Gender Differences in Disability and Economic Hardship in Older Europeans

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Abstract

European women live longer, but they experience more old age-related disability than men. Disability is related to social factors, among which is poverty, through various pathways. While women's poverty has been pointed up as a challenge for Europe, our study investigates to what extent and in which countries a greater exposure to economic hardship is associated with older women's disability disadvantage. We used the 2014 EU-SILC data in 30 European countries for men and women aged 50–79 years ($N=[1179-17,474]$). Disability was measured by self-reported activity limitation and economic hardship by difficulties in “making both ends meet” and “facing unexpected expenses”. Country-specific nested logistic regressions measured the women's disability disadvantage and its association with economic hardship. We found that activity limitations and economic hardship varied substantially across Europe, being the lowest in Sweden and Norway. We found gender gaps in activity limitations in 23 countries, always to women's disadvantage. After adjusting for age, this disadvantage was significant in 19 countries. In 11 of these countries, women's excess disability is associated with excess economic hardship in women, especially in Iceland, France, Sweden, and Austria. Women's excess disability and social factors such as economic hardship are linked, even in protective countries. These situations of double disadvantage for women deserve attention when designing policies to reduce health inequalities and to promote healthy ageing.

Keywords Ageing · Disability · Gender · Poverty · Health inequalities · Europe

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1 Introduction

The challenge of the longevity revolution is to maintain high levels of good health and quality of life, along with the gains in life expectancy. There is a well-known gender gap in this respect, often seen as a paradox: women's longevity advantage usually translates into a disadvantage in terms of health and disability (Van Oyen et al. 2013; Dahlin and Härkönen 2013; Oksuzyan et al. 2010; Luy and Minagawa 2014). Women's disability disadvantage is largely explained by a higher prevalence of disabling conditions in women and of lethal diseases in men (Crimmins et al. 2011). Gender studies have therefore explored the factors behind these health differences, and more specifically social factors, whereas different life courses and living conditions yield different socially related exposures to health risks (Arber 2004; McMunn et al. 2006; Solé-Auró and Alcañiz 2016; Cambois et al. 2017).

Among various social factors, the lack of financial or material resources is of particular interest and is approached here through the concept of economic hardship. Besides its strong link to health, there is a general concern that women might be more exposed to economic hardship than men over their life course. Indeed, with the persistent gender division of paid and unpaid work, women have a lower average own income than men; head single parent households more frequently; and are more exposed to poverty risks (Anxo et al. 2011; OECD 2012; Van Lancker et al. 2015). Interestingly, the overall level of economic hardship and the gender gap in that matter reflect not only a country's social organization but also its social protection system. Changes in macroeconomic characteristics modify the level of poverty risks and their association with health (anti-poverty programmes, female empowerment, the unemployment rate, etc.) (Bárcena-Martín and Moro-Egido 2013). Protective contexts may reduce the poverty level in a country and therefore reduce the consequences of poverty on health. Indeed, there is some evidence that specific protective welfare regimes with gender equity dimensions reduce gender health gaps (Borrell et al. 2014; Palencia et al. 2014; Van Oyen et al. 2010). However, while high levels of protection and anti-poverty policies are expected to reduce risks of economic hardship and poor health, they do not always equally protect all population groups (Dahlin and Härkönen 2013). As a matter of fact, protective regimes do not systematically disclose the smallest social differences in health and disability (Huijts and Eikemo 2009; Cambois et al. 2016a). Across European countries, the percentage of the population concerned by poverty and disability varies depending on the overall welfare context; so might the coincidence of these two situations. Such a double disadvantage reflects situations of vulnerability in terms of social network, labour force participation, access to services and programmes or so. While women experience a disability disadvantage in most European countries and seem to be more broadly affected by the risk of poverty, an analysis of the double disadvantage might bring some light to the literature, as both the reduction of women's poverty and healthy ageing are considered to be major European challenges in our time (Bárcena-Martín and Moro-Egido 2013; Rechel et al. 2013).

In this paper, we explore the relation between the higher disability prevalence among women and the gender gap in economic hardship for people aged

50–79 years across 30 European countries. We aim to assess whether and where in Europe women's disability disadvantage coincides with a disadvantage in economic hardship.

