Assessing the contribution of poverty to educational differentials in disability in 26 European countries

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Abstract

Objectives To what extent the European variation in the social inequalities in disability is associated to the variation in the level of poverty.

Methods: Using European Statistics on Income and Living Condition (EU-SILC) for 26 countries and specific logistic models, we measure the disability excess-prevalence (disadvantage) of low-educated relative to the middle-educated and the disability reduced-prevalence (advantage) of high-educated and the contribution of poverty through a measure of economic hardship (EH).

Results: We found substantial country variations in the levels of EH and in the size of the disability-advantage/disadvantage across educational groups. EH contributes to the advantage and disadvantage but to different extent across countries; the contribution depends on the size of the advantage/disadvantage and on level of poverty in each country.

Discussion: Policy actions to reduce poverty in Europe should help reducing the overall levels of disability and the related social inequalities, but to different extent across countries.
INTRODUCTION

In a context of intense promotion of healthy aging worldwide, reducing and preventing the risks of disability is a priority. It might be of crucial importance especially in mid- and old-adult ages when disability starts to be highly prevalent and raises major social support and loss of financial resources. At mid-adult ages, the objective of increasing labor force participation in late working life and to postpone age of retirement only holds if people are healthy enough to remain at work. At late-adult ages the goal are to maintain quality of life as well as to reduce and postpone the need for caregiving. There are large and persistent social inequalities in the chance of reaching the retirement age in good health and in the chance maintaining independence in later ages [1-3]. Reducing social differentials in disability within and across countries has become a priority for public policies, which constitutes a mean for increasing healthy aging [4-6]. Meanwhile the size of the differences from one country to another raises the question of the determining factors on which policies could act at the European level.

Poverty, and its consequences at the individual level in terms of access to basic needs and services, constitutes one of the key factors of social inequalities in health and disability. Indeed the level of poverty varies across social groups and across European countries, as the country economic situation or the country-specific social policies and schemes have different aims at preventing from material deprivation. Therefore poverty and material deprivation are of interest to understand the variation in social differentials in disability across Europe. In this study we examine how far the varying level of poverty in the high-educated, middle-educated and low-educated groups in Europe contribute to the variation in their respective levels of disability and the resulting educational differentials.

We examine the disability situation of the low-educated and of high-educated, in comparison to the middle-educated, separately for each country: namely the excess-prevalence \((\textit{disadvantage})\) of disability of low-educated relative to the middle-educated and the reduced prevalence \((\textit{advantage})\)
of disability of high-educated. We explore whether countries with low levels of poverty (either due to better economic context and/or due to policy schemes) better protect the low-educated groups from disability (reducing their disability disadvantage) compared to the middle-educated groups, by compensating the risk of material deprivation. We investigate the patterns applying to the high-educated groups. We don’t expect poverty to be determinant in distinguishing the high-educated groups compared to the middle-educated groups in countries where poverty only concerns the bottom end of the social gradient (as the largest part of the middle- and high-educated groups should be above the threshold). While in other countries, poverty goes further up in the educational gradient, which could exacerbate the reduced-risk of disability (disability advantage) of high-educated groups.

DATA AND INDICATORS

The “European Union Statistics on Income and Living Conditions” (EU-SILC) is a database monitored by the national statistical offices, designed to provide comparable data across the EU. We used the 2009 EU-SILC cross-sectional data. In most countries, data is collected by ad hoc interview surveys, providing self-reported information for health and socioeconomic (SES) variables. Elsewhere, socio-demographic variables are collected through population registers and health data is being collected by a complementary survey, often using telephone interview. We examined sample selection, survey designs, collection mode and question wording to ensure comparability. Due to varying response rates, representativeness of country samples regarding age, occupation and education distributions was assessed. We finally excluded Iceland, Luxembourg, and Malta and recommend caution for some countries. We excluded individuals aged 80-plus due to missing information. Our study comprises 289,816 individuals aged 30-79 from 26 European countries (Table 1).
**DISABILITY**

Disability is measured by the *Global Activity Limitation Indicator* measuring health related activity limitation (AL) with a single question: “For at least the past six months, to what extent have you been limited because of a health problem in activities people usually do?” (Severely limited; Limited but not severely vs Not limited)". AL is self-reported and so varies across European countries, partly due to varying propensity to report health disorders [7, 8].

