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Severity of material deprivation in Spanish regions and the role of the European Structural Funds

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ABSTRACT

Material deprivation has recently affected households with worrying pressure. In order to evaluate the degree of this affliction, we build categories of deprivation with increasing intensity, using the 2014–2018 EU-SILC cross-sectional data for households in Spanish regions. We explore household characteristics and regional heterogeneity associated with the relative risk ratios of falling into such categories. Moreover, the paper assesses whether two axes of the European Structural and Investment Funds (specifically, those allocated to the objective of social inclusion and sustainable and quality employment) matter at weakening such risks. Only social inclusion funds are strongly associated with a lower relative risk of material deprivation. This might be due to a regional misalignment and/or to an inefficient use of the funds.

1. Introduction

A balanced territorial development can be achieved by supporting and financing regional projects with economic and social objectives, like those aimed at alleviating unemployment or social exclusion, promoting diffused welfare, social services, jobs and education. The European Cohesion Policy operates in this direction; in particular, since the introduction of the Community Strategic Guidelines for Cohesion Policy (CSG) and Regulations for the 2007–2013 programming cycle, a new strategic approach has been adopted consisting of an interplay between different political levels. In this context, the Cohesion Policy is set to be in line with CSG priorities which, referring explicitly to the Lisbon Agenda, include social inclusion priorities and measures. Next, after the EU2020 strategy[1] for smart, sustainable and inclusive growth, the focus on fighting poverty and social exclusion has become even more explicit. The European Pillar of Social Rights has made a further step ahead in this direction.[2] Being an initiative launched by the European Commission in 2017, it aims at improving existing social rights for EU citizens, and serves as the EU's compass to achieve better working and living conditions in Europe. Such initiative rests on twenty key principles, structured around three categories: equal opportunities and access to the labor market; fair working conditions; social protection and inclusion.[3]

Following the evolution of the EU policy strategy, tackling poverty and citizens' material deprivation should acquire strategic importance, orienting EU decisions and funding. Increasing level of material deprivation (MD) may not only decrease the standard of living of a large portion of the European population, but could threaten territorial cohesion, exacerbating disparities and providing fertile ground for anti-European integration sentiments [1]. According to the Eurostat database, in most EU countries, the MD (and severe MD) rates have decreased in the last 10 years. However, Spain is an exception in this regard. In our paper, taking Spanish regions as a case study, after defining eight categories of material deprivation at household level, we identify the main economic and social characteristics that determine the probability of falling in one category (see Refs. [2–5]), and we test whether European Structural and Investment Funds (ESIF) devoted to Sustainable and Quality Employment (SQE) and to Social Inclusion (SI) play a role at reducing material deprivation.

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[1] https://ec.europa.eu/social/main.jsp?catId=751&langId=en. (Last access: 25 June 2022).

[2] https://ec.europa.eu/info/strategy/priorities-2019-2024/economy-works-people/jobs-growth-and-investment/european-pillar-social-rights/european-pillar-social-rights-20-principles_en (Last access: 25 June 2022).

[3] https://www.socialplatform.org/what-we-do/european-pillar-of-social-rights/(Last access: 25 June 2022).

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Our approach to the analysis of material deprivation intensity differs from those proposed by Ref. [6]; the fuzzy approach applied by Ref. [7], and by Ref. [8].

In particular [6], adopting a count model, shows that the part of the population with zero deprivation has significantly distinct profiles from those who have at least one dimension of deprivation. The deprivation index score is calculated as a raw sum of nine binary deprivation items, but the main analysis is repeated for two other deprivation scales. Ref. [7], instead, explores to what extent differences in individual characteristics and country-specific factors can explain country differences in material deprivation intensity. To measure the intensity of deprivation, Ref. [7] aggregates nine indicators considering frequency-based weights. Ref. [8] investigates material deprivation in Poland by using a fuzzy measure approach with data-driven weights obtained by means of the 'prevalence-correlation' method, that is, weights taking into account both the prevalence of deprivation items and the correlations among items.

In our work, we measure the intensity of deprivation by aggregating relatively homogeneous deprivation items into three different categories (for details, see Section 2). Then we use all the different combinations of categories to establish the intensity of material deprivation.

The aim of the paper, therefore, is to estimate how much the change in one (independent) characteristics of the household or the region of residence - from a base reference - influences the 'relative' risk of such a household to fall into material deprivation with different intensity. The dependent variable is a categorical variable, with categories representing the seriousness of material deprivation from a basic situation (in which a household lacks just one item of the average material standard) to the highest possible case (in which the household lacks basic, secondary and financial items), as explained in Section 3. The risk is relative because it is calculated with respect to the probability of being non deprived, holding the same household/region characteristics. As an explicit example, we estimate the distance in probability of being deprived of female and male heads of household with respect to their distance when they are not deprived, keeping all other household/regional features constant. In this case, a relative risk higher than one implies that the gender gap in the risk of deprivation is intensified and higher than the gender gap in non-deprivation. On the other hand, we estimate the distance in probability of being deprived of households residing in regions which have received European funds (as explained in Section 2) to check whether these regions are able to show lower-than-one relative risks for their households, and therefore to discuss the effectiveness and the efficient allocation of the European resources.