1.1 Gender Gap in Economic Hardship and Women's Disability Disadvantage

Few resources and economic hardship are key issues in public health. They are generally linked to poor health and high mortality, and possibly in different ways for men and women (Marmot 2010). In Spain, for instance, economic hardship differs across sexes and causes of death (Benach et al. 2001). How and why are economic hardship and health linked?

First, through a causal effect, economic hardship may increase health risks due to poor living conditions and, in a life course perspective, through its long-term effects. It limits access to basic goods and services that are beneficial to health, such as nutritious food, safe housing, and healthcare (Marmot 2002; Wilkinson and Pickett 2006; Fjaer et al. 2017), and it limits opportunities to avoid or adjust to health risks (Kangas and Blomgren 2014; Okechukwu et al. 2012). Economic hardship may both increase exposure to disabling diseases and make it more difficult to limit their impact on activities of daily living (Verbrugge 1995; Cambois and Jusot 2011). Second, disability may limit access to the labour market and/or other resources. This reverse causation path was found to be moderate, compared to the causal effect (Lynch et al. 1997). Yet, it is possibly of a different magnitude across genders. Women in poor health or with disabilities may receive less social support than their male counterparts for acquiring minimum resources or obtaining a job and income: among men and women in poor health or with severe disability, women were found less likely than men to be or to remain in the labour force (Moen and Chermack 2005; Stronks et al. 1995) and more likely to have inadequate resources and housing (Reine et al. 2016). This could be partly explained by gender differences in access to and take-up of social benefits and support, even in countries where the welfare system is reputed as supportive (Hernanz et al. 2004). Third, the association between economic hardship and poor health might result from common determinants that affect both health and individual resources, such as strenuous low-paid work or adverse life events (union dissolution, job loss, conflict, etc.). Therefore, because women have lower income and are more exposed to economic hardship, they could be more exposed to disability. Also, because women report higher disability, they could be more exposed to the associated loss of resources and income. Overall, women's excess economic hardship and disability could be associated differently depending on the country context and the level of protection against poverty, disability, and gender differences.

1.2 European Variation in the Gender Gaps in Disability and Economic Hardship

To contribute to the literature, we explore how the excess risk of economic hardship in women is linked to poorer functional health in 30 European countries. It is unclear from the literature whether the gender distributions of disability and of

hardship are similarly unbalanced in all European countries and whether these situations of disadvantage coincide.

Several hypotheses can be formulated. Anti-poverty policies are also now considered to be drivers for reducing health inequalities (Mackenbach et al. 2013; Bergqvist et al. 2013). Studies have shown a long-term association between policy schemes and health as well as gender health gaps (Avendano et al. 2015; Berkman et al. 2015; Palencia et al. 2014; Borrell et al. 2014). We assume that the levels of disability and economic hardship are diverse across Europe, with lower overall levels in countries with high levels of protection. However, it is less clear where the largest or smallest gaps within European countries should be found. Large variations in social health gaps are found across countries within a given type of welfare regime, such as the protective Nordic regimes (Eikemo and Bambra 2008; Brennenstuhl et al. 2012; Eikemo et al. 2008; Mackenbach et al. 2008; Avendano et al. 2009). Based on the literature, we assume that high levels of protection do not always prevent gender differentials in disability and in economic hardship. We also assume that in countries with low levels of social protection, the high risk of poverty is not systematically unbalanced between men and women and therefore not strongly involved in the gender gap in disability.

To highlight how gender gaps in poverty risks and disability are articulated across Europe, we first explore whether women report more disability and more economic hardship than men. Second, in countries where women's disadvantages are found, we estimate the extent to which their disability disadvantage was associated with an excess risk of economic hardship.

2 Methods

2.1 Data Set and Indicators

2.1.1 Data Set

The European Union Statistics on Income and Living Conditions (EU-SILC) is a database managed by national statistical offices and designed to provide comparable data across the EU. We used the 2014 EU-SILC cross-sectional data on individuals living in private households. In most countries, data are collected via ad hoc interview surveys that provide self-reported information on health and socioeconomic variables. Elsewhere, sociodemographic variables are collected through population registers, and health data are collected via a complementary survey, often using telephone interviews. EU-SILC's response rate is generally high. However, some countries disclose a low participation at the individual level, while the information at the household level is acceptable (Table 1). This is generally the case in countries where most of EU-SILC variables are collected in population registers and a number of household and individual variables are collected by an additional ad hoc survey, conducted by telephone on a sample. Telephone surveys have higher risk of non-participation due to contact failure: this is the case of the Scandinavian countries, the Netherlands and Slovenia. Moreover, if a household member other than

