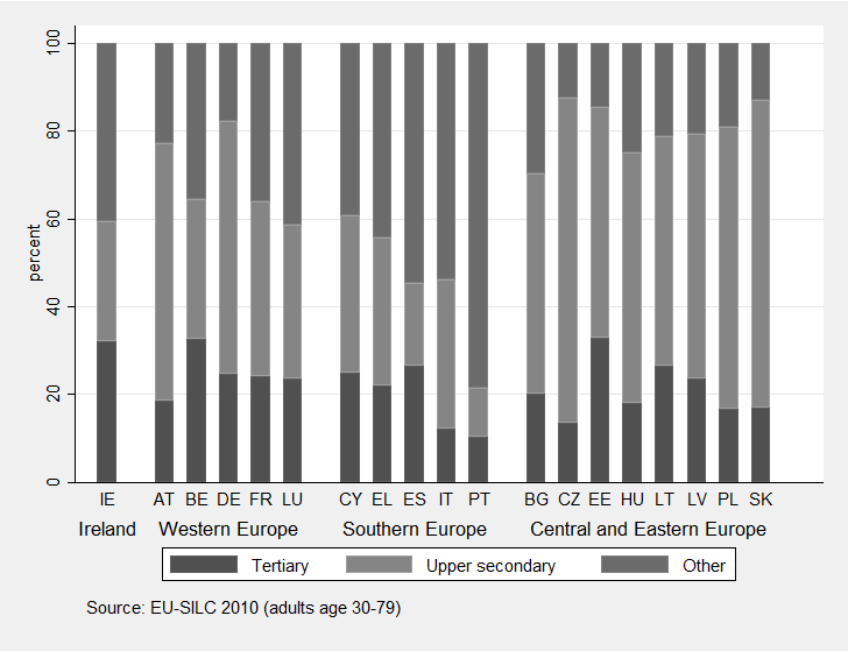


Figure 5: Distribution of the highest education level attained across the EU

Finally, income and self-reported difficulties in making ends meet are rather unevenly distributed across and within regions (Figures 13 and 14 in the Annex). Overall, Western European countries tend to report less difficulties in making ends meet than Ireland and other analysed countries, which makes it unlikely that income will be an important factor in explaining cross-country health inequalities for these countries. Southern and CEE countries, on the other hand, are on average more likely to report difficulties in making ends meet, and most of the countries have also larger share of individuals concentrated at lower income categories compared to Ireland. In particular, Greece and Cyprus among the Southern European countries and Bulgaria, Hungary and Latvia among the CEE countries are the countries where income may be important in explaining poor self-assessed health. However, the role of each factor will depend on the interactions between different explanatory factors. We discuss the decomposition results in the next section.

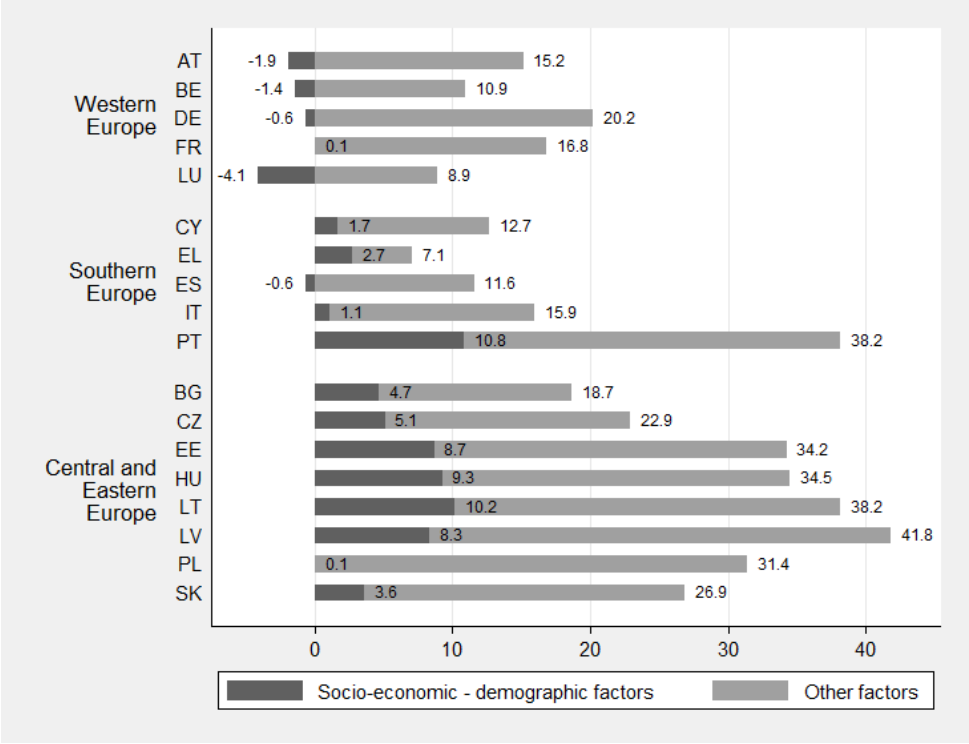
5.2 Decomposition results

This section describes the semi-parametric decomposition results for explaining cross-national differences in the prevalence of poor self-assessed health across EU countries. In the first part, we present the aggregate effects and sequential decomposition effects, whereby the effect of each factor is obtained by sequentially adding one factor after another and estimating the differences between the two counterfactual distributions. In the second part, we discuss the results obtained using two alternative decomposition sequences: marginal decomposition, whereby the effect of each factor is obtained without controlling for other factors; and conditional ('last-in') approach where the effect of each factor is evaluated after conditioning for all other factors. The latter two approaches are complete opposites; knowing that the factors analysed are likely to have a large overlap and interaction effects, we expect the results to differ depending on the sequence chosen. By comparing the three approaches, we aim to shed some light on how the effects perform under different decomposition sequences, and whether some effects are more robust than others under different scenarios. The sequential decomposition results are expressed as a share of the overall difference between the prevalence of poor health in Ireland and each comparison country.

After re-weighting each country's population based on the distribution of all explanatory factors

in Ireland, we find considerable regional variation in the aggregate decomposition results (Figure 6 below). The analysed factors taken together perform well in explaining health inequality between Ireland and most of the Southern European and CEE countries. For example, in Greece, where the rate of reporting poor health is 7.1 percentage points higher than in Ireland, they account for over a third of the total difference (2.7 p.p.). However, these factors fail to explain much of the variation between Ireland and other Western European countries. Contrary to the expectation, the prevalence of poor health would be even higher in Western European countries, if they had the distribution of demographic and socio-economic factors as in Ireland. This finding might be suggestive of cultural differences in evaluating one's health across countries: the results may have differed if an objective measure of health was decomposed. However, we are more confident that the differences in self-assessed health between Ireland and Central and Eastern European countries are more robust because they reflect the East-West divide in objective health measures, such as the prevalence of heart disease (Olsen and Dahl, 2007).

As expected, re-weighting the population of each country to mimic the distribution of demographics and socio-economic factors of the Irish population has a reducing effect on cross-country health inequality, which falls from a Gini coefficient of 0.17 to 0.13. We will discuss the detailed decomposition results in order to understand the role of each set of factors in explaining cross-country health inequality.