As a matter of fact, the official measures of poverty give indications that Spain has managed to reduce the share of population affected by severe material deprivation more than income poverty, compared to other Southern European countries (see Refs. [5,9,10]). Moreover, Spain has strong regional differences in terms of per capita GDP, employment growth rates [9], and population at-risk-of-poverty and social exclusion [11]. Regional differences might contribute to explain the regional/local destination of SI and SQE-devoted funds in this country, as well as their effectiveness in alleviating social exclusion at regional level.

The structure of the paper is the following. Section 2 discusses regional multidimensional poverty heterogeneity and policy engagement in Spain; Section 3 describes the model and variables; Section 4 shows the results and their discussion and Section 5 draws some conclusions.

2. Multidimensional deprivation and policy engagement in Spanish regions

As mentioned in the introduction, the main aim of Europe 2020 strategy of the European Commission for smart, sustainable and inclusive growth [12] was the fight against poverty and social exclusion, a target whose importance was renewed and extended by the 2030 Agenda of the United Nations [13].[4] Poverty has many dimensions, but its causes include unemployment, social exclusion, and high vulnerability of certain populations to disasters, diseases and other phenomena which prevent them from being productive. In this work, we focus on the severity of material deprivation and on the effect that funds devoted to specific ESIF thematic objectives might have on it.

Provided that human capital, employment and social inclusion are fundamental drivers for people's wellness and thriving, projecting and financing public activities around those three should reflect (also) into decreasing poverty and material deprivation rates.

In this regard, the general objective of Cohesion Policy is to support the reduction of social economic and territorial disparities, i.e. the promotion of "catching up". It is articulated into the European Regional Development Fund (ERDF), the European Social Fund Plus (ESF+) and the Cohesion Fund (CF). The ERDF aims at supporting programmes addressing regional development, economic change, competitiveness and territorial co-operation, and, for Spain, it represents around two third of the resources planned between 2014 and 2020. ESF+ represents 25% of regional ESIF for Spain; it is designed for supporting jobs, and investing in human capital.[5] These funds cover the two thematic objectives of our interest, SQE and SI. Up to 31 December 2020, as far as SQE is concerned, Spain's 'decided' eligible expenditures amounted to 18,11% of the European total and spent 14,48% (eligible costs declared) of the European total. As to SI, the country's 'decided' eligible expenditures amounted to 8,08% of the total and spent 6,10%. We think that, in spite of not being specifically designed to tackle material deprivation, these funds might have at least indirect effects on it through the thematic policy objectives "sustainable and quality employment" and "social inclusion".

The literature on the impact of structural funds focuses extensively on their direct target, i.e. GDP growth, but their effectiveness remains an open empirical issue [14]. One reason, according to Ref. [15], is that growth regressions and regression discontinuity analysis focusing on regional growth do not provide sufficient detail to support policy-makers in intervention design. The reasoning of the authors can be extended to other outcome variables like poverty and/or multidimensional poverty, among others, as in our case.

We rely on an indicator of Material Deprivation (MD) in line to that adopted by the EU. This is based on a battery of nine survey questions with yes/no answer, related to the inability to afford items considered by most people to be desirable or even necessary to reach an adequate standard of living, as recommended by the Europe 2020 strategy and the

[4] The 2030 Agenda for Sustainable Development was adopted at the UN Sustainable Development Summit in September 2015. It consists of a set of 17 Sustainable Development Goals (SDGs) to reach before the end of 2030. SDG 1 is about eradicating poverty in all its forms for all people everywhere by 2030.

[5] CF covers the 13 new member states as well as Greece and Portugal, i.e. member states with a gross national income (GNI) of less than 90% of the EU average. See https://cohesiondata.ec.europa.eu/stories/s/Tracking-progress-with-detailed-cohesion-investmen/e7u2-9gu2#5.-cohesion-policy-overview- (Last access 08/04/2023).

UN 2030 Agenda.[67]

The nine items are aggregated into three deprivation categories, based on their homogeneity [10,16,17]: 'Basic' deprivation category (B) includes the impossibility to afford a meal with chicken, meat, fish (or vegetarian equivalent) every second day; to keep home adequately warm; one week holiday away from home in a year, or to have arrears on rent payment, mortgage, utility bills, purchase installments, loan payments. 'Secondary' deprivation category (S) includes the impossibility to afford a durable good such as a telephone; a colour TV; a washing machine or a car. The category of 'Financial Distress' (D) is about the incapacity to face unexpected expenses or financial burdens. 'Basic and Secondary' category ($B \cap S$) includes flagged items of both 'Basic' and 'Secondary' deprivation type; 'Basic and Distress' category ($B \cap D$) includes items of both 'Basic' deprivation and 'Financial Distress'; 'Secondary and Distress' includes items of both 'Secondary' deprivation and 'Financial Distress'. Finally, 'Basic and Secondary and Distress' ($B \cap S \cap D$) includes contemporaneously items of those three categories.[8] Let i indicate an item of deprivation from 1 to 9. Each household $h = 1, \ldots, H$, residing in a Spanish Autonomous Community (AC) $r = 1, \ldots, 18$, may flag zero, one or more items. A household is deprived, according to our definition, if $\exists c$ such that $I_{\{i \in c\}} > 0$. Moreover, the household falls into category of deprivation c when, at time t,

