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# INEQUALITY OF OPPORTUNITY IN HEALTH: THE GENDER DIMENSION ACROSS EUROPEAN COUNTRIES


Mémoire réalisé par

**Alexia Bigorne**

Promotrice/eur

**Sandy Tubeuf**

**Luigi Boggian**



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[1] *Institute of Health and Society, Université catholique de Louvain*
[2] *Institute of Economic and Social Research, Université catholique de Louvain*

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# INEQUALITY OF OPPORTUNITY IN HEALTH: THE GENDER DIMENSION ACROSS EUROPEAN COUNTRIES


## Abstract

The analysis of inequality of opportunity in health is based on the partition of health inequality within two types of causes: legitimate causes, which are individual responsibility and lifestyles choices, also called effort, and illegitimate causes, which are social and family background, also called circumstances. This research aims to look at inequality of opportunity in health according to gender. We use data collected from the Survey on Health Ageing and Retirement in Europe in 2017. These data provide us with information on people's childhood background, such as parents' health and financial situation as well as information on people's current health-related behaviors. We use reduced-form models and estimations to predict self-assessed health, evaluate the magnitude of health inequality in Europe by gender and measure the importance of inequality of opportunity and inequality related to effort in health inequality. Results show differences in health inequality between males and females and in-between countries. Inequality of opportunity in health is lower among females than males in countries with a globally high level of inequality of opportunity in health while it is the opposite in countries with a low level of inequality of opportunity in health. Health inequality related to effort is higher for females than males in most countries. Globally, overall health inequality is mostly explained for both genders by inequality of opportunity in health rather than health inequality related to effort. Countries should invest in priority in policies to improve childhood socio-economic and health background in order to reach equality of opportunity in health across gender.



**Keywords:** Equality of opportunity; Europe; gender; health; inequality decomposition; efforts; circumstances

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# 1. Introduction

A number of researchers elaborated and developed the philosophical concept of equality of opportunity (Arneson, 1989; Cohen, 1989; Dworkin, 1981; Fleurbaey, 2008; Roemer, 1998). The goal of equality of opportunity is for everyone to be able to reach a certain level of welfare, or in other words, to satisfy their respective preferences. What lies behind this concept is not to focus for example on the living conditions of poor individuals but to reduce the gap between rich and poor individuals. In order for that to happen, distributive justice as proposed by Rawls or Sen may not be sufficient. According to Rawls' (1973) theory of justice, equal distribution of resources among the population is supposedly sufficient for everyone to reach welfare. However, Sen (1985) argued that it is not enough to give everybody the same resources, we need to distribute resources according to everyone's capacities to transform those resources into realization, that he called capabilities. Not everyone has the same needs. For example, a child does not need crutches if he or she is able to walk, but might need extra time with teachers at school if he or she suffers from dyslexia. In that sense, equality of capabilities comes close to equality of opportunity. The problem is that it is impossible to list everyone's capabilities into an index (Arneson, 1989). Equality of opportunity could therefore be an alternative method to reach welfare among all individuals.

According to Dworkin (1981), Arneson (1989), Cohen (1989), Roemer (1998), and Fleurbaey (2008), equality of opportunity implies that individuals should be held responsible strictly for the consequences of their voluntary choices, within their control, also called effort and which can be considered as legitimate sources of inequality among the population. Whereas, on the other hand, individuals should not be held responsible for what is beyond their control, for example, they do not choose where they were born nor their parents. These determinants, also referred to as circumstances, are considered as illegitimate sources of inequality. The policy principles behind this concept are to compensate people who suffer from illegitimate sources of inequality and respect the individual rewards due to legitimate causes of inequality. These two principles are called the principle of compensation and the principle of liberal reward. They are essential to reach equality of opportunity, i.e., the ideal situation where illegitimate sources of inequality no longer exist. "Equal opportunity for welfare obtains among persons when all of them face equivalent decision trees" or in other words "Full equality of opportunity is achieved not when the value of the outcome is equal for all, but when members of each type face the same chances for acquiring the outcome" (Arneson, 1989; Roemer, 2016).

Health economists recently pursued equality of opportunity as a line of research and tried to better delimit legitimate from illegitimate causes of health inequality (Fleurbaey, 2006; Fleurbaey & Schokkaert, 2009; Fleurbaey & Schokkaert, 2012; Garcia Gomez et al., 2012; Jusot et al., 2013; Rosa-Dias & Jones, 2007; Rosa-Dias, 2009; Rosa-Dias, 2010; Sen, 2002; Trannoy et al., 2010; Tubeuf et al., 2012). The concept of inequality of opportunity in health is used to explain health outcomes according to two components: individual responsibility, also called individual effort, measured by current lifestyles choices in health, and circumstances, i.e., factors that individuals should not be held responsible for and measured by social and family socio-economic and initial health capital.

Several empirical studies have been carried out in order to evaluate the different shares of contributions of circumstances, efforts and demographics in health inequality. Most results show an important contribution of demographics to the magnitude of health inequality (about 48% in Jusot et al. 2013). Therefore, it could be relevant to dig further into demographics when measuring health inequality. According to Garcia-Gomez et al (2012): "The usual practice of standardizing for age and gender in health economic applications should be reconsidered. It has a tremendous effect on measured inequity. In so far as demographic (mainly gender) differences are codetermined by social and behavioral factors and are not only linked to biological differences, they should be considered explicitly in any analysis of inequality of opportunity". These arguments invite us to measure and analyze inequality of opportunity in health across gender for the first time.

The aim of the present paper is to understand how inequality of opportunity shapes health outcomes across genders in adult Europeans. Our focus is to investigate the role played by childhood conditions (i.e., circumstances) and current health-related lifestyles (i.e., efforts) on determining the self-perceived health status of adults aged 50 and older participating to the 7$^{th}$ wave of the Survey on Health Ageing and Retirement in Europe. We fill in a gap in uncovering differences in the association between initial conditions 'circumstances', current lifestyles 'effort', and health status in adulthood between men and women. In particular, we quantify respectively for men and women the shares of inequality of opportunity and legitimate inequality in health status. We further decompose the share of inequality of opportunity within types of circumstances, including social conditions, mother's health and father's health, parent's own effort in their children's health and the importance of the relationship between mother and child and between father and child. Then, we measure the differences in health-related lifestyles between men and women.

This article is structured as followed: in section 2, a literature review provides a background of the challenges in the study of health inequality by gender and how our research can contribute to current debates on the gaps according to gender in inequality of opportunity in health and health inequality related to individual effort in health investments and current debates on the principles of compensation and liberal reward. In sections 3 and 4, we go through the methods and data used in this paper. Section 5 shows and explains the result through graphical representations: we first present the magnitude of health inequality, health inequality of opportunity, health inequality related to effort, all by gender across Europe, we then decompose the health inequality within inequality of opportunity in health gender gaps and, finally, we present the shares of demographics, inequality of opportunity in health and health inequality related to effort on overall health inequality by gender across Europe. In section 6, we put our results in perspective with previous research and conclude. References are listed in section 7.

# 2. Literature review

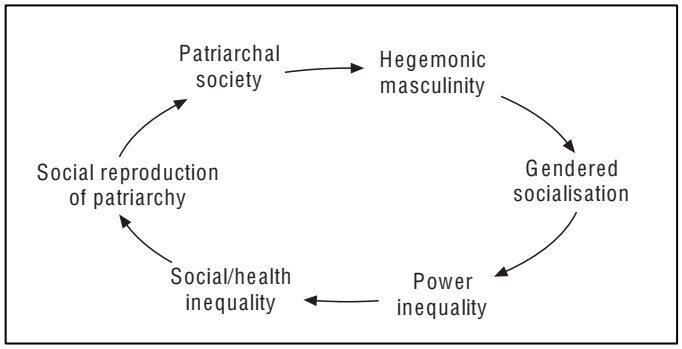
## 2.1. Gendered health inequality

Women have a higher life expectancy than men (Eurostat, 2020). According to the review from Oksuzyan et al. (2008), this gap in life expectancy is due to men engaging in more risk-taking activities, for instance: cigarette smoking, alcohol consumption, use of psychoactive substances and dangerous driving conducts. This then leads to several illnesses that shorten men's life more than women's: liver cirrhosis, lung cancer, chronic obstructive pulmonary diseases and driving accidents. Moreover, men are more likely to be overweight and women are more likely to eat low-fat foods, reduce meat and salt intakes and increase fruits and fiber intakes.

In contrast, women live longer but report worse health status than men for a number of reasons (Case & Paxson, 2005). Firstly, women suffer more from chronic health disease, such as migraines and arthritis, which leads to a lower self-rated health but not to a deadly outcome. Secondly, women give more accurate results of self-assessed health because they use more healthcare services than men, therefore they have a better understanding of their own health and are more willing to discuss their health issues in front of interviewers (Case & Paxson, 2005; Idler, 2003; Verbrugge, 1989).