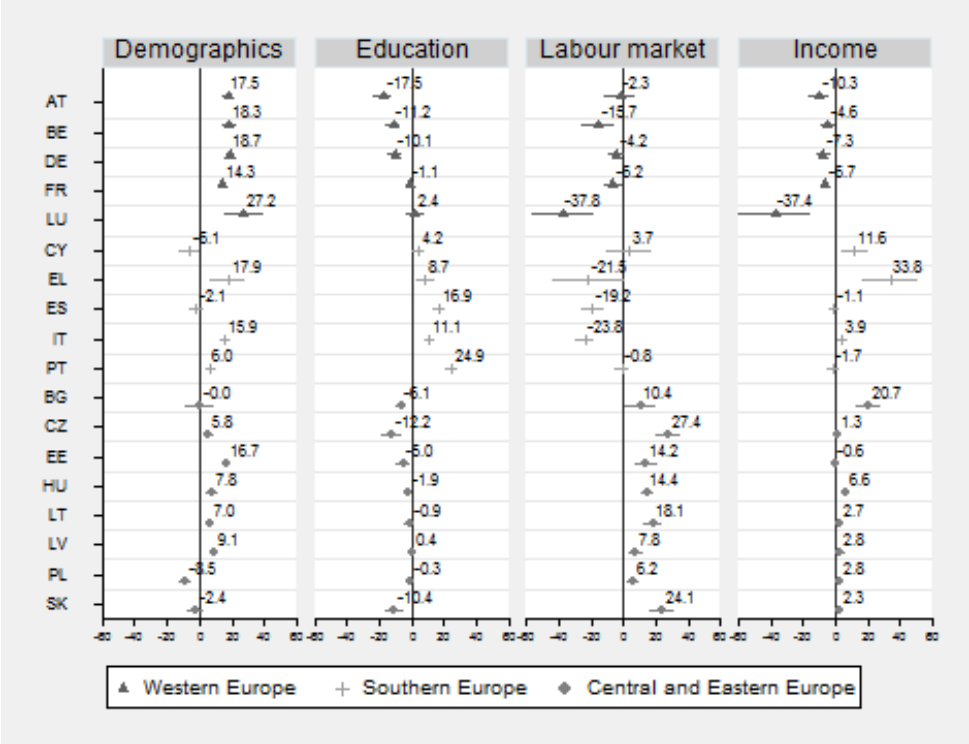


Notes: Positive coefficients measure how much of cross-country difference in the prevalence of poor self-assessed health (in p.p.) is explained when all the observed factors are imported from Ireland. Negative coefficients show an increase in inequality after accounting for all the factors.

Figure 6: Aggregate decomposition results (comparison country – Ireland)

Sequential decomposition results reveal considerable clustering within different regions in Europe. Even though the factors taken together could not explain differences in self-assessed health between Ireland and the Western European countries, demographics account for 14.3% to 27.2% of the cross-country gap. Significant positive effects are found for most other European countries, but smaller on average and less consistent compared to West Europe. The effects are largely

driven by the age structure: Ireland has a relatively large population of individuals below 40 years of age, who report considerably better health in many countries compared to older individuals (Table 8 in the Annex). However, we find a significant negative effect of demographics in Poland, which means that if Poland had Ireland's demographic structure, the prevalence of poor health would be 8.5% higher (hence, the gap between the countries would increase). The result may be driven by the large differences in the share of individuals born in another country between Poland and Ireland (1% and 13.9% respectively, see Table 7 in the Annex), who report higher odds of having poor health in Poland than the natives (Table 9 in the Annex).



Notes: Positive coefficients represent the share of the difference in poor health (in percent) between each country and Ireland accounted for by each factor. Negative coefficients show an increase in inequality in each country after importing factors from Ireland. Bootstrapped standard errors for 95% confidence bands (500 replications, stratified by age and sex) are shown by horizontal lines.

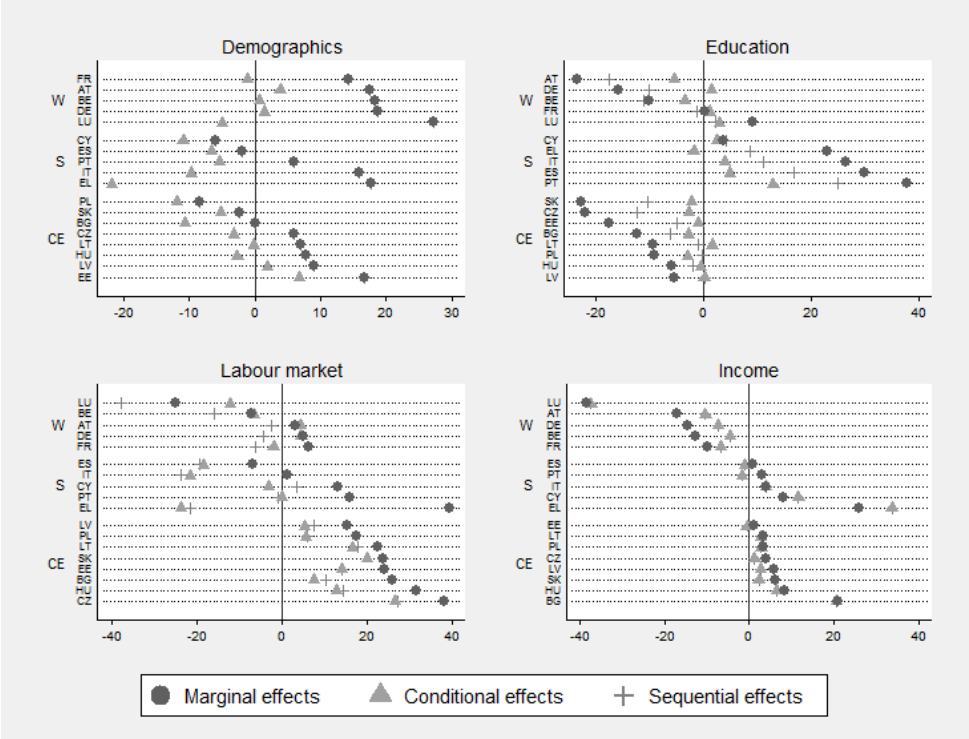
Figure 7: Sequential decomposition results (comparison country – Ireland)

The role of socio-economic determinants is estimated by adding factors one after another in a sequence. It means that the interaction effects between the variables are accounted for by the preceding factor(s). After controlling for demographics, differences in education account for up to one fourth of the gap between the analysed countries and Ireland. As expected, we find the largest effects of education for Portugal (24.9%), where the share of individuals with at least upper secondary education among individuals of ages 30-79 is slightly above twenty percent[9] compared to 60% in Ireland. Somewhat smaller but significant effects are found for other Southern European countries: Spain, Italy, Greece and Cyprus (4.2% to 16.9%). Labour market factors (economic activity status and occupational grade), on the other hand, play an important role in explaining health inequalities between Ireland and the CEE region, but not in other countries. The effects are most pronounced in the Czech Republic (27.4%) and Slovakia (24%), and somewhat less pronounced in Hungary, Bulgaria, the Baltic states and Poland (6.2% to 18%). The contributions to the differences in the prevalence of poor health accounted for

[9]Estimates in the population aged 25-64 in 2010 are about 33% based on SILC and OECD data (OECD, 2012a).

by income (income position with respect to the median and inability to make ends meet) are most pronounced in Greece and Bulgaria, where it accounts for 33.7% and 20.6% of the overall difference, respectively. Similar but slightly smaller effects are found for Cyprus (11.6% of the overall gap) and Hungary (6.6% of the gap). Mostly positive but sometimes lacking significance are the effects of income on the health gap between Ireland and other CEE countries. This is not surprising given high interaction of income with education and labour market status (Lahelma et al., 2004), which have been accounted for before estimating the effects of income.

Further, we discuss the marginal and conditional decomposition results to check the robustness of the effects obtained in the sequential decomposition. In addition, we aim to identify possible interactions between analysed factors. We find that labour market factors and education remain important for explaining inequalities in poor self-assessed health for CEE and Southern European countries, respectively. Income effects tend to reduce after taking into account other factors, but some countries (in particular, Bulgaria, Greece, Hungary and Cyprus) maintain stable effects irrespective of the decomposition order. Overall, the dispersion of results based on the order of decomposition indicate high degree interactions between demographics, education and labour market factors. The results are not surprising: younger cohorts tend to be better educated and have more updated labour market skills, and education is predictive of success in the labour market. However, the findings suggest that interactions between analysed factors are not uniform across countries, and therefore could be studied in detail, for example, using the additive decomposition approach proposed by Biewen (2012).