**EDUCATION AND POVERTY**

We considered three groups based on the level of education achieved, using the International Standard Classification of Education\(^1\): low (0-2 primary and lower secondary education), middle (3-4 upper secondary education) and high (5-6 tertiary education).

In 2009 EU-SILC poverty can be approached by a thematic module on self-perceived situations of deprivation, as an alternative to an income-based measure [9]\(^2\). This approach includes both the individual’s income as well as available social transfers; it accounts for the potential policy schemes preventing from deprivation. In this study, we focused on the “economic stress” dimension of the thematic module which is assessed by three items\(^3\). The first item relates to “the household ability to cope with unanticipated expenses” (Yes/No). The second item relates to “the household ability to make ends meet, namely, to pay for its usual necessary expenses?” (introduced by “A household may have different sources of income and more than one household member may contribute to it. Thinking of your household’s total income”), the answer categories being “With great difficulty; with difficulty; with some difficulty; fairly easily; easily; Very easily”. The third items relates to "difficulty to reimburse mortgage….". Due to substantial missing values for the third item, we only used the first two. We consider as situation of economic poverty

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\(^{2}\) Measuring poverty in international studies raises a number of difficulties: based on individuals’ income, variation in income levels and standard of living impose to adjust the definition. Data on income needs to be also of equivalent quality, which might often not be the case depending on the data collection mode used in the different countries.

\(^{3}\) *Basic deprivation* comprises three items related to a meal with meat or a vegetarian alternative, adequate home heating and leisure activity. *Consumption Deprivation* comprises three items related to a personal computer (PC), a car or internet connection. These two dimensions could be more sensitive to variation across countries in the perception or definition of the items.
hardship (EH) people reporting (“great” and “some”) difficulty to make ends meet and difficulty to cope with unexpected expenses.

ANALYSIS

First, we assess the variation in the AL-advantage and disadvantage of the high- and low-educated groups in the 26 countries, using a logistic regression model, for the 26 countries in order to compare the country-specific levels (Model 1)\(^4\). The risk of AL is estimated as a function of three independent variables age (and age squared), sex, and education, which are interacted with country. The AL-advantage and disadvantage in each country correspond to the ORs associated with the education*country term; from these ORs, we identify which country departs from the average pattern. Second, Model 2 repeats the same analysis adding the EH interacted with countries in the model (Model 2)\(^5\) [models are not shown in this extended abstract]. The new estimates AL-advantage and disadvantage across educational levels, adjusted on EH, show whether the country-specific patterns observed in Model 1 remained stable or changed after controlling for EH.

Finally, we quantify the contribution of country- and education-specific levels of EH to the AL-advantage and disadvantage across educational groups. To do so, we use a “KHB” logistic regression model which allow us to quantify the ORs effect before and after accounting for EH (Kohler, Karlson, and Holm 2011, Karlson, Holm and Breen 2011). These models provide (1) the ORs for AL associated with the educational level, (2) the ORs when accounting for EH and (3) a percentage contribution of EH in the association between AL and education for each country.

RESULTS

Figure 1 shows a range from the lowest to the highest values of the level of EH across educational groups in the 26 European countries. Although the low-educated groups are systematically more

\(^4\) OR of activity limitation for the country*education term, adjusted on age, age2, sex and country (Model 1) + economic hardship (Model 2); Model 1: \(\text{AL}=\beta_1 \text{Country} + \beta_2 \text{Age} \times \text{Country} + \beta_3 \text{Age}^2 \times \text{Country} + \beta_4 \text{Sex} \times \text{Country} + \beta_5 \text{HighEd-Country} \).  
\(^5\) Model 2: \(\text{AL}=\beta_1 \text{Country} + \beta_2 \text{Age} \times \text{Country} + \beta_3 \text{Age}^2 \times \text{Country} + \beta_4 \text{Sex} \times \text{Country} + \beta_5 \text{HighEd-Country} + \beta_6 \text{EconomicHardship-Country} \).
affected by EH, there are large variations. The lowest levels of EH for the low-educated group ranged between 15% and 20% and are found in Sweden, Denmark and Norway and Finland. The Netherlands comes just after and presented the lowest level of EH for both the low- and high-educated groups. Germany, Belgium, Portugal and UK are the next group of countries with a level of EH for the low-educated groups between 20% and 30%. Between 30% and 40% of low-educated groups report EH in other Western and Southern European countries plus Estonia; except Ireland and Cyprus where half of low-educated groups report EH. The levels of EH are high and present large variations in the Eastern and Baltic European countries in both ends of the educational attainment. More than 40% of the high-educated groups report EH in Hungary and Latvia.