Focusing on male and female gender roles can inform on women's health. Scott-Samuel (2009) defines patriarchy as "the systematic domination by men of women and of other men". A patriarchal society induces hegemonic masculinity, which can be defined as agreed negative attributes such as aggressiveness, toughness, suppression of emotions, excessive risk-taking and positive attributes such as strength, positiveness, decisiveness and courage. This hegemonic masculinity is accepted in childhood socialization. Boys being encouraged to seek independence, strengths and authority, while girls are taught to suppress their capacities and abilities. Through their activities and mobility, young girls have to learn how to be submissive and dependent (Sen & Östlin, 2007). Hegemonic masculinity leads to inequality of power between social, racial, gender groups and institutions. This inequality is expressed by what is called "structural violence", which is responsible for social and health inequality (Scott-Samuel, 2009). This dynamic of relationships is represented in Figure 1 below.

**Figure 1: The dynamic of gender inequality (Scott-Samuel, 2009).**




Let us consider two consequences in which women's health is likely to suffer from a patriarchal society.

First, social gender norms, mentioned above, are internalized by young women and transmitted into cultural practices and individual actions by the people in charge of protecting girls (e.g., parents). Such social gender norms will then create an environment where young men and men (inside or outside of the family) sexually abuse girls or are physically violent towards them (Barker, 2006). Data from a WHO report (2021a) states that 30% of women, worldwide, have suffered from either physical and/or sexual violence from their partner or non-partner. Another report from WHO (2021b), states that violence against women leads to short- and long-term mental, physical, sexual and reproductive health problems. This violence can, among other things, cause death or trauma, "unwanted pregnancies, induced abortions, gynecological problems and sexually transmitted infections, including HIV" (WHO, 2021b).

Psychological repercussions can include "depression, post-traumatic stress disorder and other anxiety disorders, sleep disturbances, eating disorders and suicide attempts" (WHO, 2021b). Finally, sexual violence "can lead to increased smoking, psychoactive substances consumptions, and risky sexual behavior" (WHO, 2021b).

Second, women are taught to self-sacrifice towards the other members of the family and to take care of others (Sen & Östlin, 2007). Data from 2018 in an OECD report states that women who work take care of their ill or old entourage twice more often than men (OECD, 2020). For instance, according to some Belgian data from 2020, women are more represented than men in the following jobs: beauticians and midwives with more than 99% of women, housekeeping and medical secretaries (98%), child care workers (96%), home caretakers (95%), children's educators (93%), nurses (92%), teaching assistants (91%) (STATBEL, 2020). These jobs have one thing in common: they involve taking care of others. What could that imply on women's health? Woo et al (2020) found through a systematic review and meta-analysis including 113 published studies that up to 1 nurse out of 10 around the world suffers from high symptoms of burn-out. Finally, an OECD (2020) report states that women spend on average 2 hours more than men doing domestic tasks. Eek and Axmon (2015) demonstrate in their study that "women living in relationships with perceived more unequal distribution of responsibility for household duties showed significantly higher levels of perceived stress, fatigue, physical/psychosomatic symptoms, and work family conflict compared with women living in more equal relationships. They also had significantly increased odds for insufficient time for various forms of recovery [needed because of the increased stress perceived], which may further contribute to an increased risk of poor health".

We can now better understand the consequences of gender roles on women's health. In addition, hegemonic masculinity also has consequences on men's health. As women suppress their health needs and their families ignore them, men tend not to seek help from healthcare (Sen & Östlin, 2007). Barker (2006) explains that during childhood, by the age of two or three, children imitate the family member that has the same gender as them. Boys are encouraged by their family to imitate other males in the family and to avoid female's behaviors. This leads to several consequences: if some fathers are violent against women and/or treat them as sexual objects, boys will copy that behavior and continue to put women's health at risk. Moreover, girls will copy their older female relative, which can lead to the perpetuation of submissive and dependent behaviors, which can also put their health at risks. Finally, as viewed previously, since men engage more than women in lifestyles choices that put their health in danger, if boys imitate their fathers this could negatively affect their health.

This literature review is a summary of the existing research on gender differences in health. This article aims to enrich these facts with quantitative results. This work focuses on two research questions: (i) Are men and women equal in the face of good health? and (ii) do their circumstances (i.e., family background and parental characteristics) and effort (health-related lifestyles) affect their health status similarly?

## 2.2. Compensation and liberal reward principles

In order to reach equality of opportunity, illegitimate sources of inequality (i.e., circumstances such as childhood socio-economic backgrounds) need to disappear. By referring to the principles of compensation and liberal reward, we will build upon the philosophical debate that states that illegitimate causes of health inequality (circumstances) should be compensated for, while legitimate causes of health inequality (efforts, beyond individuals' control, such as lifestyles choices) should be rewarded. Before discussing which circumstance should be compensated for and which effort should be rewarded, we need to understand clearly what both represent in our study.

There is an open debate in the philosophical literature on the fact that circumstances and efforts cannot be assumed independent. Roemer (1998) and Barry (2005) have two different perspectives on how we should consider and measure effort. According to Roemer (1998, p.22): "Asian children generally work hard in school and thereby do well because parents press them to do so. The familial pressure is clearly an aspect of their environment outside their control." However, Barry believes that "the fact that their generally high levels of effort were due to familial pressure does not make their having expended high levels of effort less admirable and less deserving than it would have been absent such pressure" (Roemer, 1998, p.21). Therefore, the correlation between effort and circumstances according to Barry does not matter and the effort gap between the student who has family pressure and the other one without family pressure should not be taken into account. On the contrary, Roemer suggests that "we could somehow disembody individuals from their circumstances" and thus remove effort and circumstance's correlation from effort (Roemer, 1998, p. 15). This means that the surplus of effort from the student who had family pressure should not be rewarded because it is out of his control. Conversely, in Barry's view the extra effort should be rewarded and the lack of family pressure not compensated. If we transpose this philosophical debate to health, this leads us to query whether the daughter of a smoker who smokes is less responsible for smoking than the

daughter of a non-smoker who smokes? For Barry this question is irrelevant, both women should be treated the same, whereas for Roemer the smoking habit of the daughter of a smoker should be considered as a circumstance and should be compensated for.
In the present article, we do not account for the correlation between circumstances and effort and as such do not investigate whether this philosophical debate is of any relevance to the estimated levels of inequality. We do however consider how lifestyles (namely effort) on the one hand and family background (namely circumstances) on the other hand matter for health status according to gender. We therefore adopt a perspective *à la* Barry.

Looking further into compensation of poorer circumstances brings us to enquire whether men should be compensated for their shorter life expectancy compared to women (Van Parijs, 2015). According to Casal (2015), if women engage in safe activities in contrast with men, they should be able to keep the benefits of their safer behaviors and therefore the gaps in life expectancy simply reflect chosen behavior and so relate to effort.

Our study makes a contribution to these philosophical debates by adding quantitative knowledge on the respective shares of efforts and circumstances according to gender in the magnitude and decomposition health inequality in determining factors.

## 3. Method

We empirically assess inequality of opportunity in health in-between European countries using a regression-based methodology.
In the first step, we estimate reduced-form models to measure the association between health status and respectively, circumstances and efforts. The use of a reduced-form model allows us to measure these correlations, without taking into account endogenous variables that might have been associated with circumstances or efforts or both. Each individual's current socio-economic environment, marital status and family status for example are not included in this study.
In the second step, we predict health status to measure the magnitude of health inequality and decompose this inequality into the share of inequality of opportunity in health and the share of inequality related effort.

## 3.1. Estimation strategy

Let us assume that individual health status H is a function of circumstances C, efforts E, demographics variables D and an error term u in a reduced form:

$$H = f(D, C, E, u) \text{ (Eq. 1)}$$

The vector of circumstances C consists of a set of variables beyond individual control related to health status in adulthood such as childhood conditions and family background. The vector of efforts E captures individual responsibility for health, such as lifestyles. Circumstances are considered as a source of illegitimate inequality and efforts are considered as a source of legitimate inequality.

The vector of demographic variables D captures biological determinants such as age. Controlling for demographics is essential for international comparisons in order to control for differences in population composition. These biological determinants are circumstances in the very sense of the word. It could also be argued that health differences by age classes reflect the human destiny and everyone will experiment them soon or later over the life cycle. Since we are interested in carrying out the analysis separated by gender, we only include age in the demographics. The error term u represents unobserved variables such as unobserved efforts or circumstances as well as luck. If we assume that we have a complete description of all factors, the residual term appeals to pure luck and other random factors (accident for example) which cannot be captured by the other determinants.