Notes: W - Western Europe, S - Southern Europe, C - Central and Eastern Europe

Figure 8: Comparison of marginal, sequential and conditional decomposition effects

Overall, when we introduce the factors one by one in a sequential manner, we find that differences in demographics explain the largest part of the health inequality for Western European countries, education and income – for countries in the South of Europe, while the biggest role of labour market factors is played in the Central and Eastern European countries. In addition to this, we find that conditioning on all the other factors has a reducing effect on the decomposition results. This is due to the potential overlap between different explanatory factors: after we control for all

but one factor and estimate conditional decomposition results we may be overlooking important interactions between different factors, and while looking at the marginal decomposition, we are assigning the interactions to each of the factor analysed. Therefore, it is likely that the true effect lies somewhere in between.

6 Conclusion

Recent studies highlight the importance of socio-economic factors in shaping health inequalities and population health. However, little is known how these factors shape cross-country health inequality. In this paper, we set out to shed light on how demographics, education, labour market factors and income explain the variation of the prevalence of poor self-assessed health across the EU, and to find out whether there are any regional differences in the role of different factors in explaining cross-country variation in population health. In order to do so, we compared the distribution of health between each analysed country and the country with the lowest prevalence of poor self-assessed health – Ireland – in a number of pair-wise comparisons, and decomposed the health differential into the differences in the distribution of explanatory factors. In addition to this, we tested how the detailed decomposition results compared under different decomposition sequences, in order to add a contribution to the methodological debate on the path dependence in the proposed decomposition approach.

Overall, we find that all the analysed factors taken together explain up to one third of health differences between Ireland and other Southern European and CEE countries, but it fails to explain the differences for the Western European countries. Given that the Western European countries have similar or in some cases more favourable characteristics for health compared to Ireland and better performance in other health indicators, it might suggest potential cross-country differences in reporting of self-assessed health. The detailed decomposition results confirm that there is variation in the effects of the different factors across regions in Europe. However, the same results do not always hold for different decomposition sequences, which signals that interactions between the explanatory factors are important in explaining health inequality in Europe and thus may merit further analysis.

The results of this study confirm that socio-economic and demographic factors play a significant role in explaining the differences in population health across the EU. Increasing educational attainment and fostering policies aimed at breaking the link between labour market status, income and health may improve population health and reduce cross-country differences in population health.

7 Annex

Table 5: Non-response in EU-SILC 2010 (adults 30-79 years old)

Country	Share of missing observations				
	Self-assessed health	Education	Occupation	Difficulty making ends meet	All
Selected countries					
AT	0.1 %	0.0 %	0.6 %	0.1 %	0.8 %
BE	1.2 %	1.4 %	0.2 %	0.0 %	1.8 %
BG	0.2 %	0.2 %	0.9 %	0.0 %	0.9 %
CY	0.0 %	0.0 %	0.7 %	0.0 %	0.7 %
CZ	14.6 %	0.0 %	0.4 %	0.0 %	14.9 %
DE	0.5 %	0.5 %	0.5 %	0.1 %	0.6 %
EE	18.5 %	0.9 %	0.6 %	0.0 %	19.0 %
EL	0.5 %	0.5 %	1.6 %	0.0 %	1.6 %
ES	1.2 %	1.3 %	2.1 %	0.0 %	2.3 %
FR	0.6 %	0.3 %	2.4 %	0.0 %	2.9 %
HU	0.3 %	0.0 %	1.0 %	0.1 %	1.4 %
IE	0.0 %	1.7 %	0.9 %	0.0 %	2.6 %
IT	0.9 %	0.0 %	0.7 %	0.0 %	1.7 %
LT	11.7 %	0.3 %	0.3 %	0.0 %	12.1 %
LU	0.1 %	0.4 %	0.3 %	0.9 %	1.7 %
LV	1.3 %	0.8 %	0.2 %	0.0 %	1.5 %
PL	5.6 %	5.6 %	0.4 %	0.0 %	6.0 %
PT	0.6 %	0.7 %	0.9 %	0.1 %	1.2 %
SK	0.3 %	0.1 %	0.5 %	0.0 %	0.8 %
Omitted countries					
Non-response to the health question					
DK	48.8 %	1.3 %	2.8 %	0.0 %	50.8 %
FI	49.0 %	1.1 %	0.7 %	0.6 %	50.0 %
IS	52.4 %	1.5 %	0.7 %	1.6 %	53.0 %
NL	44.9 %	0.9 %	5.2 %	0.3 %	48.4 %
NO	47.5 %	2.2 %	2.2 %	0.2 %	49.5 %
SE	48.6 %	0.5 %	2.2 %	2.9 %	50.0 %
SI	60.1 %	0.0 %	3.3 %	0.0 %	61.1 %
Non-response in explanatory variables					
MT	0.1 %	0.0 %	84.1 %	0.5 %	84.2 %
RO	0.2 %	0.2 %	100.0 %	0.0 %	100.0 %
UK	1.5 %	11.2 %	3.2 %	0.5 %	13.3 %

Table 6: Proportion of missing observations and the prevalence of poor health in the initial and final sample (adults 30-79 years old)

Country	Education	Occupation	Difficulty making ends meet	All	Poor self-assessed health		
	Share of missing observations				Initial sample	Final sample	Difference
AT	0.0 %	0.6 %	0.1 %	0.7 %	34.2 %	34.2 %	0.0 %
BE	0.5 %	0.2 %	0.0 %	0.7 %	30.0 %	29.9 %	0.1 %
BG	0.0 %	0.8 %	0.0 %	0.8 %	37.5 %	37.6 %	-0.1 %
CY	0.0 %	0.7 %	0.0 %	0.7 %	31.4 %	31.7 %	-0.3 %
CZ	0.0 %	0.3 %	0.0 %	0.3 %	41.8 %	41.9 %	-0.1 %
DE	0.0 %	0.0 %	0.1 %	0.1 %	39.2 %	39.2 %	0.0 %
EE	0.0 %	0.5 %	0.0 %	0.6 %	53.2 %	53.2 %	0.0 %
EL	0.0 %	1.1 %	0.0 %	1.1 %	25.9 %	26.1 %	-0.2 %
ES	0.1 %	1.1 %	0.0 %	1.1 %	30.5 %	30.6 %	-0.1 %
FR	0.1 %	2.2 %	0.0 %	2.3 %	35.9 %	35.8 %	0.1 %
HU	0.0 %	1.0 %	0.1 %	1.1 %	53.3 %	53.4 %	-0.1 %
IE	1.7 %	0.9 %	0.0 %	2.6 %	18.9 %	19.0 %	-0.1 %
IT	0.0 %	0.7 %	0.0 %	0.7 %	35.1 %	35.1 %	0.0 %
LT	0.1 %	0.3 %	0.0 %	0.4 %	57.1 %	57.1 %	0.0 %
LU	0.4 %	0.3 %	0.9 %	1.6 %	28.1 %	27.9 %	0.2 %
LV	0.0 %	0.2 %	0.0 %	0.2 %	60.7 %	60.8 %	-0.1 %
PL	0.0 %	0.4 %	0.0 %	0.5 %	50.3 %	50.4 %	-0.1 %
PT	0.1 %	0.4 %	0.1 %	0.6 %	57.2 %	57.1 %	0.1 %
SK	0.1 %	0.5 %	0.0 %	0.5 %	45.8 %	45.9 %	-0.1 %

