Measuring Educational Gradient in Disability-Free Life Expectancies across Europe

Theoretical focus

Understanding trends in health and its inequalities across countries and over time is important for policy makers amid population ageing. Population health trends observed in highly industrialized countries suggest increasing life and health expectancies, although in recent years that process seems to be slowing down (Jagger et al., 2020). However, social health inequalities have been found to raise or remain persistent for certain health measures in many of the OECD countries (Lampert et al., 2018, Mackenbach et al., 2018).

International comparisons of health often focus on the United States (US) and Western European countries, and the difference between them, which has been partly driven by the availability of data (Avendano et al., 2009, Jagger et al., 2020). However, health is not homogenous across European regions, with the most notable gap between West and East across almost all health indicators. For example, life expectancy at birth for men in Sweden was 81.5 years, while in the Baltic states, such as Lithuania and Latvia, it was around 71 years, according to 2019 estimates (Eurostat, 2022). Similar patterns are also observed in the number of years that a person is expected to live without activity limitations. Countries that fall below the European average are concentrated in Central and Eastern Europe, and those that may expect the higher numbers of remaining healthy life years are predominantly Western Europe and the Nordic region, with the gap stretching beyond 20 years (Eurostat, 2021).

With the aggregate of knowledge on widening cross-country divide between Western and Eastern Europe, multiple studies also indicate growing within-country social gradient in health (Mackenbach et al., 2018, Majer et al., 2011, Mäki et al., 2013, Valverde et al., 2021). A certain position in society, such as education, mitigates or aggravates the opportunity of good health (Siegrist and Marmot, 2004). Ross and Mirowsky (2010) expound that effects of education are embedded in the nexus between increased human capital and commodity. Thus, education increases effective agency (life choices) in health. Differences in HLE by education are true for every country across Europe and are persistently growing over time (Mackenbach et al., 2018). However, educational attainment is a merit for health by varying degrees, depending on the country. How to explain such variance?

Inter-individual characteristics are responsive to socioeconomic environment in which individuals are weaved. While micro-level factors such as individual’s education may act as an agency - a set of skills that empowers an individual to make independent decisions that are likely to act in health

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1 The Organisation for Economic Co-operation and Development (OECD) consists of 37-member states that are characterized by high-income economies and a very high Human Development Index (HDI).
promoting direction, contextual elements define the structure - an environment that either enables or limits individual’s life choices and access to resources that can be used for health benefits (Cockerham, 2005). Therefore, when considering health and health inequalities of a particular demographic, it is necessary to consider national and regional institutional elements they carry.

Despite numerous studies on educational health disparities in Europe, Central and Eastern European (CEE) countries have not been covered in a comparative power. These countries are particularly interesting due to their history of state socialism, early expansion of education, historically high female employment and the relationship between education and income. Traditionally, education is thought as a means to obtain a higher occupational position and therefore more income. But this was not necessarily the case in CEE countries before the demise of communism as laborers of blue-collar occupations received better incentives and thus education was not the main requirement for well-paid jobs (Zajda, 1980).

The goal of this study is to derive gender-specific life tables on educational attainment using survey data. After combining the life tables with the Global Activity Limitation Indicator (GALI) obtained, we will provide estimates of the numbers of years expected to live with and without disability at age 50 by educational attainment in Europe, with a particular focus on the Central and Eastern European countries. Finally, we will discuss our results with respect to previous findings and summarize the main conclusions from this study.

Methods

Data

This study employs cross-national longitudinal data from the Survey of Health, Ageing and Retirement in Europe (SHARE), spanning across 7 waves. SHARE provides comparable information on demographic covariates, socioeconomic and health measures for countries of interest.

Indicators

In this study, a health indicator refers to the observed prevalence of any long-standing activity limitations, referring to general health problems and activities people usually perform obtained from the SHARE data (Robine et al., 2003, Van Oyen et al., 2006). SHARE provides the generated variable of the Global Activity Limitation Indicator (GALI), which identifies individuals as healthy if they report no limitations in activities, and as limited if they report some or severe limitations. GALI is based on the following question in the survey:

For at least the past 6 months, to what extent have you been limited because of a health problem in activities people usually do? Would you say you have been (1) severely limited, (2) limited but not severely, or (3) not limited at all?
The key advantage of using the GALI instrument for estimating DFLE is that it has been found to be consistent in both concurrent and predictive terms, both on the national and international levels. Therefore, it is reliable to use this indicator when comparing the level of population health across European countries (Van Oyen et al., 2018).

The harmonized measure of education across all countries are used to indicate educational attainment. Individuals are categorized into three groups according to their level of educational attainment based on the International Standard Classification of Education (Statistics UIS, 2012.): 1. Lower secondary education or less (ISCED 0–ISCED 2), 2. Upper secondary or vocational training (ISCED 3–ISCED 4), and 3. Tertiary education (ISCED 5–ISCED).

Data analysis

In this study, we construct gender-education–specific life tables using a multivariate life table approach (Teachman and Hayward, 1993). To do this, we include covariates in the estimation of life table quantities, following an approach similar to Brown et al. (2012). First, a set of country-gender-specific discrete-time regression models are fit to the data separated by gender. To estimate the probability of death, the models include age in five years intervals and education. We use the estimated probabilities of death by age, gender and education to build life tables by means of microsimulation. The abridged period life tables start with age 50 and are closed with an open age category 85+. Further, population size of a synthetic cohort is assigned. We simulate the elimination by death of a synthetic cohort evaluating the possible mortality for each individual of the cohort starting with 500000 men and women of age 50-54.

Each individual in the age interval x survives to the age interval x + 1 if the corresponding probability of death is lower than a random draw from a uniform distribution. The process is repeated iteratively from age x up to x + n, corresponding to the age intervals 50-54, 85+. By repeating this process for each person until they are eliminated by death, we obtain synthetic lifetimes for the cohort, from which we can derive common quantities., e.g., life expectancy, averaging over the simulated lifetime. Lastly, DFLE is estimated using the Sullivan method (Sullivan, 1971).

Expected findings

Three decades ago, Central and Eastern Europe underwent a profound transformation: the fall of the totalitarian political systems and the institutional realignment fundamentally changed population health trajectories in the region. Emerging institutional settings lead to opportunities for societies but at the same time threw countries into a tailspin and left them both systematically and socially disorganized. Previous research provides ample of evidence that former socialist countries in the CEE face difficulties in catching up in life expectancy and health with Western Europe. It is also well established that education is a fundamental attribute to health and that educational health inequalities exist.
In accordance with this knowledge, we expect among CEE countries, individuals to experience higher prevalence and more years of poor health. We expect that our results will support the current evidence in the literature that shows the positive relationship between educational attainment and expected life years without disability. We also expect important sex differences in the association between education and DFLE. Lastly, according to existing evidence, it is reasonable to expect that health inequalities across educational gradient will be, in large part, borne by lower-educated individuals.

Period life tables stratified by sex and the level of education, which are required to estimate sex-education-specific DFLE are not readily available. Instead, it is a common practice to estimate these using sex- and education-specific population sizes for each age group and the number of deaths in each age group. However, these figures for exposures and deaths are not always obtainable from National Statistics Offices. To our knowledge, this is the first work to use discrete-time modeling in combination with microsimulation to estimate multivariate life table quantities, which are required for DFLE estimation by the Sullivan method, directly from SHARE data.

References


EUROSTAT 2022. Life expectancy by age and sex [DEMO_MLEXPEC].