We consider that the dependent variable, which measures health with an ordinal and categorical variable is deemed continuous and we regress circumstances and effort variables on health status using a linear model to measure the correlation between health status and individual effort in health capital investment on the one hand, and the correlation between health status and circumstances on the other hand. The health status $H_{ij}$ of individual i in country j can then be written as follows:

$$H_{ij}^{m,f} = \lambda^{m,f} + \alpha^{m,f} C_{ij} + \beta^{m,f} E_{ij} + \gamma^{m,f} D_{ij} + u_{ij}^{m,f} \text{ (Eq. 2)}$$

Where the superscripts $m$ and $f$ differentiate the estimated coefficients in male and female. Equation (Eq. 2) allows us to test the condition of equality of opportunity by testing the equality of $\alpha^{m,f}$ to zero. Independence between $C_{ij}$ and $E_{ij}$ is not required.

## 3.2. Regression-based decomposition

We then consider the predicted value of health status from the linear models in (Eq. 2) as linearly decomposable as follows:

$$\widetilde{H_{ij}^{m,f}} = \widetilde{\lambda^{m,f}} + \widetilde{\alpha^{m,f}} C_{ij} + \widetilde{\beta^{m,f}} E_{ij} + \widetilde{\gamma^{m,f}} D_{ij} \text{ (Eq. 3)}$$

Where $\widetilde{H_{ij}^{m,f}}$ is the predicted health for each individual *i* in a country *j* being male (*m*) or female (*f*). The accented coefficients are the estimates from each respective model.

Then, in order to decompose the inequality in these indicators into legitimate and illegitimate components, we follow Jusot et al. (2013) and measure absolute inequality with the variance and/or relative inequality with the squared coefficient of variation, since these are the only inequality measures which are linearly decomposable by sources and fulfil a set of desirable decomposition properties (Shorrocks, 1982). Since the square coefficient of variation is just the variance divided by the squared mean, then the decomposition for both is the same.
Let $\widetilde{C^{m,f}} \equiv \widetilde{\alpha^{m,f}} C_{ij}$ be the part of the predicted score attributable to circumstances, then the decomposition of the variance of the predicted health scores for men and women is given by:

$$\sigma^2\left(\widetilde{H_{ij}^{m,f}}\right) = cov\left(\widetilde{H_{ij}^{m,f}}, \widetilde{C^{m,f}}\right) + cov\left(\widetilde{H_{ij}^{m,f}}, \widetilde{E^{m,f}}\right) + cov\left(\widetilde{H_{ij}^{m,f}}, \widetilde{D^{m,f}}\right) \text{ (Eq. 4)}$$

The contribution of circumstances, respectively per gender and per country, is given by:

$$cov\left(\widetilde{H_{ij}^{m,f}}, \widetilde{C^{m,f}}\right) = \sigma^2\left(\widetilde{C^{m,f}}\right) + \rho_{CE}\sigma\left(\widetilde{C^{m,f}}\right)\sigma\left(\widetilde{E^{m,f}}\right) + \rho_{CD}\sigma\left(\widetilde{C^{m,f}}\right)\sigma\left(\widetilde{D^{m,f}}\right) \text{ (Eq. 5)}$$

Where $\rho_{CE}$ is the correlation coefficient between circumstance and effort parts of the predicted score (and same definition for $\rho_{CE}$, etc.).
The contributions of efforts and demographics is given by similar equations replacing $\widetilde{C^{m,f}}$ by $\left(\widetilde{E^{m,f}}\right)$ or $\left(\widetilde{D^{m,f}}\right)$.

Inequality of opportunity in health (IOP) by gender is equal to the component of overall health inequality due to illegitimate causes, also called circumstances. It is calculated as follows:

$$IOP^{m,f} = cov\left(\widetilde{H_{ij}^{m,f}}, \widetilde{C^{m,f}}\right) \text{ (Eq. 6)}$$

Health inequality related to effort (IEF) by gender is equal to the component of overall health inequality due to legitimate causes, also called effort. It is calculated as follows:

$$IEF^{m,f} = cov\left(\widetilde{H_{ij}^{m,f}}, \widetilde{E^{m,f}}\right) \text{ (Eq. 7)}$$

A second way to visualize inequality of opportunity in health and health inequality related to effort is to evaluate, in a proportion, the magnitude of demographics, IOP and IEF in health by gender on overall health inequality, represented by the predicted variance $\sigma^2\left(\widetilde{H_{ij}^{m,f}}\right)$. The share of demographics (SD), IOP (SIOP) and IEF (SIEF) in health on overall health inequality are calculated as follows:

$$SD^{m,f}(\%) = \frac{D^{m,f}}{\sigma^2\left(\widetilde{H_{ij}^{m,f}}\right)} \times 100 \quad with \quad D^{m,f} = cov\left(\widetilde{H_{ij}^{m,f}}, \widetilde{D^{m,f}}\right) \text{ (Eq. 8)}$$

$$SIOP^{m,f}(\%) = \frac{IOP^{m,f}}{\sigma^2\left(\widetilde{H_{ij}^{m,f}}\right)} \times 100 \text{ (Eq. 9)}$$

$$SIEF^{m,f}(\%) = \frac{IEF^{m,f}}{\sigma^2\left(\widetilde{H_{ij}^{m,f}}\right)} \times 100 \text{ (Eq. 10)}$$

Moreover, measuring gender gaps between males' and females' SIOP decomposition allows us to have deeper knowledge on which variable *(k)* in the set of circumstances $\widetilde{\alpha^{m,f}C_{ij}}$ will be to the detriment of females' health and vice versa. Shares of inequality of opportunity in health gender gap decomposition is measured as follows:

$$IOP_k\ gender\ gap\ (\%) = SIOP_k^f\ (\%) - SIOP_k^m(\%) \text{ (Eq. 11)}$$

A positive IOP in health gender gap means the variable *k* is to the detriment of females' health. A negative IOP in health gender gap means the variable *k* is to the detriment of males' health.

Finally, in the case of Europe, a vector country $\eta^{m,f} S_i$, which includes all 23 countries of our model, is introduced to the reduced form model in equation 2. Therefore, $\widetilde{\eta^{m,f}} S_i$ also has to be added in the equation of the predicted value of health status (Eq. 3) and in equation 4 as $cov\left(\widetilde{H_i^{m,f}}, \widetilde{S^{m,f}}\right)$.

The share of country in overall health inequality by gender in Europe is measured as follows:

$$SS^{m,f}(\%) = \frac{S^{m,f}}{\sigma^2\left(\widetilde{H_i^{m,f}}\right)} \times 100 \quad with \quad S^{m,f} = cov\left(\widetilde{H_i^{m,f}}, \widetilde{S^{m,f}}\right) \text{ (Eq. 12)}$$

### 3.3. Correlation between effort and circumstances

In this article we will not consider the correlation between effort and circumstances. Future research should explore Roemer's perspective, which requires to purge effort from all circumstances and allows to identify pure efforts. Jusot et al (2013) proposed a method to do so by estimating an auxiliary equation regression for the effort $E_{ij}$, which allowed them to isolate a residual term $e_{ij}$, the pure individual effort, purged from all circumstances. They found little variation in-between Barry's and Roemer's view for health differences in France; this is the reason why we restricted this research paper to a perspective *à la* Barry.

# 4. Data

We used data from the 7th wave of the Survey on Health, Ageing and Retirement in Europe (SHARE). SHARE is a multidisciplinary and international panel database of micro data of European individuals aged 50 and over, on their health, socio-economic status and social and family networks (SHARE, 2021a). Its purpose is to examine the effects of health, social, economic and environmental policies over the life-course of citizens (SHARE, 2021b). The 7th wave was collected in 2017 and contains a retrospective survey called SHARELIFE, which collected data in 2013 and 2017. SHARELIFE has the advantage to take interest in people's backgrounds in several European countries and Israel. This data provides information on the childhood of the interviewees, for instance we have information on their parents' health, their parents' financial situation and education. We also have information on their current health habits. Data were collected in 27 European countries and Israel.