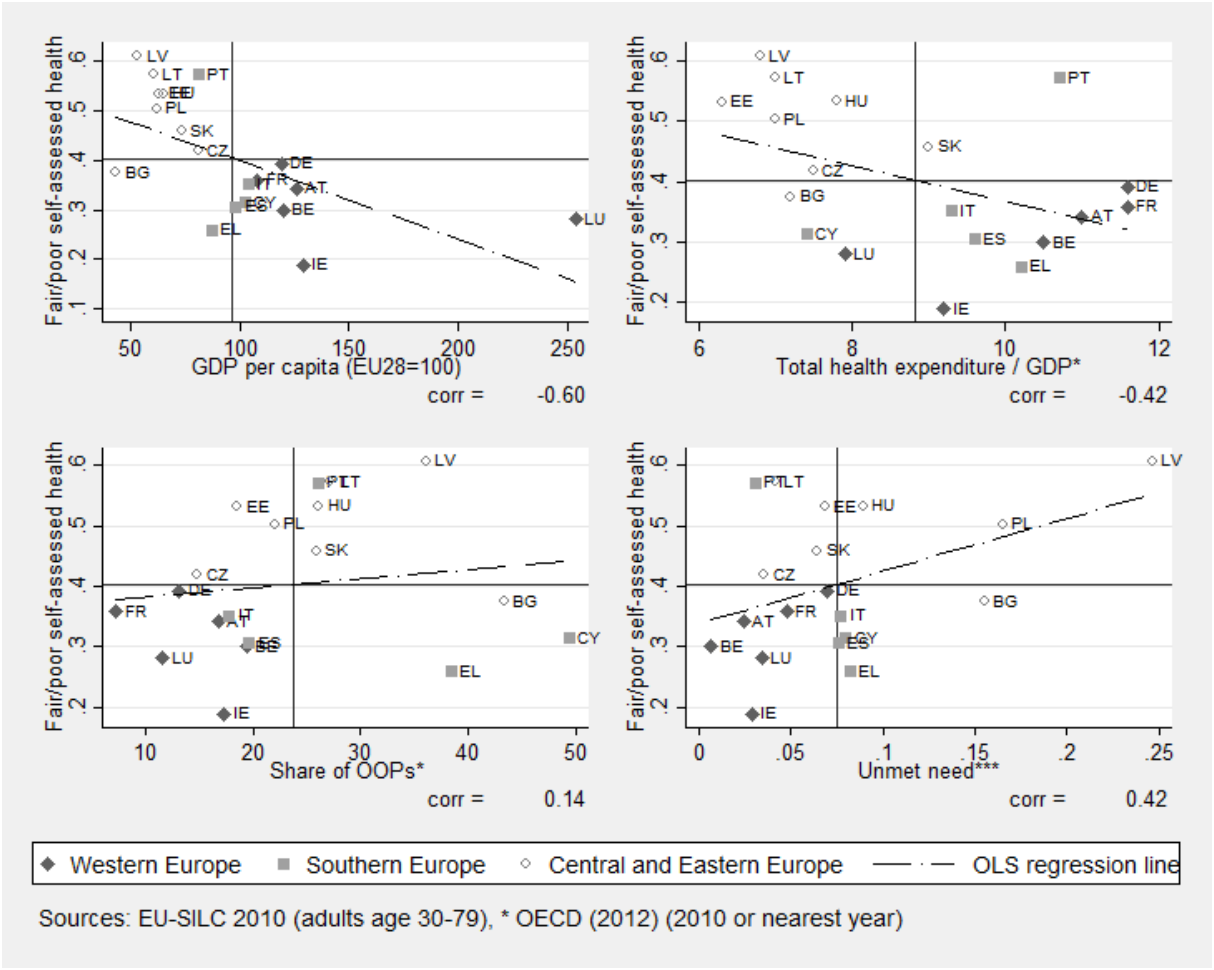


Figure 9: Indicators of healthcare vs. self-assessed health

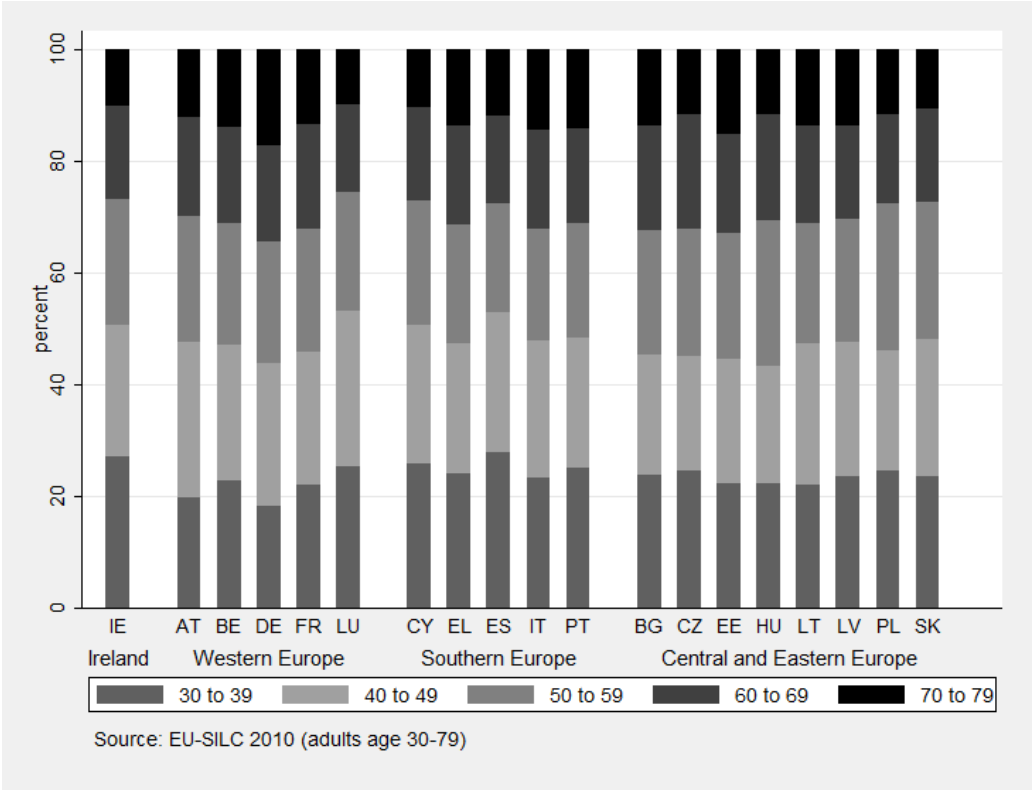


Figure 10: Distribution of age groups across the EU

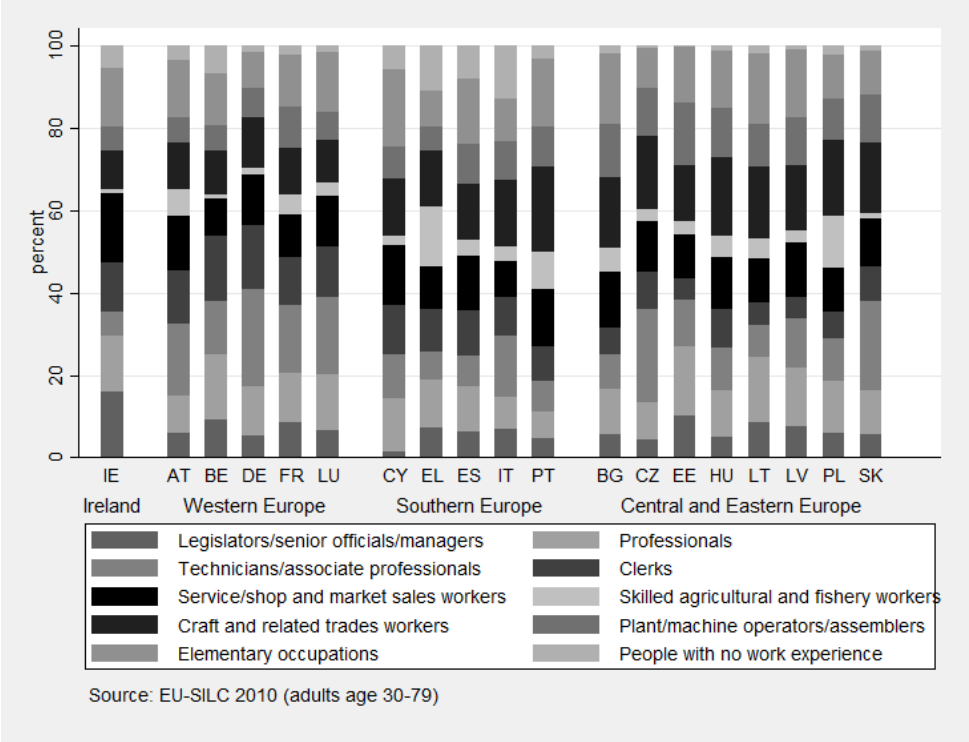


Figure 11: Distribution of occupational grades across the EU

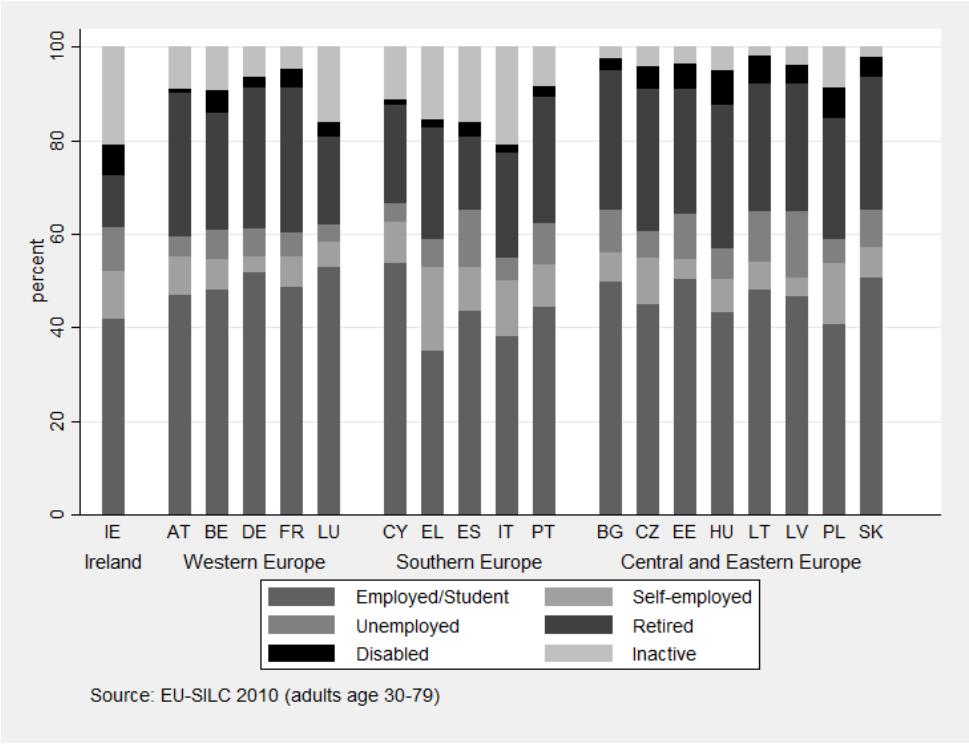