Table 1 EU-SILC 2014 country sample size (50–79 years) and total participation rates. *Source:* EU-SILC 2014; <http://www.geis.org/en/missy/materials/EU-SILC/documents/quality-reports>

Countries		Study sample of men and women 30–79 years old who answered the individual question (disability)			Overall EU-SILC rates of participation and missing variables on disability		
		Men	Women	All	Households ^a (%)	Individuals ^b (%)	Missings ^c (%)
Austria	AT	2245	2520	4765	77	99	0
Belgium	BE	2295	2523	4818	65	99	1
Bulgaria	BG	235	2925	5275	86	99	0
Cyprus	CY	1906	2135	4041	91	100	0
Czech Republic	CZ	2523	3632	6155	91	100	17
Germany ^d	DE	5881	6365	12,246	–	–	1
Denmark ^f	DK	1538	1588	3126	73	51	47
Estonia	EE	2345	2901	5246	82	87	0
Spain	ES	5284	5853	11,137	79	98	0
Finland ^e	FI	2602	2623	5225	80	100	47
France	FR	4329	4966	9295	83	96	1
Greece	GR	3898	4339	8237	83	99	0
Croatia	HR	2789	3302	6091	–	–	1
Hungary	HU	3556	4899	8455	85	100	0
Ireland	IE	2056	2173	4229	–	–	0
Iceland ^e	IS	579	600	1179	71	100	53
Italy	IT	8255	9219	17,474	79	99	4
Lithuania	LT	2436	3084	552	89	98	1
Luxembourg	LU	1551	159	3141	53	96	0
Latvia	LV	2117	338	5497	–	–	1
Malta	MT	2277	2596	4873	89	98	0
Netherland ^e	NL	2357	2744	5101	88	93	45
Norway ^e	NO	1695	1514	3209	82	100	47
Poland	PL	5497	7039	12,536	81	99	4
Portugal	PT	3126	3688	6814	–	–	0
Romania	RO	3433	4079	7512	97	100	0
Sweden ^e	SE	1297	1375	2672	–	–	47
Slovenia ^d	SI	1903	2206	4109	–	–	58
Slovakia	SK	2273	3082	5355	92	100	2
United Kingdom	UK	3745	4164	7909	61	100	0
All		88,138	103,104	191,242			

– No quality report available for 2014

^aParticipation rate at the household level^bCoverage of the individual sample within the total household sample^cMissing on health variables^dSelf-administred collection mode^eTelephone assisted (CATI)^fSelf-administered and CATI mode (others are totally or mainly face-to-face computer or paper collection)

the intended individual provides the household information, answers to individual variables, such as health, were not allowed. This framework explains the large, missing rates in these countries. However, an exploratory study based on an earlier wave of EU-SILC found a reliable representativeness of the samples (related to age and occupational structure of the populations) when using the appropriate weighting (Cambois et al. 2016a). For this current work, we have further explored whether the missing answers on the disability question were linked to the main variables under consideration (see Sect. 4, below).

Once the 12% of individuals with missing values on disability are discarded, our study comprises 191,242 individuals (88,138 men and 103,104 women) aged 50–79 from 30 European countries. (Individuals aged 80 and over were excluded as they are very likely to be living in a care facility after this age, with variations by country, gender, and socioeconomic situation.)

2.1.2 Health-Related Global Activity Limitations

Disability was measured by the Global Activity Limitation Indicator (GALI) with the 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*). GALI was self-reported and differed across European countries, partly due to a varying propensity to report health disorders and to differences in survey design (Berger et al. 2015). However, this indicator proved to be highly correlated with other measures of functional difficulties as well as predictive of later healthcare consumption and mortality risks (Cabrero-Garcia and Julia-Sanchis 2014; Jagger et al. 2010; Van der Heyden et al. 2015).

2.1.3 Economic Hardship

Economic hardship was assessed by a thematic module on self-perceived situations of deprivation, as an alternative to an income-based measure in international comparative studies (Whelan and Maître 2013). In this study, we focused on the “economic stress” dimension of the thematic module. We used two items (due to a high level of non-response on the third one): people who reported that it was difficult (very or somewhat) for them “*to make ends meet, namely, to pay for usual necessary expenses*” and “*to cope with unanticipated expenses*” were considered to be in a situation of economic hardship (also referred to hereafter as “hardship”).