**Figure 1. Percentage of people reporting economic hardship by educational groups across the 26 European countries: individuals aged 30-79**

The smallest differences in EH between high- and low-educated groups are in the Nordic countries, where the welfare regimes comprise poverty reduction schemes. The largest differences in EH between high- and low-educated groups are in Baltic and Eastern European countries; followed by the Southern European countries as well as France and to a greater extent Ireland.
THE AL ADVANTAGE AND DISADVANTAGE OF THE HIGH- AND LOW-EDUCATED GROUPS

Models 1 and 2 indicate that AL-disadvantage of the low-educated groups varies across the 26 countries (not shown here). A number of countries show an increased disadvantage compared to the average pattern, before and/or after accounting for EH (CZ, DK, HU, IT). Other countries show a reduced disadvantage compared to the average before and/or after accounting for EH (BG, FI, RO, SE). A number of countries show increased AL advantage for the high-educated groups (CZ, EE, HU, LT, NO) and some a reduced AL advantage (BG, DK, UK). The introduction of EH in the model changed both the AL-advantage and disadvantage but to varying extent. Although most patterns identified earlier remained, the estimate suggest a varying contribution of the EH on the disability differentials which should be quantified.

CONTRIBUTION OF ECONOMIC HARDSHIPS TO THE ASSOCIATION BETWEEN EDUCATION AND DISABILITY IN THE 26 EUROPEAN COUNTRIES

EH contributes significantly to both the disadvantage of the low-educated and the advantage of the high-educated relative to the middle-educated group, but to various extent across countries: the average of the country specific contributions of EH is 23% both to the AL-advantage of the high-educated group related to the middle-educated group and to the AL-disadvantage of the low-educated group related to the middle-educated group. The ORs obtained by the country-specific KHB logistic regression models cannot be directly compared, but we can compare the contribution of EH to the ORs, keeping in mind that the meaning of this contribution depends on the magnitude of the AL-advantage/disadvantage (Models 1 and 2). Therefore, we classified countries in 4 cases: (a) larger contribution of EH than the 23% total average where the AL-disadvantage/advantage is smaller than average pattern, and (b) when it is larger than the average pattern; (c) smaller contribution of EH than the 23% average where the AL-

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6 Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), Czech Republic (CZ), Germany (DE), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Greece (GR), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), United Kingdom (UK)
disadvantage/advantage is smaller, and (d) when it is larger than the average pattern. We plotted the ORs and the percentage contribution (in different axis) in Figure 2.

Figure 2: ORs of AL by education attainment adjusted and not adjusted for economic hardship (EH) and % contribution of EH to the ORs.

Panel A: Low- vs middle-educated group (or AL-disadvantage)

Panel B: High- vs middle-educated group (or AL-advantage)

Country labels: Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), Czech Republic (CZ), Germany (DE), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Greece (GR), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Netherland (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), United Kingdom (UK)

Regarding the low-educated groups (Panel A), we found a general pattern where the smaller the AL-disadvantage, the larger the EH contribution. Meanwhile this is not systematic and we found disparities, for instance, among the four Nordic countries.
(a) The contribution of EH is above the average in Sweden and Finland and Bulgaria. In the two Nordic countries, the AL disadvantage of the low-educated group vanished (no longer significant) after accounting for EH in the model. The disability disadvantage of the low-educated groups is fully associated with the situation of EH that differentiate the low- and middle-educated groups, even though EH is relatively rare in these two countries. It could be a specific selected population on their poor health and functioning; a situation that it is more frequent in the low level of education than in the middle one. The AL-disadvantage of the low-educated groups could be potentially explained by the reverse causation of disability on poverty, and on the level of education (when poor health occurred in the earliest stages of life).