Figure 12: Distribution of economic activity status across the EU

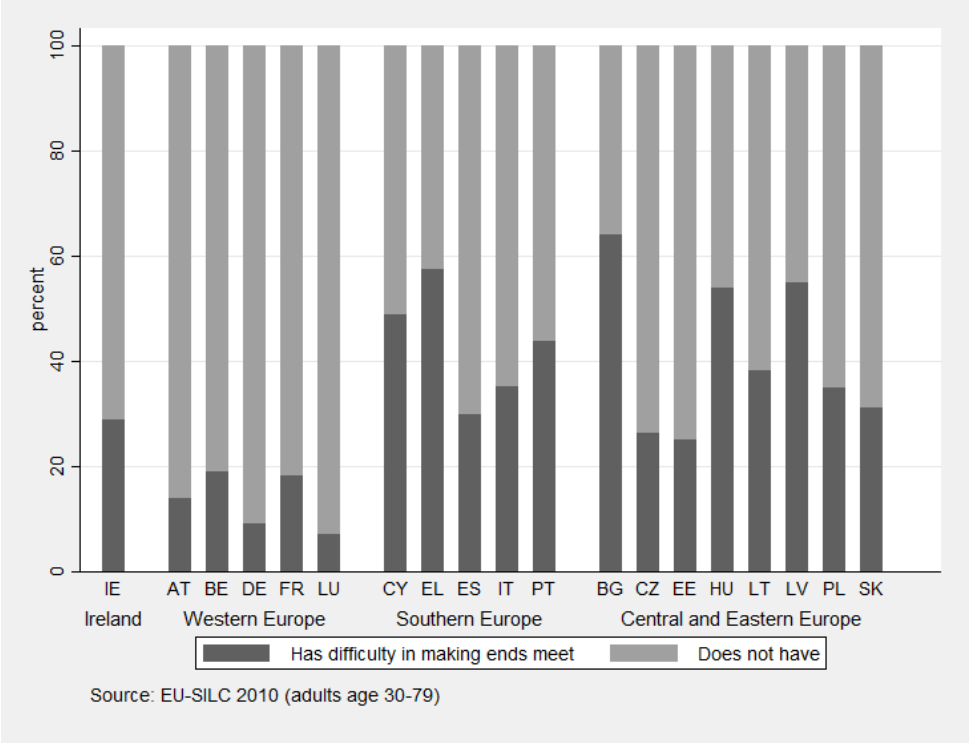


Figure 13: Distribution of difficulty in making ends meet across the EU

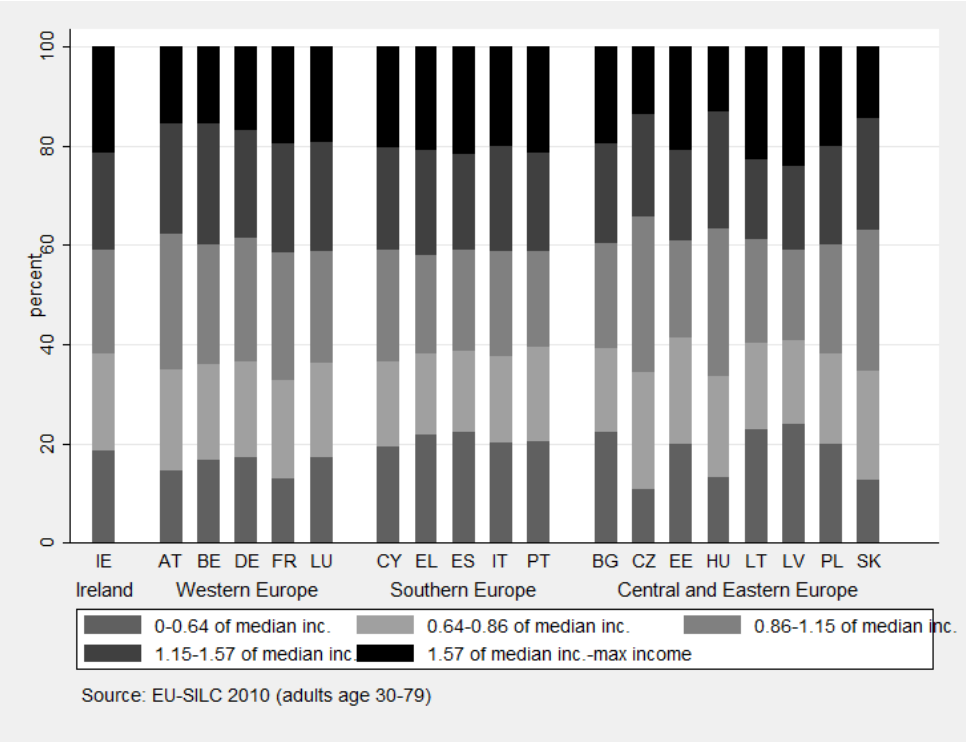


Figure 14: Distribution of equivalised disposable income across the EU

Table 7: Distribution of explanatory variables across countries (sample weights)