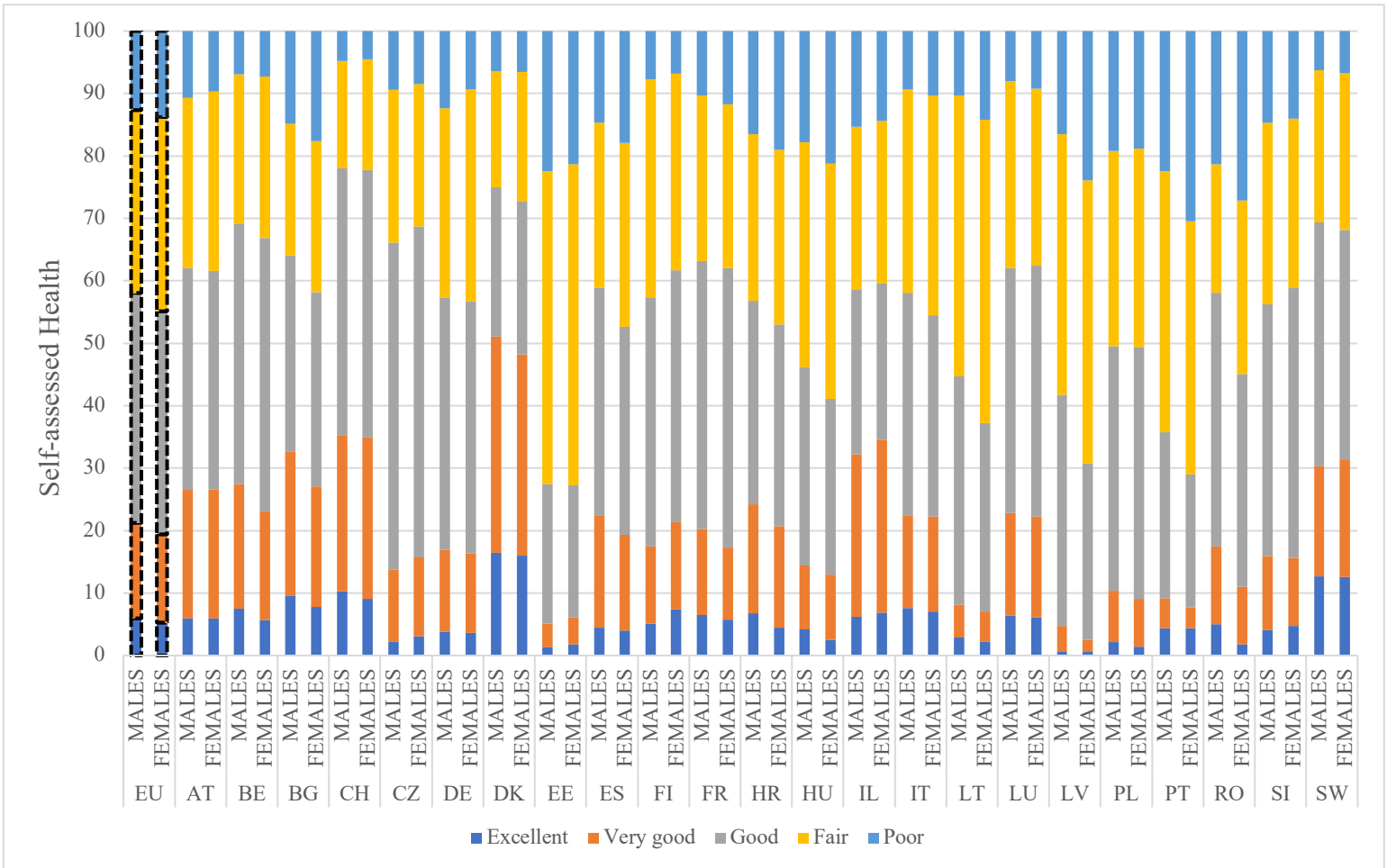
For this study, we undertook a thorough investigation of missing data and decided to exclude 5 countries that had a high level of incomplete data for our variables of interest namely self-assessed health and current health-related lifestyles. We did however keep a number of countries with a smaller level of incomplete data to allow us to include more people in the study and thus improve the reliability of our findings. For each variable in the vector of circumstances and the vector of efforts, we created a category called "unknown", which includes missing values along with the answers "do not know" or "do not want to answer". The analysis therefore considers a sample of 23 countries with 54 995 individuals (23 821 men and 31 174 women), aged between 50 and above.

Table 1 presents these descriptive statistics at European-level, among gender, including age. There is a high proportion of respondents between 60 and 69 years old (almost 40%).

## 4.1. Health status

We measure individuals' health with self-assessed health (SAH). Respondents answered the question: *"How would you rate your health?"* using five possible answers: *Excellent*, *Very Good*, *Good*, *Fair* and *Poor*. This variable has been shown to be a reliable indicator of health (Idler and Benyamini, 1997), a good predictor of more elaborate health indicators (Vandenberghe, 2021), and has largely been used in cross-country comparisons (Jusot et al., 2009, 2010; Mackenbach et al., 2008; Masseria et al., 2006; Tubeuf & Jusot, 2011; van Doorslaer and Koolman, 2004). The distribution of self-assessed health by gender and by country is presented in Figure 2. EU values on the far left of the graph represent global average. We can see that there are not many differences between males' and females' self-assessed health inside each country, but differences exist in-between countries. We note that Switzerland, Denmark, and Sweden have quite a high level of "*very good*" and "*good*" health among both genders while Bulgaria, Estonia, Croatia, Hungary, Latvia, and Romania have quite a high level of "*poor*" health among both genders.

**Figure 2: Self-assessed health distribution by gender across Europe**



## 4.2. Vector of circumstances

The set of circumstances includes variables related to parents' characteristics that have been shown to matter for health (Jusot et al., 2013; Rosa-Dias, 2009, 2010; Trannoy et al., 2010; Tubeuf et al., 2012). Circumstances are decomposed into social conditions during the childhood, the self-reported relationship with the mother and with the father during childhood, parents' longevity and parents' own health-related effort.

Social conditions are proxied by 6 variables: the mother's education and father's education, the main breadwinner's occupation, family's finance, the number of books at home and the number of rooms in the household. For parents' education SHARE used the International Standard Classification of Education (ISCED), which enables comparisons between countries through a uniform international classification (UNESCO institute of statistics, 2021). Level of education is classified according to criteria chosen in the revision of the International Standard Classification of Education (ISCED) in 2011: early childhood education, considered in our study as "no education", primary and low secondary education, considered as "low education", upper secondary to tertiary education, considered as "middle or high education" (UNESCO et al., 2020). We can note that there are not many differences between males and females' parents' education but the percentage of fathers in middle or high education (25%) is higher than the one of mothers (15%), who remain mostly in low education (nearly 40%). The "unknown" category includes a third of the answers for both genders. As for the main breadwinner occupation, SHARE used ISCO-08 classification (International Standard Classification of Occupations), which divides professional occupations into six categories: "senior managers and professionals", "technicians and associate professionals and armed forces", "office clerks, service and sales workers", "skilled agricultural and fishery workers", "craftsmen and skilled workers", "elementary occupations and unskilled workers". Again, there are not many differences between genders but we can observe a slightly higher proportion of skilled agricultural and fishery workers, craftsmen, skilled workers, elementary occupations and unskilled workers among both genders. Again, the "unknown" category includes more than a third of the answers for both genders. To have better knowledge on families' finance, interviewees could choose between 4 possible answers: "*pretty well off financially*", "*about average*", "*poor*", "*it varied*". Results did not differ between men and women, most families were about average financially (almost 50%). The "unknown" category represents a fifth of all the answers for both genders. Then, respondents were asked on the number of books they had at home. It includes 4 categories: from the first "*none or very few (0-10 books)*"

to the last "*enough to fill two or more bookcases (101 – 200+ books)*". There were no differences between genders, most families had none or very few books at home (30%). Once again, the "unknown" category represented a fifth of all the answers for both genders. Finally, as a last proxy for social conditions, respondents could state how many rooms their house contained. We calculated the mean of all the answers. Both genders got a similar mean of approximately 3 rooms per household.

In SHARELIFE, respondents could rate the quality of their relationships with each of their parents during childhood from "*excellent*" to "*poor*". There was a slightly higher proportion of "*fair* or *poor*" relationship between mothers and daughters than between mothers and sons. Globally a "*fair* or *poor*" relationship with the mother remained the lowest rates. The "unknown" category represents a fifth of all the answers for both genders. As for the relationship with the father, the relationship between fathers and daughters was rated "*excellent*" more often than the relationship between fathers and sons. The "unknown" category represented a fifth of all the answers for both genders. The rate of "*fair* or *poor*" was greater between father and both children than between mothers and children. Children seem to have better rated relationships with the parent of the opposite gender.

To measure parents' health, we used information on their longevity as a proxy. Respondents could state if their mother or father was still alive at the time of the survey and if not, the year they died. We computed the country-specific medians for mothers' and fathers' year of death in order to code a variable indicating if the parent died at an age below or above the country-specific median; we considered as prematurely-deceased those who died at an age below the median. The proportion of fathers still alive was lower than mothers (between 6 to 7% versus between 17 to 19%). There was a slightly higher proportion of prematurely deceased fathers compared to mothers (34-33% versus 30%).

Finally, we could proxy parents' effort into the health of their children during childhood. Interviewees could state if during their childhood their parents had them vaccinated and brought them regularly to the dentist. Parents brought more regularly their daughter to the dentist (45%) than their son (39%).