2.2 Analysis

First, we assessed the gender differences in GALI prevalence and the gender gap in hardship. Gender-specific logistic regressions confirmed the association between hardship and GALI, adjusting for age and age squared. Second, for countries where we found a gender gap in both hardship and GALI, we examined whether they were associated. To test this hypothesis, we used nested logistic regressions models for each country (“KHB”) (Karlson et al. 2012). With nested logistic models, one can

quantify the change in the association between the explanatory variable (*gender*) and the outcome (*GALI*) before and after controlling for a potential mediator (*hardship*). This change corresponds to the indirect effect of the explanatory variable also considered as mediator in these models. Here, we assessed the *total effect* of gender (adjusted on age and age squared) and its *indirect part* mediated by high risk of hardship (the *total effect* being the sum of the *direct* and *indirect* effects) (Fig. 1). The contribution of hardship corresponds to the ratio of the *indirect effect* to the *total effect*. It expresses the extent to which gender difference in hardship is associated with the women's excess disability.

Supplementary analyses were conducted to consolidate the results. The age range is large and combines different work and health situations, due to retirement and different income situations. We repeated the analysis, separating the pre- and post-retirement ages to account for the variation in situation across the life course (Figure S1 in online supplementary material). We also replicated the models, considering a possible association between economic hardship and disability mediated by the household composition (living alone; with a spouse; with or without a child; and having a partner/never partnered; separated; widowed) or by partnership status (in a union; never partnered; separated; widowed) (Figure S2 in online supplementary material).

3 Results

3.1 Gender Gaps in Activity Limitations or in Economic Hardship

Regarding our first question, Table 2 reports the gender-specific prevalence of GALI in the 30 countries, ranging from above 55% in Latvia, Portugal, and Slovakia to 20% or less in Malta and Sweden in women, and from about 50% in Germany, Estonia, Latvia, and Slovakia to 20% or less in Norway, Malta, Iceland, and Sweden in men. Women report more GALI than men in all countries, but the female-to-male GALI ratio is not statistically significant in six countries ($\leq 10\%$ confidence interval). The GALI W/M ratios are relatively small in Austria, Czech Republic, Latvia, and Poland. Interestingly, the largest GALI W/M ratios are found in countries with relatively low overall levels of GALI, such as Sweden. However, the ratios are also

Fig. 1 Illustration of the total and direct effect of gender on activity limitation and the indirect effects through economic hardship

Table 2 Weighted prevalence of activity limitation and economic hardship. *Source:* EU-SILC 2014