Variables	Western Europe						Southern Europe					Central and Eastern Europe							
	IE	AT	BE	DE	FR	LU	CY	EL	ES	IT	PT	BG	CZ	EE	HU	LT	LV	PL	SK
Age groups																			
30 to 39	27.1	19.8	22.6	18.1	21.9	25.3	25.8	23.9	27.7	23.1	25.0	23.6	24.6	22.3	22.3	22.0	23.4	24.4	23.5
40 to 49	23.4	27.8	24.5	25.5	24.0	27.8	24.8	23.5	25.3	24.7	23.4	21.7	20.5	22.2	21.0	25.2	24.0	21.7	24.7
50 to 59	22.5	22.6	21.8	21.8	21.9	21.2	22.2	21.2	19.5	20.0	20.6	22.2	22.8	22.6	26.1	21.7	22.1	26.3	24.6
60 to 69	16.8	17.7	17.3	17.4	18.8	15.7	16.8	17.7	15.7	17.7	16.9	18.9	20.4	17.7	19.1	17.3	16.8	16.0	16.6
70 to 79	10.2	12.2	13.8	17.2	13.3	10.0	10.4	13.7	11.9	14.5	14.2	13.6	11.6	15.3	11.6	13.7	13.7	11.7	10.6
Gender																			
male	48.0	48.4	49.1	48.2	47.9	49.5	47.3	48.6	49.1	48.2	47.6	47.3	43.7	39.0	45.8	41.2	44.0	45.7	45.6
Marital status																			
married	66.6	64.0	61.7	64.2	59.2	66.2	78.4	77.2	69.5	68.2	71.6	68.5	67.8	48.4	63.0	64.7	51.9	73.1	70.1
Country of birth																			
Local	86.1	83.0	85.2	85.2	87.8	54.0	84.5	90.5	91.4	93.6	93.1	99.5	96.0	80.4	98.9	92.8	81.7	99.0	98.2
Education																			
upper secondary	27.2	58.7	31.9	57.6	39.9	35.1	35.9	33.8	18.8	34.0	11.2	50.2	74.1	52.6	57.2	52.4	55.7	64.1	69.9
tertiary	32.2	18.6	32.7	24.5	24.1	23.6	25.0	21.9	26.6	12.2	10.2	20.2	13.4	32.8	17.9	26.4	23.6	16.7	17.0
Occupation																			
Legislators/senior officials/managers	15.9	6.0	9.2	5.2	8.6	6.6	1.6	7.4	6.4	7.0	4.8	5.6	4.3	10.1	5.0	8.4	7.6	6.0	5.5
Professionals	13.8	9.0	15.9	12.2	11.9	13.6	12.9	11.7	11.1	7.7	6.3	11.2	9.2	17.0	11.2	15.9	14.1	12.5	10.9
Technicians/associate professionals	5.8	17.4	13.0	23.7	16.6	18.8	10.7	6.5	7.3	15.0	7.6	8.3	22.4	11.0	10.6	8.0	11.9	10.6	21.4
Clerks	12.0	13.0	15.7	15.5	11.6	12.1	11.7	10.3	11.0	9.4	8.4	6.5	9.3	5.3	9.4	5.5	5.4	6.3	8.4
Service/shop and market sales workers	16.7	13.3	9.1	12.1	10.5	12.4	14.7	10.6	13.4	8.6	13.6	13.3	12.2	10.7	12.6	10.4	13.1	10.6	11.7
Skilled agricultural and fishery workers	0.8	6.3	1.0	1.6	4.8	3.2	2.3	14.5	3.7	3.6	9.0	6.0	2.7	3.2	4.9	4.9	3.1	12.9	1.2
Craft and related trades workers	9.4	11.4	10.8	12.4	11.1	10.2	13.8	13.5	13.6	16.2	20.8	17.0	18.0	13.5	19.3	17.7	15.7	18.2	17.2
Plant/machine operators/assemblers	6.1	6.2	6.2	7.0	10.2	7.0	7.6	5.9	9.7	9.2	9.5	13.1	11.7	15.1	11.9	10.2	11.6	10.0	11.8
Elementary occupations	14.1	13.8	12.5	8.6	12.6	14.4	18.8	8.6	15.9	10.4	16.6	17.2	9.8	13.5	13.8	17.2	16.5	10.8	10.6
People with no work experience	5.5	3.5	6.7	1.7	2.2	1.7	5.9	11.0	8.0	13.0	3.3	1.8	0.5	0.4	1.4	1.9	1.0	2.2	1.3
Economic activity status																			
Employed/Student	41.8	47.0	48.0	51.7	48.7	53.0	53.8	34.9	43.5	38.0	44.3	49.8	45.0	50.2	43.2	47.9	46.5	40.6	50.7
Self-employed	10.0	8.1	6.6	3.4	6.5	5.4	8.9	17.9	9.5	12.1	9.1	6.2	9.9	4.4	7.0	6.2	4.2	13.2	6.6
Unemployed	9.4	4.4	6.1	6.0	5.1	3.5	3.8	5.9	12.2	4.7	8.9	9.1	5.7	9.7	6.6	10.7	14.0	5.1	8.0
Retired	11.1	30.6	25.2	30.0	31.0	18.9	21.2	23.9	15.5	22.5	27.0	29.8	30.3	26.7	30.7	27.3	27.3	25.6	28.4
Disabled	6.6	1.0	4.6	2.3	3.7	3.3	1.1	1.9	3.2	1.7	2.2	2.4	5.0	5.3	7.4	5.9	4.0	6.8	4.1
Inactive	20.9	9.0	9.5	6.5	4.9	16.1	11.3	15.5	16.1	21.0	8.6	2.6	4.1	3.6	5.1	1.9	4.0	8.7	2.3
Difficulty in making ends meet																			
Has difficulty in making ends meet	28.9	13.9	19.0	8.9	18.0	6.9	48.8	57.5	29.7	35.1	43.7	64.0	26.2	25.0	54.0	38.3	54.8	34.9	31.1
Relative equivalised disposable income																			
$<$ 0.64 of the median	18.5	14.6	16.7	17.2	13.0	17.1	19.5	21.8	22.4	20.2	20.3	22.3	10.8	20.0	13.1	22.8	23.9	20.0	12.8
0.64 to 0.86 of the median	19.6	20.2	19.3	19.3	19.8	19.2	17.0	16.3	16.4	17.5	19.1	17.0	23.6	21.4	20.5	17.5	16.8	18.2	21.9
0.86 to 1.15 of the median	20.8	27.4	24.1	25.0	25.7	22.6	22.5	19.8	20.2	21.2	19.4	21.2	31.2	19.6	29.6	20.7	18.4	21.8	28.5
1.15 to 1.57 of the median	19.6	22.3	24.3	21.8	21.9	21.9	20.7	21.3	19.2	21.1	19.9	20.1	20.9	18.2	23.7	16.3	16.9	19.8	22.5
above 1.57 of the median	21.4	15.5	15.6	16.7	19.5	19.3	20.3	20.7	21.8	20.0	21.3	19.5	13.5	20.7	13.1	22.7	24.1	20.2	14.3