**Table 1 – Descriptive statistics – Demographics and circumstances variables**

| | Female | Male |
|---|---|---|
| **Age** | | |
| 59- | 25% | 21% |
| 60-69 | 35% | 38% |
| 70-79 | 26% | 27% |
| 80+ | 14% | 13% |
| **Mother's education** | | |
| Unknown | 32% | 31% |
| No education | 15% | 16% |
| Low | 37% | 38% |
| Middle or High | 15% | 14% |
| **Father's education** | | |
| Unknown | 33% | 32% |
| No education | 13% | 14% |
| Low | 28% | 28% |
| Middle or High | 25% | 25% |
| **Main breadwinner occupation** | | |
| Managers and professionals | 9% | 9% |
| Technicians, associate professionals and armed forces | 6% | 6% |
| Office clerks, service workers and sales workers | 8% | 8% |
| Skilled agricultural and fishery workers | 13% | 13% |
| Craftsmen and skilled workers | 15% | 16% |
| Elementary occupations and unskilled workers | 13% | 12% |
| Unknown | 37% | 36% |
| **Family's finance** | | |
| Pretty well off financially | 10% | 9% |
| About average | 48% | 48% |
| Poor or it varied | 21% | 22% |
| Unknown | 22% | 21% |
| **Number of books at home** | | |
| Unknown | 19% | 19% |
| None or very few (0-10 books) | 30% | 31% |
| Enough to fill one shelf (11-25 books) | 19% | 20% |
| Enough to fill one bookcase (26-100 books) | 19% | 19% |
| Enough to fill two or more bookcases (101 – 200+ books) | 12% | 11% |
| **Number of rooms in household (mean)** | 3,22 | 3,31 |
| **Relationship with the mother** | | |
| Excellent | 25% | 24% |
| Very good | 26% | 27% |
| Good | 21% | 22% |
| Fair or poor | 9% | 6% |
| Unknown | 20% | 21% |
| **Relationship with the father** | | |
| Excellent | 20% | 17% |
| Very good | 23% | 23% |
| Good | 23% | 25% |
| Fair or poor | 11% | 11% |
| Unknown | 23% | 23% |
| **Parent's longevity** | | |
| Mother still alive | 19% | 17% |
| Mother prematurely deceased | 30% | 30% |
| Father still alive | 7% | 6% |
| Father prematurely deceased | 34% | 33% |
| **Health behaviors during childhood** | | |
| Vaccinations | 78% | 79% |
| Regular dentist | 45% | 39% |

### 4.3. Vector of efforts

Jusot and Tubeuf (2019) explain there is a consensus in the health sector that lifestyles, such as smoking, food or drinking habits as well as the use of preventive healthcare can be considered as indicators for individual efforts in health and healthcare. These are determinants freely chosen by the individual according to their preferences and for this reason considered as legitimate sources of health inequality. Efforts are proxied here by health-related behaviors which are available in SHARE and concerns current lifestyles of respondents. We will consider whether respondents have had a dentist visit in the last 12 months, whether they have had regular blood checks and their body mass index (BMI). All these efforts were transformed into binary variables. The respondent had to report if he or she had, or not, seen a dentist in the last 12 months and if yes or no he or she had ever done regular blood pressure check-ups over the course of the several years. Finally, the BMI, calculated using height and weight measures, was attributed the value 1 if obese (BMI>30) and 0 overwise. Statistics did not show differences by gender in effort. Half of respondents had seen a dentist in the last 12 months. There were higher proportions of people who have never done regular blood checks in the course of several years (65%). A quarter of participants had a BMI over 30. Table 2 presents the descriptive statistics of effort variables at European-level and by gender.

**Table 2 – Descriptive statistics – Effort variables**

| | **Female** | **Male** |
|---|---|---|
| **Lifestyle/Effort variables** | | |
| Not seen a dentist/dental hygienist in the last 12 months | 53% | 50% |
| No regular blood pressure checks | 65% | 65% |
| Obese | 25% | 23% |

## 5. Results

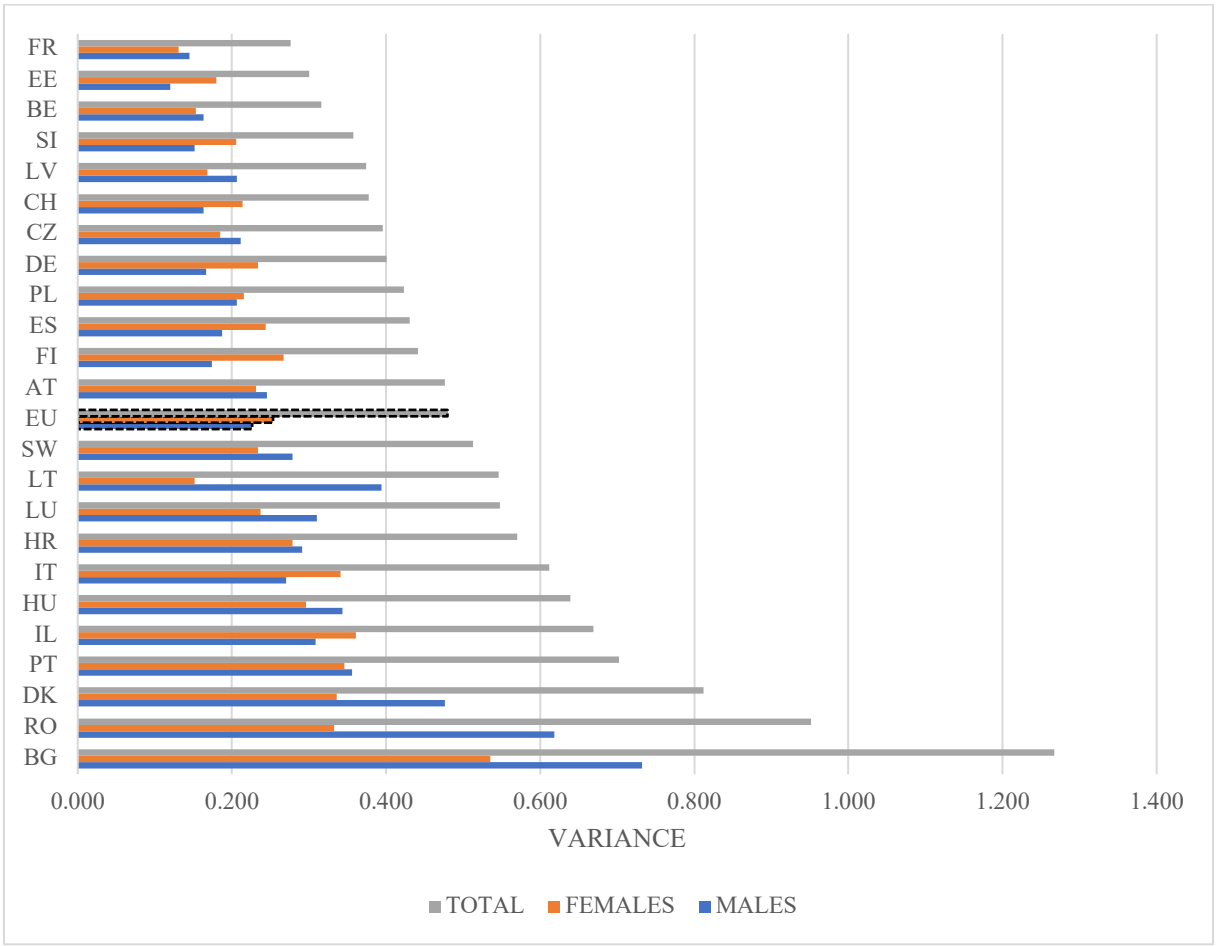
Results are presented below in the form of histograms: overall health inequality by gender across European countries in Figure 3, inequality of opportunity in health (IOP) and IOP in health gender gap decomposition in Figures 4 and 5, health inequality related to effort (IEF) in Figures 6 and the shares of inequality of opportunity in health (SIOP) and health inequality related to effort (SIEF) in Figure 7.

## 5.1. Overall health inequality

Figure 3 shows different levels of health inequality between males and females and between countries. More countries have a higher level of health inequality in males than females but Europe's females' health inequality is slightly higher for females than males.

Countries with the highest level of health inequality are Bulgaria, Romania, Denmark, Lithuania for males and Bulgaria, Israel, Portugal and Italy for females. Countries with the lowest level of health inequality are Estonia, France, Slovenia, Belgium for males and France, Lithuania, Belgium and Latvia for females. Finally, among all countries, those with the highest level of health inequality have much higher health inequality among males than among females. Those countries are Bulgaria, Romania, Denmark and Hungary. Whereas countries with the lowest level of health inequality have higher health inequality among females than among males. These countries are: Estonia, Slovenia, Switzerland, Germany, Finland, and Spain.