Countries	Self-reported activity limitation				Self-reported economic hardship				ORs of AL for EH ^a	
	Men (%)	Women (%)	W/M		Men (%)	Women (%)	W/M		Men	Women
Austria	AT	42.7 [40.6–44.7]	46.2 [44.2–48.1]	1.08 [§]	14.6 [13.2–16.1]	17.3 [15.8–18.8]	1.18 [§]		3.39	3.71
Belgium	BE	27.8 [26.0–29.7]	34.3 [32.4–36.1]	1.23**	14.2 [12.8–15.6]	17.1 [15.6–18.5]	1.20 [§]		2.83	4.11
Bulgaria	BG	24.7 [23.0–26.4]	28.4 [26.8–30.0]	1.15*	50.4 [48.4–52.5]	57.2 [55.4–59.0]	1.14**		1.53	1.48
Cyprus	CY	29.5 [27.5–31.6]	33.6 [31.6–35.6]	1.14 [§]	51.3 [49.0–53.5]	55.0 [52.8–57.1]	1.07 [§]		2.75	2.56
Czech Republic	CZ	31.8 [30.0–33.6]	34.3 [32.7–35.8]	1.08 [§]	30.6 [28.8–32.4]	38.7 [37.2–40.3]	1.27**		2.12	2.20
Germany	DE	49.2 [47.9–50.5]	50.8 [49.6–52.0]	1.03	13.2 [12.3–14.1]	14.4 [13.5–15.3]	1.09		3.45	3.79
Denmark	DK	36.2 [33.8–38.6]	37.8 [35.4–40.2]	1.04	12.2 [10.5–13.8]	14.7 [13.0–16.4]	1.21		1.89	4.32
Estonia	EE	50.7 [48.7–52.8]	52.5 [50.7–54.3]	1.03	35.9 [34.0–37.8]	40.2 [38.4–42.0]	1.12*		2.34	2.82
Spain	ES	31.2 [30.0–32.5]	36.4 [35.1–37.6]	1.16**	35.4 [34.1–36.7]	39.0 [37.8–40.2]	1.10**		1.96	2.45
Finland	FI	39.6 [37.7–41.5]	44.2 [42.3–46.1]	1.12*	13.7 [12.4–15.0]	15.6 [14.2–17.0]	1.14		2.49	2.36
France	FR	30.5 [29.2–32.0]	35.0 [33.8–36.5]	1.15**	21.3 [20.0–22.5]	25.8 [24.6–27.0]	1.21**		2.08	2.50
Greece	GR	34.4 [32.9–35.9]	40.1 [38.6–41.5]	1.17**	48.9 [47.4–50.5]	51.0 [49.5–52.5]	1.04		1.77	1.65
Croatia	HR	42.9 [41.1–44.8]	49.3 [47.6–51.0]	1.15**	61.5 [59.7–63.3]	65.4 [63.7–67.0]	1.06*		1.45	1.50
Hungary	HU	38.6 [37.0–40.2]	44.6 [43.2–46.0]	1.16**	65.6 [64.0–67.1]	67.9 [66.6–69.2]	1.04		1.81	2.25
Ireland	IE	25.9 [24.0–27.8]	27.5 [25.6–29.4]	1.06	41.8 [39.7–44.0]	42.1 [40.1–44.2]	1.01*		3.30	3.08
Iceland	IS	19.7 [16.5–23.0]	28.2 [24.5–31.7]	1.43*	16.8 [13.7–19.8]	28.4 [24.7–31.9]	1.69**		3.90	2.30
Italy	IT	38.1 [37.1–39.2]	42.7 [41.7–43.7]	1.12**	31.8 [30.8–32.8]	35.1 [34.1–36.1]	1.10**		2.47	2.08
Lithuania	LT	35.3 [33.4–37.2]	42.4 [40.7–44.2]	1.20**	51.6 [49.6–53.6]	56.4 [54.6–58.2]	1.09*		2.18	2.38
Luxembourg	LU	32.2 [29.9–34.5]	37.1 [34.7–39.5]	1.15*	15.0 [13.3–16.8]	13.2 [11.6–14.9]	0.88		2.68	3.32
Latvia	LV	52.9 [50.7–54.9]	57.3 [55.7–59.0]	1.08*	63.3 [61.4–65.5]	69.2 [67.7–70.8]	1.09**		1.96	1.83
Malta	MT	17.1 [15.6–18.7]	20.0 [18.5–21.6]	1.17 [§]	17.9 [16.3–19.5]	22.0 [20.4–23.6]	1.23**		2.47	2.09
Netherlands	NL	32.2 [30.3–34.1]	45.7 [43.8–47.6]	1.42**	14.5 [13.1–15.9]	19.1 [17.6–20.6]	1.32**		3.88	3.35
Norway	NO	18.1 [16.3–20.0]	26.0 [23.8–28.2]	1.43**	4.7 [3.6–5.7]	8.2 [6.8–9.5]	1.75**		4.87	3.03

Table 2 (continued)

Countries	Self-reported activity limitation				Self-reported economic hardship				ORs of AL for EH ^a	
	Men (%)	Women (%)	W/M		Men (%)	Women (%)	W/M		Men	Women
Poland	36.2 [35.0–37.5]	38.7 [37.6–39.9]	1.07*		44.4 [42.9–45.5]	48.7 [47.4–49.7]	1.10**		1.90	1.73
Portugal	43.6 [41.8–45.3]	57.5 [55.9–59.1]	1.32**		35.9 [34.2–37.6]	41.1 [39.5–42.7]	1.14**		2.33	2.32
Romania	39.1 [37.4–40.7]	51.1 [49.6–52.6]	1.31**		48.5 [46.8–50.1]	51.7 [50.1–53.2]	1.07*		1.52	1.56
Sweden	11.7 [10.0–13.5]	17.4 [15.4–19.4]	1.48**		6.0 [4.7–7.3]	10.2 [8.6–11.8]	1.69**		15.18	3.27
Slovenia	43.5 [41.3–45.7]	45.8 [43.7–47.9]	1.05		44.1 [41.9–46.4]	50.7 [48.6–52.8]	1.15**		2.59	2.51
Slovakia	49.5 [47.4–51.5]	56.0 [54.3–57.8]	1.13**		33.0 [31.5–34.9]	34.6 [32.9–36.2]	1.05		1.65	1.52
United Kingdom	32.1 [30.6–33.6]	34.1 [32.7–35.6]	1.06		21.1 [19.8–22.4]	24.5 [23.2–25.9]	1.16*		3.86	2.87