Notes: Data: EU-SILC 2010; Population: adults age 30-79

Table 8: Prevalence of poor self-assessed health across explanatory variables, percent (sample weights)

Variables	Western Europe						Southern Europe					Central and Eastern Europe							
	IE	AT	BE	DE	FR	LU	CY	EL	ES	IT	PT	BG	CZ	EE	HU	LT	LV	PL	SK
Age groups																			
30 to 39	9.3	15.3	14.7	17.2	19.3	13.2	9.6	4.8	12.1	11.5	29.9	9.2	12.9	21.8	19.5	23.5	32.1	18.7	14.6
40 to 49	12.7	23.5	23.0	27.2	25.7	21.9	18.3	12.2	20.6	20.9	44.3	17.6	24.6	40.0	37.4	41.5	49.4	33.4	30.0
50 to 59	22.8	38.1	32.5	42.6	37.6	33.3	36.0	22.5	33.0	33.4	63.7	36.2	47.1	58.8	59.8	63.6	67.9	59.4	53.9
60 to 69	28.9	45.0	37.0	51.0	45.0	39.9	54.9	44.2	50.1	53.5	80.5	62.8	65.0	74.3	79.2	85.4	83.9	79.4	74.1
70 to 79	34.2	66.1	54.0	63.8	65.3	51.5	71.6	69.2	65.1	75.6	89.0	86.3	82.6	85.6	91.1	94.0	89.9	88.3	89.0
Gender																			
male	19.1	32.4	28.2	38.6	33.9	26.9	28.8	24.0	27.4	31.6	51.2	32.3	39.7	52.3	50.3	53.2	57.1	47.1	41.7
female	18.8	35.8	31.6	39.7	37.5	28.9	34.3	28.1	33.6	38.0	62.5	42.4	43.5	53.8	56.1	59.9	63.7	53.2	49.4
Marital status																			
married	16.5	32.1	27.8	38.3	34.7	26.6	29.8	24.1	30.6	33.7	55.7	34.1	39.9	51.7	51.1	50.5	57.2	46.5	42.9
not married	24.0	37.7	33.3	40.8	37.4	30.5	38.6	32.9	30.6	37.6	60.8	45.4	46.0	54.6	57.4	69.3	64.6	61.1	52.8
Country of birth																			
Local	20.3	33.2	29.4	38.5	34.9	27.0	34.4	27.1	31.4	35.7	58.4	37.6	41.6	47.5	53.5	56.3	58.6	50.1	45.8
Other	10.8	38.9	32.6	42.9	42.2	28.9	16.5	16.4	22.2	24.1	40.0	51.3	48.3	76.9	46.2	68.3	70.4	78.8	50.7
Education																			
other	30.3	57.9	45.7	55.5	49.8	38.1	50.9	42.4	42.4	46.4	65.2	58.9	68.8	77.9	75.5	82.5	79.8	77.5	76.3
upper secondary	14.7	29.8	25.5	38.4	31.9	24.2	24.3	15.6	20.6	23.0	29.8	30.6	40.4	55.3	49.6	57.8	61.0	48.5	44.7
tertiary	8.3	18.8	17.0	29.0	21.3	15.5	12.1	9.2	13.3	17.4	25.2	23.8	24.6	38.9	35.0	35.5	43.6	26.6	27.3
Occupation																			
Legislators/senior officials/managers	13.0	23.2	22.1	31.7	27.8	23.6	13.7	20.7	25.7	31.2	40.5	26.7	31.6	36.5	46.3	39.0	44.6	37.4	35.8
Professionals	9.8	16.0	18.4	26.4	23.1	14.6	11.2	8.8	11.9	22.4	25.6	25.9	28.7	37.4	33.9	45.1	48.6	34.2	34.5
Technicians/associate professionals	11.7	22.2	24.7	34.6	25.9	20.9	20.4	12.9	15.3	25.2	37.1	32.8	35.4	42.8	43.9	43.6	54.5	43.7	39.2
Clerks	15.6	25.4	23.2	39.0	34.7	22.8	18.6	14.0	19.8	28.4	46.4	36.2	41.6	56.1	54.4	60.5	62.9	47.8	48.2
Service/shop and market sales workers	17.4	34.6	33.8	40.4	36.2	29.7	31.3	21.6	28.4	31.1	53.8	31.7	38.9	53.5	46.4	51.6	61.9	47.6	46.3
Skilled agricultural and fishery workers	18.9	48.7	32.8	50.1	48.5	28.2	50.7	45.0	47.1	49.6	84.8	56.4	56.2	67.3	64.7	64.7	74.5	63.9	51.1
Craft and related trades workers	19.4	42.4	36.1	46.0	40.2	38.4	35.3	28.8	33.7	36.9	58.8	38.6	44.8	59.0	58.9	60.2	63.2	53.7	47.3
Plant/machine operators/assemblers	21.3	40.1	35.2	47.4	43.9	35.7	39.5	23.6	30.0	40.7	60.1	39.0	47.0	61.2	55.7	61.1	63.6	48.6	46.8
Elementary occupations	31.6	50.7	42.8	51.5	48.1	41.5	45.5	33.3	43.0	45.9	68.9	46.4	60.5	74.2	69.0	74.2	73.7	64.4	66.6
People with no work experience	43.6	59.5	49.1	53.9	56.8	41.2	58.6	39.1	55.9	43.5	75.1	50.6	75.8	68.6	75.3	91.4	78.4	64.5	74.3
Economic activity status																			
Employed/Student	7.6	18.9	16.6	24.6	23.6	17.6	16.6	7.9	14.2	17.5	36.7	15.4	22.2	36.8	32.0	38.1	44.3	27.1	27.1
Self-employed	10.1	18.6	16.1	19.7	22.7	15.4	26.8	13.9	19.5	19.0	47.1	17.4	22.6	30.1	29.7	41.7	47.9	36.0	23.8
Unemployed	16.0	54.4	35.7	57.3	39.3	47.7	25.0	20.1	27.2	31.6	57.8	31.9	46.5	48.8	48.8	47.7	58.2	49.2	41.3
Retired	29.4	56.0	43.6	59.2	52.2	44.2	64.6	55.0	55.5	60.7	85.5	76.0	71.7	84.1	83.1	90.9	88.0	80.7	79.7
Disabled	80.2	91.4	87.9	91.0	63.7	79.1	86.8	82.8	84.9	88.4	97.0	95.9	95.7	95.5	95.3	95.0	99.3	95.6	96.6
Inactive	22.3	37.3	38.2	37.5	45.7	32.1	42.3	31.9	48.8	44.2	73.3	37.7	12.0	31.4	33.9	37.7	50.9	57.8	31.2
Difficulty in making ends meet																			
Has difficulty in making ends meet	28.2	56.0	48.7	61.7	48.1	47.4	38.2	31.7	40.1	42.5	65.5	43.4	50.8	65.8	58.8	68.7	68.2	63.4	57.0
Does not have	15.2	30.6	25.5	37.0	33.1	26.5	25.5	18.6	26.5	30.8	50.6	27.4	38.7	49.0	47.2	50.0	51.8	43.4	40.8
Relative equivalised disposable income																			
$<$ 0.64 of the median	27.2	54.1	47.8	56.1	49.1	38.1	50.2	35.4	40.2	41.5	73.0	55.7	50.8	69.5	59.7	61.2	71.2	59.6	49.5
0.64 to 0.86 of the median	30.4	43.4	42.7	48.0	41.2	34.9	40.8	34.3	38.6	39.3	66.4	43.5	56.8	67.1	60.3	67.2	73.2	59.2	59.5
0.86 to 1.15 of the median	17.3	34.8	29.0	38.8	35.9	32.5	29.7	29.6	34.0	37.9	58.3	34.2	41.9	54.8	56.1	64.2	61.9	54.3	48.7
1.15 to 1.57 of the median	12.7	23.8	19.0	30.4	31.1	19.5	24.8	19.5	25.1	32.2	50.9	31.5	30.7	43.9	48.2	51.3	56.2	45.2	38.4
above 1.57 of the median	8.7	17.0	13.4	23.6	26.6	16.0	15.5	13.2	16.3	24.1	38.5	22.0	25.7	29.9	39.7	43.0	44.2	34.2	28.0