**Figure 3: Overall health inequality by gender across European countries**



## 5.2. Inequality of opportunity in health (IOP)

If we take interest in inequality of opportunity (IOP) in health by gender across Europe (Figure 4), a few countries have very different results from the rest of Europe (Bulgaria, Romania, Denmark, Luxembourg, Portugal and Lithuania), their level of IOP in health is much higher in males than in females. As for the rest of the countries there are not many disparities. Countries with the highest level of IOP are Bulgaria, Romania, Denmark, Lithuania for males and Bulgaria, Portugal, Denmark and Lithuania for females. Countries with the lowest level of IOP in health are Estonia, France, Slovenia, Belgium for males and Latvia, Lithuania, France and Belgium for females. Among all countries, those with the highest level of IOP have a much higher IOP in health among males than among females (Bulgaria, Romania, Denmark, Lithuania, Luxembourg and Croatia), whereas those with the lowest level of IOP have higher IOP in health among females than among males (Estonia, Slovenia, Finland, Germany and Poland). This was also the case with overall health inequality in Figure 3.

**Figure 4: Inequality of opportunity in health by gender across European countries**

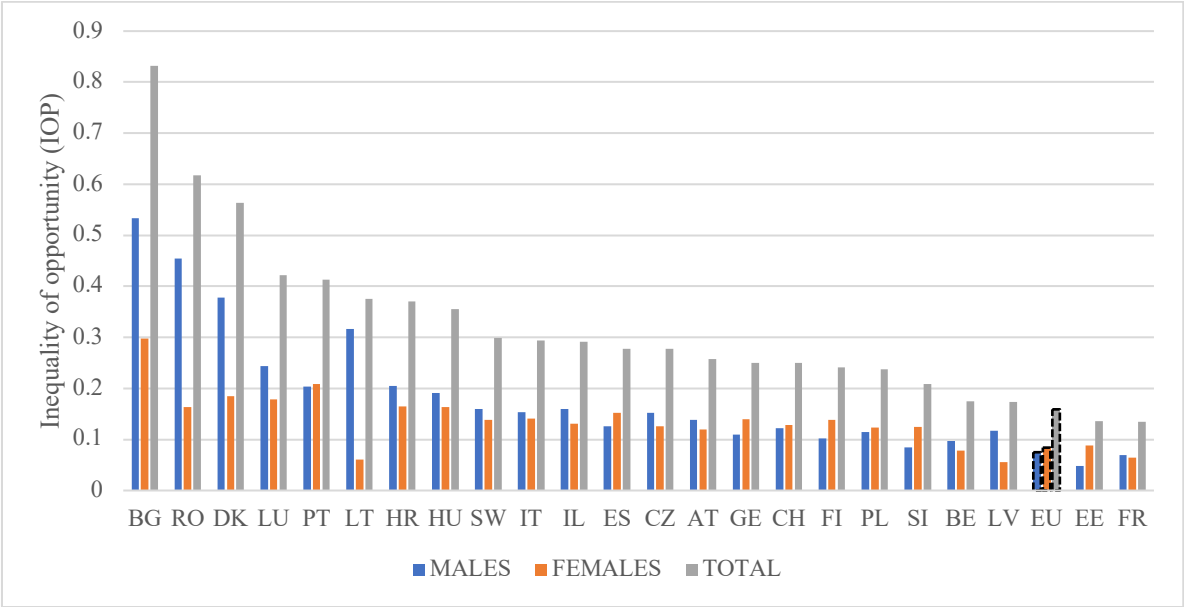
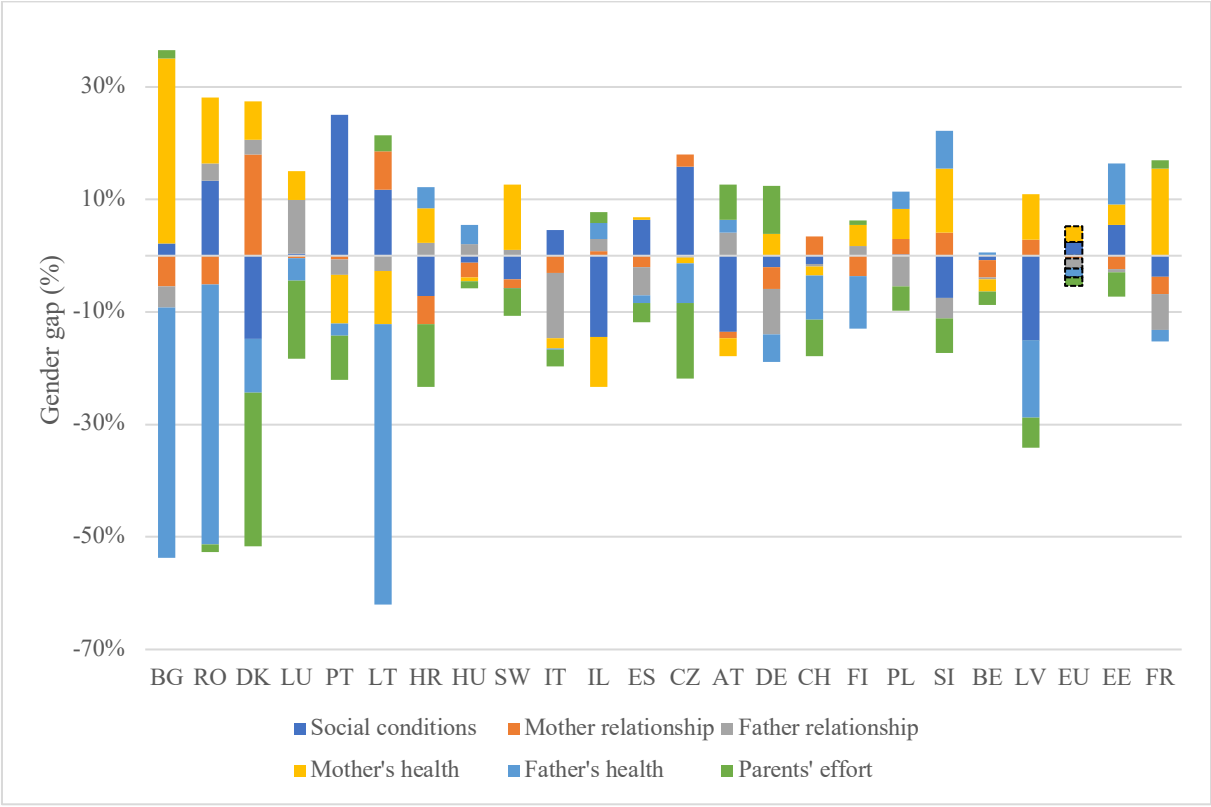



Figure 5 provides further information on the decomposition of the contributing factors to the vector of circumstances (social conditions, relationship with the mother, relationship with the father, mother's health, father's health and parents' effort) by presenting on a graph gender gap in inequality of opportunity decomposition across Europe.

Countries were sorted by descending order of total IOP in health. It shows that countries with the highest level of IOP in health also have very important gender gaps, detrimental to both genders, if we compare with the rest of the countries. In Portugal, Italy, Czech Republic and Spain social conditions explain most of the gender gap that is to the detriment of females IOP in health. In Austria, social conditions represent most of the gender gap that is to the detriment of males IOP in health. Except for females in Denmark, the relationship with the mother does not explain much of the IOP in health gender gap. In Italy, Denmark, Estonia, Poland and France, the relationship with the father explains most of the gender gap that is to the disadvantage of males IOP in health. In Luxembourg, the relationship with the father explains nearly all of the gender gap that is to the disadvantage of females IOP in health. For countries where the gender gap in IOP in health is to the detriment of females, the gap is mostly explained by the mother's health. Similarly, in countries where the gender gap in IOP in health is to the detriment of males, the gap is mostly explained by the father's health. Finally, parent's effort plays an important role in explaining the gender gap that is to the disadvantage of males IOP in health in Denmark, Latvia, Italy, Switzerland, Croatia, Spain, Czech Republic, Luxembourg, Poland, Portugal, Slovenia and Estonia.