Odds ratios of activity limitation associated with economic hardship (adjusted on age). Men and women aged 50–79 in 30 European countries

AL activity limitation, EH economic hardship

** $p > 0.01$; * $p > 0.05$; § $p > 0.10$. ^aStatistically significant ORs (95%)

large in the Netherlands and Romania, where men's prevalence reaches 32.2% and 39.1%, respectively.

Table 2 also shows that economic hardship's prevalence ranges from 10% or less in Norway and Sweden, to half or more of the population in some eastern and southern countries, and up to 69% of women in Latvia. Women report significantly more hardship than men in 23 countries. The gender ratio is not statistically significant in countries with a generally high level of hardship; the largest ratios are in Iceland, as well as in Norway and Sweden, where the overall level of hardship is the lowest.

Finally, based on the odds ratios from logistic regression, we confirmed that economic hardship was significantly associated with GALI for both genders in all 30 European countries (Table 2).

3.2 The Women's Disability Disadvantage and Its Association with Economic Hardship

Regarding our second question, nested logistic regressions modelled GALI to measure the gender gap in disability, controlling for age and age squared without, and then with, adjusting for economic hardship. The gap is not significant in UK, Bulgaria, Czech Republic, Latvia, and Malta (in addition to the above-mentioned six countries where the GALI ratio—not adjusted for age—was not significant). Yet, the GALI gender gap remains significant in 19 countries (Fig. 2). In 11 of them, the gender gap in economic hardship is significantly associated with the gender gap in GALI. In other words, in these countries, more women with disability go hand in hand with more women experiencing economic hardship. On average, 16% of the gender gap in disability relates to the gender gap in hardship (Fig. 2B). When accounting for the higher risk of hardship in women in these countries, the excess GALI prevalence associated with being a woman is reduced by 16%. Not surprisingly, gender differences in economic hardship are far from being the main factor associated with the gender disability gap on average. However, this result confirms that social factors, even as specific as economic hardship, are part of the gender health differences. Furthermore, this average hides larger associations. In Austria, the GALI gender gap is relatively small, yet up to 31% of this gap is linked to excess economic hardship in women. The association is also above average in Iceland, Sweden, and France. In contrast, the association exists but is below average in the Netherlands, Norway, and Portugal, and close to the average in the four remaining countries.

3.3 Supplementary Analysis

We replicated the analysis in the two groups aged 50–64 years and 65–79 years, separately (online supplementary material Figure S1). Regarding the gender differentials in GALI, most results are similar in these two age groups; however, they are generally less significant in the youngest age group. Belgium and Greece tend to be in atypical situations, with a larger gender disability gap in the 50–64 age group than in older ages. Focusing on older ages, we found that older Belgians, Bulgarians, Germans, and Estonians show smaller gender differentials in GALI than the

Fig. 2 Women's disability disadvantage. **A** Total and direct effect of gender and indirect effect of gender mediated by economic hardship. **B** Contribution of indirect effect mediated by economic hardship to the total effect of gender. Individuals aged 50–79 years in 30 European countries. NS non-statistically significant ($p < 0.10$). Country labels: Austria (AT), Belgium (BE), Bulgaria (BG), Cyprus (CY), Czech Republic (CZ), Germany (DE), Denmark (DK), Estonia (EE), Spain (ES), Finland (FI), France (FR), Greece (GR), Croatia (HR), Hungary (HU), Iceland (IS), Ireland (IE), Italy (IT), Lithuania (LT), Luxembourg (LU), Latvia (LV), Malta (MT), the Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Romania (RO), Sweden (SE), Slovenia (SI), Slovakia (SK), United Kingdom (UK). Source: EU-SILC 2014

average, as do Austrians. However, the indirect effect of economic hardship in the gender gap is not significant in any country when disaggregating by age groups (online supplementary material Figure S1). We also replicated the model, accounting for household composition and partnership status. We found little change in the association between economic hardship and women's GALI disadvantage (Supplementary material Figure S2). The only changes consisted in the association of economic hardship with gender gap in GALI becoming significant in Cyprus, Finland, and Greece (and non-significant in Hungary), although with no substantial change in the association with gender gap in GALI.