Notes: Data: EU-SILC 2010; Population: adults age 30-79

Table 9: Logistic regression table for all countries (Odds ratios)

Poor health	Western Europe						Southern Europe					Central and Eastern Europe							
	IE	AT	BE	DE	FR	LU	CY	EL	ES	IT	PT	BG	CZ	EE	HU	LT	LV	PL	SK
Demographics																			
Age	1.04***	1.04***	1.04***	1.05***	1.05***	1.05***	1.07***	1.09***	1.05***	1.08***	1.06***	1.09***	1.08***	1.06***	1.08***	1.09***	1.08***	1.08***	1.10***
Male	0.87	1.02	1.01	1.07	0.98	0.96	0.81*	0.94	0.88*	0.80***	0.60***	0.69***	0.97	1.02	0.87**	0.75**	0.82**	0.87**	0.84**
Married	0.86	0.82**	0.78***	1.02	0.80***	0.80*	0.71**	0.65***	0.93	0.81***	0.81**	0.85*	0.90	1.12	0.94	0.83	1.02	0.90*	0.91
Born in a foreign country	0.74	1.25*	1.02	1.02	1.12	1.09	0.63***	1.08	0.95	0.96	0.96	2.05*	0.95	2.26***	0.94	1.12	0.88	1.18	0.76
Education																			
(Excluded category – other)																			
Tertiary education	0.61**	0.45***	0.58***	0.67***	0.84*	0.80	0.64**	0.54***	0.69***	0.61***	0.39***	0.60***	0.55***	0.60***	0.61***	0.52***	0.40***	0.57***	0.72*
Upper secondary education	0.74*	0.59***	0.65***	0.77***	0.87**	0.76**	0.85	0.65***	0.78***	0.75***	0.54***	0.72***	0.67***	0.82	0.71***	0.88	0.61***	0.82**	0.89
Occupation																			
(Excluded category – professionals)																			
Legislators/senior officials/managers	0.93	1.08	0.89	0.92	1.04	0.95	1.00	0.99	1.23	0.91	0.58*	1.39*	1.12	1.11	1.37*	0.87	0.85	0.91	0.82
Technicians/associate professionals	0.92	1.12	1.12	1.12	1.14	1.15	1.32	1.26	0.94	0.90	0.82	1.20	1.22	1.03	1.26*	0.83	1.02	0.96	1.13
Clerks	1.03	1.07	0.81	1.08	1.35**	1.04	1.07	0.99	1.23	0.97	0.81	1.19	1.45**	1.62*	1.52***	1.15	1.11	0.92	1.38*
Service/shop and market sales workers	0.98	1.38*	1.20	1.26*	1.43***	1.19	1.54	1.34	1.39**	1.00	0.83	1.33*	1.55**	1.39*	1.66***	1.20	1.08	1.08	1.47**
Skilled agricultural and fishery workers	0.78	2.12***	0.82	1.47*	1.77***	0.83	1.91*	1.16	1.47**	1.11	1.53	1.15	1.88***	1.61*	2.00***	1.40	1.33	1.41**	1.25
Craft and related trades workers	0.82	1.88***	0.94	1.44***	1.58***	1.74*	1.71*	1.21	1.26	1.05	0.97	1.20	1.49**	1.68**	2.14***	1.26	1.05	1.14	1.46**
Plant/machine operators/assemblers	1.07	1.45*	0.89	1.51***	1.64***	1.22	1.53	1.07	1.25	1.22	1.01	1.39*	1.45**	1.51**	1.89***	1.25	1.06	1.11	1.29
Elementary occupations	1.31	1.99***	1.21	1.47***	1.70***	1.61*	2.03**	1.56	1.85***	1.24*	1.05	1.62***	1.80***	1.78***	2.14***	1.56*	1.36*	1.38**	1.99***
People with no work experience	1.28	1.61*	1.18	1.25	1.27	1.33	1.29	1.19	1.49**	0.78*	0.73	2.32**	3.17*	2.08	3.17***	2.66	1.37	1.22	2.81**
Labour market status																			
(Excluded category – employed)																			
Self-employed	1.23	0.92	0.83	0.81	0.84	0.88	1.13	1.19	1.11	0.94	1.06	1.07	1.02	0.65*	0.78*	0.89	0.95	1.02	0.87
Unemployed	1.50*	2.55***	1.33*	2.34***	1.37**	2.79***	1.05	1.83**	1.46***	1.92***	1.58***	1.89***	2.16***	1.15	1.38***	1.05	1.30**	1.67***	1.28*
Retired	2.07***	1.85***	1.06	1.20*	1.14	1.33	1.67***	1.87***	1.75***	1.26***	2.15***	2.62***	1.49***	1.66***	2.00***	1.60**	1.31**	1.81***	1.40***
Disabled	25.3***	22.2***	17.6***	18.4***	3.38***	8.39***	17.0***	29.8***	18.3***	18.3***	31.0***	73.2***	42.9***	18.4***	19.5***	14.7***	127.0***	26.0***	41.5***
Inactive	1.58**	1.39**	1.16	1.34***	1.58***	1.05	1.87***	1.42	1.74***	1.42***	1.65***	1.91***	0.81	1.18	1.13	0.62	1.11	1.63***	1.42*
Relative income																			
(Excluded category - above 1.57 of the median)																			
$<$ 0.64 of the median	1.24	1.85***	2.04***	1.87***	1.63***	2.02***	1.39*	1.77***	1.60***	1.43***	2.01***	1.36**	1.02	1.59**	1.33**	1.11	1.41***	1.26**	1.41**
0.64 to 0.86 of the median	1.64**	1.77***	1.97***	1.65***	1.35***	1.78***	1.57**	1.40*	1.38***	1.25***	1.76***	1.08	1.17	1.46**	1.08	1.20	1.45***	1.24**	1.55***
0.86 to 1.15 of the median	1.13	1.56***	1.72***	1.40***	1.32***	1.64***	1.36*	1.33	1.44***	1.40***	1.53***	1.07	0.98	1.43**	1.12	1.15	1.08	1.21**	1.37***
1.15 to 1.57 of the median	1.03	1.18	1.32*	1.18*	1.27***	1.09	1.24	1.12	1.26**	1.36***	1.30*	1.22*	0.85	1.32*	1.03	0.90	1.22*	1.10	1.38***
Difficulty in making ends meet																			
Has dificulty in making ends meet	1.92***	2.02***	1.77***	1.92***	1.74***	1.64**	1.79***	1.55***	1.66***	1.66***	1.41***	1.48***	1.48***	1.47***	1.53***	1.52***	1.79***	1.57***	1.51***
Constant	0.019***	0.027***	0.031***	0.021***	0.022***	0.020***	0.0063***	0.0019***	0.012***	0.0072***	0.051***	0.0032***	0.0080***	0.019***	0.0082***	0.014***	0.031***	0.012***	0.0040***
Observations	6509	8744	8693	19391	15145	7599	6303	11029	22686	30040	8594	10899	11867	6301	15219	7711	9369	20960	9556
Pseudo R^2	0.233	0.195	0.179	0.156	0.122	0.147	0.248	0.303	0.211	0.224	0.252	0.344	0.280	0.260	0.293	0.305	0.237	0.288	0.286

Source: EU-SILC 2010; Population: Adults age 30-79

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