**Figure 5: Inequality of opportunity in health gender gap decomposition across Europe**

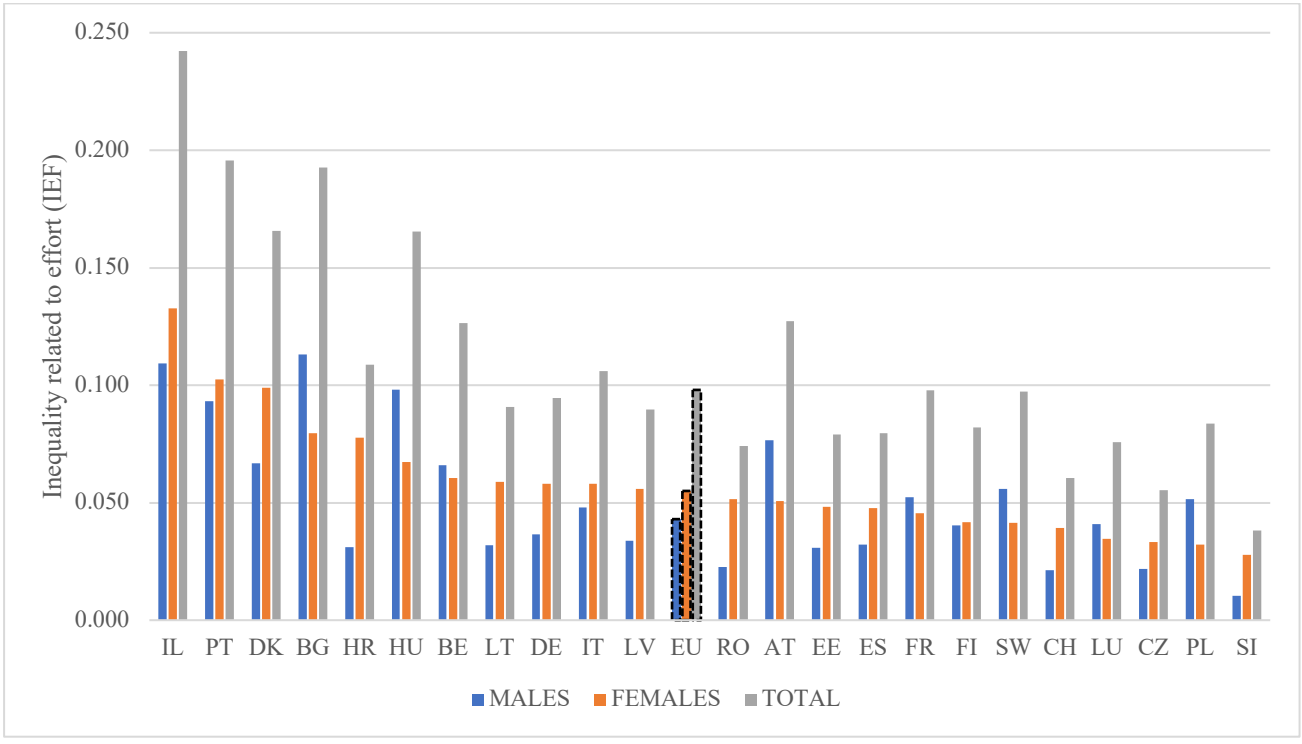


## 5.3. Health inequality related to effort (IEF)

Figure 6 presents health inequality related to effort (IEF) by gender and across European countries. Females' IEF in health are higher in a majority of countries than males' IEF in health. Globally, it is also slightly the case in Europe. Countries with the highest level of IEF in health are Bulgaria, Israel, Hungary, Portugal for males and Israel, Portugal, Denmark, Bulgaria and Croatia for females. Countries with a low level of IEF in health for males are Slovenia, Switzerland, Czech Republic and Romania. Countries with a low level of IEF in health for females are Slovenia, Poland, Czech Republic and Luxembourg. Furthermore, countries with the lowest level of IEF in health have higher IEF in health for females than males. These countries are: Slovenia, Switzerland, Czech Republic, Romania, Estonia, Lithuania, Spain, Latvia and Germany. Added to these countries are Israel and Denmark, which also have higher IEF in health for females than males. In other words, countries where lifestyles for both genders play a minor role in health status, females' lifestyles behaviors will have more impact on their health status.

Finally, when countries have high levels of IEF in health, they do for both genders and when they have low levels of IEF in health, they do for both genders.

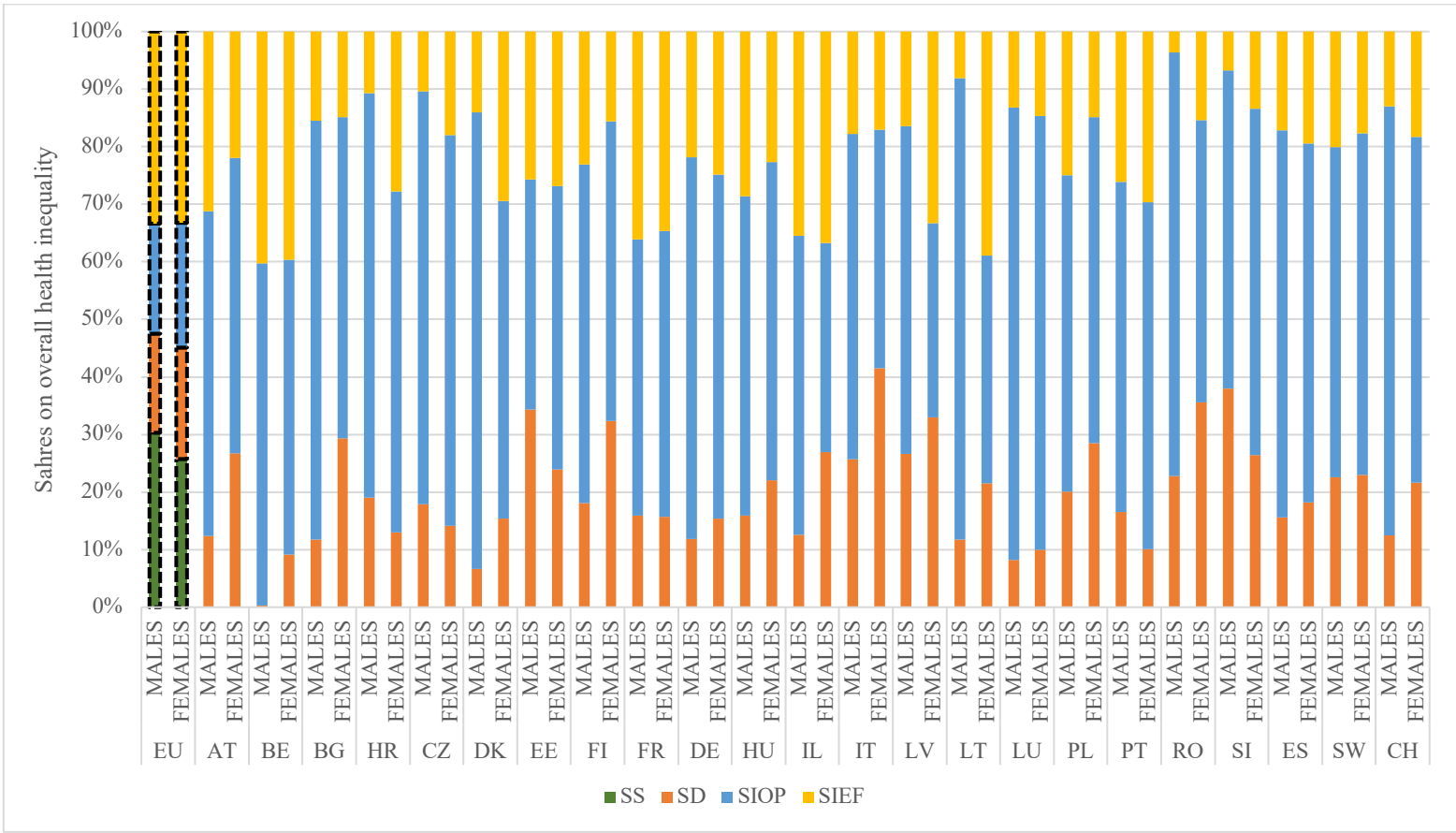
**Figure 6: Health inequality related to effort by gender across European countries**



## 5.4. Shares of IOP (SIOP) and IEF (SIEF) in health.

Figure 7 illustrates the respective shares of demographics (SD), inequality of opportunity in health (SIOP), health inequality related to effort (SIEF) and countries (SS, in the case of Europe) on overall health inequality. All countries have a much higher correlation between health status and circumstances than between health status and effort or demographics. A big share of overall health inequality is explained by inequality of opportunity in health. Shares in demographics and health inequality related to effort vary from one country to another. Some countries have demographics as a second biggest contribution to overall health inequality and others have inequality related to effort as a second biggest contribution. The share of countries explains 30% of overall health inequality in Europe. This highlights the relevance of this current research, which aims to analyze disparities among countries.

**Figure 7: Shares of countries (SS), demographics (SD), inequality of opportunity in health (SIOP) and health inequality related to effort (SIEF) on overall health inequality by gender across European countries**



# 6. Discussion

## 6.1. Overall health inequality

There are health disparities between men and women but also among countries. Among all countries, those with the highest level of overall health inequality have much higher health inequality among males than among females. Whereas those with the lowest level of overall health inequality have higher health inequality among females than among males. It would be relevant to investigate what leads to important differences in health status according to gender in countries with high level of health inequality (Bulgaria, Romania, Lithuania, Denmark). Further research could investigate this question in order to create policies aiming to decrease health inequality especially among males. In the same way, there is a need for further investigation in countries with low level of health inequality (Estonia, Slovenia, Switzerland, Germany, Finland and Spain), on what could impact more females' than males' health. Specific policies to reduce inequality in females' health could take place in those countries to prevent these genders disparities.