4 Discussion

Our study first shows that gender difference in GALI was significant in 24 out of the 30 countries and remarkably large in Iceland, the Netherlands, Norway, Portugal, Romania, and Sweden, countries with very different overall levels of GALI. After controlling for age, women remain disadvantaged in 19 countries. The gender gap in GALI is generally not found in countries with relatively high overall levels of GALI

(several Eastern European and Baltic countries and Germany, but also in Denmark and Ireland). We also find that women are generally more affected by economic hardship than men, except in countries with high overall levels and in Luxembourg. These results confirm our assumptions that large gender differentials are found in some of the countries with a protective welfare regime and not found in all countries with low protection regimes.

Second, our analyses demonstrate that in 11 of these 19 countries, the gender gap in GALI is significantly associated with the gender gap in economic hardship. Women's greater GALI partly coincides with greater economic hardship for them in these 11 countries. Our results are challenging because these 11 countries have very different levels of disability and economic hardship. We found that a variation of the percentage of the gender gap in GALI linked to excess economic hardship in women was rather low on average but reached up to 31% in Austria, a country with a small gender gap. The association is also greater than the average in Iceland, Sweden, and France, countries with very different policies and modes of social organization. Therefore, we can conclude that social factors, such as material conditions, and even as specific as economic hardship, are associated with women's disadvantage in disability. This was found in 11 of the 30 countries under consideration, where women's disadvantage was also shown in terms of hardship. The association does not appear to be large in most of the countries concerned; however, this can be explained by the fact that economic hardship is quite scarce in a number of countries. Other social factors might be considered in interpreting these results further. This first approach is encouraging suggesting to explore the association in greater detail, using a more precise dataset to better describe populations that experience economic hardship: for instance, in looking at the level of education, which is also known to be at the intersection of economic hardship and disability (Cambois et al. 2016b).

As suggested in Introduction, the association of gender gaps in economic hardship and disability may be due to (a) more frequent situations of hardship in women, which translates into increased risk of disability, (b) more women with disability than men being at risk of economic hardship, and (c) women being more exposed than men to determinants of both disability and hardship. The coincidence of women's disadvantage in disability and in economic hardship might be due to insufficient protection to ensure a minimum income and/or to access basic goods and services in situations of vulnerability which women experience more often than men (single parenthood, unemployment, widowhood, etc.). It could also be due to situation of deteriorated health exposing more women than men to deprivation. This is consistent with the Swedish study showing that women with severe impairments were less likely than men to be employed (Reine et al. 2016); whereas both deprivation and disability are scarce in this country, we may consider women being more at risk of accumulating health and income difficulties. Therefore, Sweden shows an unexpected association between the gender gap in economic hardship and the gender gap in disability; it seems that a selection of women faces a double disadvantage. However, these results need to be interpreted with caution due to issues of sample size in countries where economic hardship concerns less than 10%, such as in Norway or Sweden. There are also considerations related to the survey sample (see below).

The gender gap in disability results from gender-specific exposures to disabling diseases and differential access to resources for coping with their consequences. The gender differences in exposure to economic hardship might partly result from gender-unequal access to and/or participation in the labour market, differences in individual income (Borrell et al. 2014) and household situations (separated/divorced, widowed, or single parent) (Berkman et al. 2015). However, regarding the latter aspect, the model comprising partnership status and household composition did not change the results. Finally, at the country level, the gender differences in economic hardship and disability result from the availability of healthcare and social protection systems, combined with possible gender differences in access to and take-up of their benefits (Fjaer et al. 2017).

The literature shows that public policies promoting gender equity, in terms of work and career, reduce gender differentials in poverty (Bárcena-Martín and Moro-Egido 2013), which could translate into a reduction in the gender gap in disability (Borrell et al. 2014; Palencia et al. 2014; Avendano et al. 2015; Van Oyen et al. 2010). However, our study further shows that such policies do not always limit the gender differences, as is the case in Norway or Sweden. This result is consistent with those of a study on gender differences in subjective health (Dahlin and Härkönen 2013). These countries, although generally egalitarian, still could face gender differences in resources, such as income or pension levels. Furthermore, while these countries yield relatively few situations of disability and hardship, these situations could concentrate on a selection of people, who tend to be socially vulnerable (isolated, in poor health, in the process of migration, etc.), falling through social safety nets (with unmet needs, for instance, in terms of health care) and being more exposed to disability. These situations could also correspond more frequently than in other countries to a “reverse causation” in which disability leads to adverse economic outcomes (Lynch et al. 1997). Unexpectedly, our study shows that in such contexts with low levels of hardship and disability, the gender gaps appear large and strongly associated when these situations become scarce and selected.