(b) The contribution of EH is also above the average in Austria, Ireland, Slovenia and UK where the AL-disadvantage is relatively high, although not always statistically different from the average disadvantage (as found in Model 1 and 2): the EH explains a larger part of the differentials between low- and middle-educated groups than in the average pattern, illustrating a larger impact of the material deprivation in these countries for mediating the relatively strong association between disability and education.

We also found in Cyprus, Poland, France and Slovenia a larger contribution of EH to the AL-disadvantage of their low- compared to the middle-educated group (while the disadvantage is not significantly different from the average pattern).

Finally the contribution of EH to the disadvantage of the low-educated group is similar than in average in Romania, Spain, Germany, Italy and Czech Republic.

(c) In contrast to the previous cases, Belgium, Denmark, Portugal, Greece, and Norway show a relatively small contribution of EH to the AL-disadvantage. The differentials might be explained by situations of materials deprivation in the low-educated group, but less than elsewhere; other factors than those directly linked to low income play an important role. Indeed, this group of
countries includes two Nordic countries where material deprivation is rather low due to the protective welfare regime. AL might affect more the low-educated than the middle-educated group due to a larger exposure to disability, independently from living conditions or access to basic needs, or to a weaker chance to cope with disabling conditions and maintain activity.

(d) Finally, we found a small contribution of EH to the reduced disadvantage in Lithuania and also a small contribution to the disadvantage, similar to the average, in Slovakia, Estonia, Latvia. In these countries, the two bottom-educational groups are less different regarding the disability prevalence than elsewhere and the level of deprivation does not contribute as much as elsewhere to differentiate these groups.

Regarding the high-educated groups, (a) the contribution is generally larger than average in countries where the AL-advantage of the high-educated group (relative to the middle-educated group) tends to be smaller than average like in Denmark, Bulgaria, Austria or UK. It is also quite large in countries with an AL-advantage, which is not significantly different than the average (Model 1 and 2): Cyprus, Poland, Latvia, and Ireland. In these countries, while the two top educational groups are not so different regarding disability as elsewhere, the role of EH is more important than elsewhere.

Otherwise, the contribution of EH is smaller than average, and particularly low in Norway and Hungary where the high-educated groups have a larger AL-advantage than in the average pattern. The contribution of the EH is similar to the average in Hungary, Slovenia, Spain and the Netherlands.

**DISCUSSION**

The level of EH varies largely across and within the 26 countries according to education. The Nordic countries, which benefit from a protective welfare regime, have the lowest levels and the smallest differentials in EH [10, 11]. In contrast the Eastern European and Baltic countries
generally have the highest rates of EH, in line with their social and economic context and the move towards a market economy organization [12].

EH captures situations that are part of the association between education and disability across the all-educational gradient. We defined four cases linking the size of the disability differentials and the level of contribution of EH. These cases gather countries with very different economic and welfare contexts. Material deprivation has a greater contribution to the association between education and disability in all countries and the percentage contribution is not straightforward even when considering at the same time the prevalence of EH and the magnitude of the advantage and disadvantage. For instance, we cannot conclude that EH has a greater contribution in the differences in the bottom part of the gradient then in the top part of the gradient: in a number of countries the contribution is larger in the top part (Denmark, Bulgaria, UK, Latvia, Cyprus, Hungary, Poland).

Further exploration of the country context, such as the level of social protection, should help interpreting these findings. Indeed, EH might be rare or frequent depending on both the economic situation of the country and the level of protection from material deprivation: there are several forces at plays in the contribution to disability gaps. The reverse causality in the association between material deprivation and disability might be found in countries where the risk of poverty is largely reduced by policy schemes so the contribution to the social differentials might be important as being strongly and directly linked to disability. In other countries, its contribution might be small in percentage because other factors (strong income gradient, variation in health behaviours, different chances to cope with health problems) that might contribute to produce the differences. More research is needed to describe the different situations to which EH correspond across European countries.
References