More globally, we identified some countries where there is high overall health inequality among both male and female, it would be efficient for the European Union to tackle health inequality in those countries.

## 6.2. Inequality of opportunity in health (IOP)

There are disparities in inequality of opportunity in health (IOP) between men and women as well as between countries.

Let us begin with disparities among countries: those where circumstances are very correlated with health status are Bulgaria, Romania, Denmark, Luxembourg, Portugal and Lithuania. A high correlation between circumstances and health status tells us that circumstances play a significant role in individuals' health status. Further investigation needs to take place in these countries in order to set up policies to tackle these inequalities that are considered as the most unjust. Countries should invest in policies to improve childhood socio-economic and health background. This is even more relevant in countries where the level of health inequality is the highest: Bulgaria, Romania, Denmark and Portugal.

Moreover, as observed with overall health inequality, countries with high level of IOP in health have a much higher IOP in health among males than among females, whereas those with the

low level of IOP in health have higher IOP in health among females than among males. This means that countries (Estonia, Slovenia, Finland, Germany and Poland) with low correlations between circumstances and health status should focus on policies to improve childhood conditions specifically towards girls, while countries (Bulgaria, Romania, Denmark, Lithuania, Luxembourg and Croatia) with high correlations between circumstances and health status should focus on policies to improve childhood conditions specifically towards boys.

We were able to dig deeper by looking at gender gaps in IOP in health decomposition into social conditions, relationship with the mother, relationship with the father, mother's health, father's health and parents' effort.

In countries where the gender gap in IOP in health was to the detriment of females, IOP was mostly explained by the mother's health while in countries where the gender gap in IOP in health was to the detriment of males, it is mostly explained by the father's health. We can conclude that males' and females' health status are influenced by each respective parent's health. This result is in line with the literature stating that children imitate their parent of the same gender (Baker, 2006). These countries could work on introducing early childhood prevention policies to reduce gender norms in order to decrease these copying behaviors, especially in countries with high levels of IOP in health (Bulgaria, Romania, Denmark, Lithuania, Luxembourg and Croatia). In these countries, early prevention on gender norms could prevent boys from imitating their father and thus reducing IOP in health.

Finally, parents' effort plays an important role in explaining the gender gap that is to the detriment of males IOP in health. Parents' behaviors toward their sons' health seem to have an important impact on their health. In Denmark, Latvia, Italy, Switzerland, Croatia, Spain, Czech Republic, Luxembourg, Poland, Portugal, Slovenia and Estonia) prevention policies could encourage parents to take better care of their sons' health.

### 6.3. Health inequality related to effort (IEF)

Figure 6 shows that effort is more correlated to health status among females than among males, which means women have a higher return on their health than males. This is the case in Israel, Portugal, Denmark, Bulgaria and Croatia.

To dig further on this return on investment, we could check for examples to find out if in these countries women are engaged in higher skilled professions than the rest of the countries. The Gender equality index has a score in the domain of power, which measures gender

representation in decision-making positions in political, economic and social jobs (EIGE, 2017). It reported that Denmark and Bulgaria obtained in 2015 scores in the domain of power greater than the overall average in Europe, while Portugal and Croatia were below the average. We could also examine other indicators in order to continue investigating women's return on investment in other sectors than health, for example: in the socio-economic field: e.g., the number of women obtaining university degrees, the number of female doctors, the number of female scientific publications or the number of female writers.
Furthermore, the IEF in health in women is even higher in countries where overall IEF in health is lower. These countries are Slovenia, Switzerland, Czech Republic, Romania, Estonia, Lithuania, Spain, Latvia and Germany. To understand better this phenomenon, it would be interesting to investigate why the return of health effort of the whole population is lower in these countries and why on the contrary it is higher for females.

Nevertheless, globally, all countries have a much higher correlation between health status and circumstances than between health status and effort. A big share of overall health inequality is explained by inequality of opportunity in health. Therefore, countries should prioritize research and policies on inequality of opportunity in health rather than on health inequality related to effort.

Finally, the share of health inequality caused by demographics, or in other words peoples' age, can be non-negligible in some countries. This is related to people having their health status worsen with age. However, it would be meaningful to dig deeper in these disparities in order to understand how countries impact differently their population's health with age.

### 6.4. Principles of compensation and liberal reward

This research builds upon the philosophical debate that states that illegitimate causes of health inequality (circumstances) should be compensated for, while legitimate causes of health inequality (efforts, beyond individuals' control, such as lifestyles choices) should be rewarded. Results show that countries with the highest level of IOP in health are Bulgaria, Romania, Lithuania and Denmark. If we follow the principle of compensation in order to achieve equality of opportunity, these countries should actively think of compensation policies to provide the population with equal opportunities in health. For further information on which part of individuals' childhood background those policies should tackle, the decomposition of the IOP

in health is useful. Furthermore, looking at the IOP in health decomposition gender gap can also be relevant, in order to reduce gender gaps and reach equality of opportunity in health. For example, Bulgaria could focus on the impact parents' health has on their descendant's health.

Let us take further interest in gender disparities that are in need for compensation for poor circumstances. Since countries with the highest level of IOP in health (Bulgaria, Romania, Denmark, Lithuania, Luxembourg and Croatia) have a much higher IOP in health among males than among females, those countries should consider compensation policies targeting males. On the other hand, since countries with the lowest level of IOP in health (Estonia, Slovenia, Finland, Germany and Poland) have higher IOP in health among females than among males, compensation policies could target females.
Finally, since males' and females' health status gender gap is mostly influenced by each respective parent's health, they should receive specific compensations for that matter. Moreover, since parents' effort play an important role in males' IOP in health gender gap, there is a need to compensate the lack of effort from parents towards their sons' health.

As for health inequality related to effort being higher among females than among males, attention should be given to the principle of natural reward for females.

### 6.5. Limitations

Nonetheless, our study has several limitations.
First, we had to restrict the SHARE database because of missing values in variables that would have been relevant for the vector of effort, namely smoking and diet habits, alcohol intakes and physical activities. It would have been relevant to add such effort measures in our model and would have allowed to consider other effort variables than healthcare use.
The use of efforts beyond healthcare use is also interesting in a multi-country study since government policies in healthcare (e.g., on healthcare access, health prevention campaigns and health consultations refunds) could have an impact on individuals' healthy lifestyles choices independently from their own preferences.
Another concern regards the efficiency of self-assessed health as an indicator for the health status, since other factors such as health care utilization, mental and physical conditions and countries characteristics could impact self-assessed health and should be taken into account (Bago d'Uva et al., 2007).

Different studies suggest that men and women have different ways of responding to questionnaires and our estimates might suffer from this source of gender bias. A first study states that since women are less stoical than men, they will put less life-threatening health concerns in their survey compared to men (Spiers et al., 2003). On the other hand, two other studies suggest that women give more accurate results of self-assessed health because they use more healthcare services than men, therefore have a better understanding of their own health and are more willing to discuss their health issues in front of interviewers (Idler, 2003; Verbrugge, 1989). However, a French study shows that self-assessed health is the least distorted health indicator in comparison to others (Devaux et al., 2008).

### 6.6. Future perspectives

For further research three main perspectives could be explored.

First, this study could be pursued by using perspective *à la* Roemer. It could show the impact of circumstances and efforts' correlation on health inequality, IOP and IEF in health.

Second, the same study could be run with another health outcome. We could use mortality as an outcome, in order to better understand gender gap in life expectancy mentioned in the literature review. This would allow us to answer to Van Parijs (2015) on whether men should or should not be compensated for their shorter life expectancy than women's, as we would measure the correlation between mortality and circumstances and mortality and efforts. We could also use as an outcome an indicator of mental health status. This would allow us to have an idea, among other things, of the impact of hegemonic masculinity and gender norms, also explained in the literature review, on women's mental health.

Finally, we could think of a way to consider in a full model of health status where the individual's current environment (e.g., socio-economic and marital status) is accounted for in the model. This would allow us to further investigate the impact of hegemonic masculinity and gender norms on a women's outcome (e.g., physical or mental health, mortality). Moreover, we could also think of a way to include for each country an indicator of its gender or health policies. As Roemer (2002) explains: "the outcomes individuals sustain are the consequence of circumstances, effort, and policy […] and policy is the instrument by which society (or the planner) influences outcomes – perhaps some allocation of a publicly owned resource". This would allow us to deepen our comprehension of the results disparities across countries.

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