Due to the small sample size in some of the countries considered, and due to possible selection in the respondents, additional analyses should be conducted to confirm these results and provide further explanations. As previously mentioned there are large missing values on GALI in the Scandinavian countries and in the Netherlands (associated with the telephone collection mode). The large gender gap found in Scandinavian countries and its strong association with economic hardship might be exaggerated by the selected sample of respondents (for instance, if the missing values are preferably men with disability). We explored the association of the probability of missing values on GALI with age, sex, economic hardship, and working status (multivariate logistic models provided on request). The probability of missing GALI is negatively associated with economic hardship in all these countries and with age in Denmark and the Netherlands; the likelihood is greater for men in Denmark and Finland. We also find a positive association with being employed in all countries, except Norway (even though employment is usually negatively associated with disability and economic hardship risks). With this, we assume that the selected sample of respondents is not likely to have exaggerated the patterns we found.

Furthermore, our results for the Scandinavian countries are congruent with other findings in Sweden.

At this stage, our study cannot disentangle the causation relationship between hardship and disability to interpret these results and the role of the social context. Pathways need to be further studied. Our study also has several limitations regarding the measures used. Hardship and disability are self-reported measures, and there are some variations in how men and women detect and report their health, disability, and economic problems. In this study, the measurements are not based on the exact health situation (diseases) and economic situation (income), which are sensitive to a certain knowledge which can differ across genders. The measurements are based on *difficulties in performing normal activities due to health issues* and *difficulties in meeting both ends meet due to financial constraints*. A number of studies have demonstrated that these measures are highly correlated with more objective indicators (see Sect. 2). Also, some studies tend to demonstrate that gender differences in poor health are generally due to poorer health profiles in women rather than differences in reporting propensity (Oksuzyan et al. 2009, 2010). So even though more precise measurements could usefully complete these analyses, our findings are still congruent with other studies. We believe they highlight patterns of gender inequality that deserve attention.

There are also variations across European countries, which might be due to the data. There are some differences in the survey design, and comparison of results across countries requires caution; yet our study more specifically concentrates on how men and women's situations differed within each country, and we focused on these gender-specific patterns, although we compare the general patterns across countries.

Regarding interpretation, while studies usually report significant gender differences in disability, we found no gender differences in six countries (Crimmins et al. 2011). This could be due to the nature of the GALI indicator, which tends to increase men's propensity to report disability, especially in working ages: it was found that people were more likely to report GALI when they were in difficulty at work, and situations of work disability were more frequent in men (Tubeuf et al. 2008).

The indicator of economic hardship also reflects different social situations in different countries. More research is needed to describe these situations across Europe. A step further could be to explore other situations of distress linked to isolation or exclusion. At this stage, our results do not claim to explain the underlying mechanisms that produce the gender gap in disability, especially those linked to morbidity differences; they nonetheless demonstrate the gender-sensitive intersection between economic hardship and disability in various European contexts.

Despite these limitations, we found that a part of the gender disability gap is associated with excess economic hardship in women in a number of countries with very different social contexts. Whatever the causal relationship, our results contribute to the existing literature, indicating that women might be exposed to a double disadvantage in a number of European countries. It may be that women with health problems are less likely than men to get the support that limits the risk of poverty: through a lower probability of keeping/getting a job or to take up protective social benefits. Or, it may be that women in adverse economic situations are less likely

than men to access health protection programmes; for instance, access to job-related programmes when women are on average more distant from the labour market. While poverty has been presented as a challenge throughout Europe, our results tend to indicate that situations of economic hardship are often more frequent in women—which is the case even when overall levels are low—and are linked to their poorer functional health in 11 countries. This suggests that policies to combat poverty as well as health differentials need to concentrate on these associations of disability and economic hardship and to pay specific attention to gender differences.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest. The data used in this research come from anonymized datasets of population surveys run by European Statistical Institutes and delivered to researchers upon request by EUROSTAT.

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