$$y_{h,t,r} \Longleftrightarrow \sum_{i=1}^{9} I_{\{h,t,r,i \in c\}} > 0 \tag{1}$$

and c = {B, S, D, B ∩ S, B ∩ D, S ∩ D, B ∩ S ∩ D}. We therefore identify 8 mutually exclusive categories (including the non-deprivation one, ND), which (weakly) rank households by deprivation "levels" (see e.g. Ref. [5]). Single categories denote a lower level of deprivation. Dual categories report an intermediate level, while category B ∩ S ∩ D denotes the highest degree of deprivation.[9]

We use EU-SILC cross-sectional data in 2014–2018 for households in Spanish regions[10] in order to build the dependent and explanatory variables at the household level. The special questionnaire included in these releases of the EU-SILC database allows us to identify households characterized by deprivation. The heterogeneous regional distribution of households by category of deprivation is represented in Fig. 1 (Figure A1 in Appendix A reports a map with the names of the regions, and the distribution is in Table A2 and A3). It consists of eight panels, seven for the disadvantage/deprivation categories considered (panels a: B, b: S, c: D, d: $B \cap S$, e: B ∩ D, f: S ∩ D, g: B ∩ S ∩ D), and one (panel h) for the baseline category of "non-deprived households". The highest concentration of households with only one item of deprivation is in the regions of the Centre-North (panel a to c); the highest concentration of intermediate level deprivation is in the large regions of the North (panel d to f), and the highest concentration of strongly deprived households is located in the South. Panel g, in fact, shows that households suffering from all types of deprivation at the same time ($B \cap S \cap D$) are primarily concentrated in the South, i.e. Andalucía, Murcia, Extremadura, Valencia, and in Cataluña. Panel h shows that non-deprived households are mainly concentrated in the Northern regions of Aragón, La Rioja, Navarra, País Vasco but also Castilla y Leòn.

Data on funds come from the Cohesion Open Data Platform of the European Commission. In our study we refer to the latest European 2014–2020 programmed cycle following the general practice of using commitments (eligible costs) as a proxy for payments, even if it is likely to introduce biases linked to measurement errors [15]. Specifically, we take funds for the period 2016–2018, the last years for which household data are available, because of the N+2 rule, according to which funds must be spent by the end of the second year after their allocation.[11] This choice lets us isolate the effects of the latest programming, avoiding overlaps with the previous one.

As already mentioned, we focus on the areas Sustainable and Quality Employment (SQE) and on Social Inclusion (SI) in the framework of the European Structural Funds, which are directly linked to limiting households from falling into material deprivation and poverty. Table 1 reports the distribution of regional ESIF on the selected thematic areas based on eligible costs of projects (column 1 and 3). Column 2 and 4 report the average amount of eligible costs per person. Column 5 reports the total costs for both objectives, SQE and SI, by region. The funds are distributed quite heterogeneously among regions. SQE funds range from less than 1% in Madrid, where it stands around 0, Ceuta y Melilla (0.5%), La Rioja (0.7%), and Illes Baleares (0.8%), to more than 10% in Cataluña (10.8%), Galicia (13.8%) and Andalucía (17.1%). If we look at the distribution of SQE funded costs per person, at the very bottom we find Madrid with the lowest level (€0.02), Illes Baleares (€8.20) and Comunidad Valenciana (€9.83). At the top level, Galicia finances SQE with €58.57 per capita, Cantabria with €76.78, and Extremadura at the highest level (€96.19).

There is a somehow different distribution of SI funds for eligible

[6] The survey items are: 1) coping with unexpected expenses; 2) one week's annual holiday away from home; 3) avoiding arrears (in mortgage or rent, utility bills or hire purchase installments); 4) a meal with meat, chicken, fish or vegetarian equivalent every second day; 5) keeping the home adequately warm; 6) a washing machine; 7) a colour TV; 8) a telephone; 9) a personal car. A person is (officially) said to be materially deprived if she/he lives in a household lacking at least 3 of such items. The national MD rate is defined as the fraction of people living in households with a score of at least three.

[7] The indicator for MD suffers from some limitations, such as the small number of items, their validity and relevance, as well as the fact that deprivation cannot be considered only a material issue (see Ref. [38]; and [39]). This latter aspect led to the introduction of a new indicator for material and 'social' deprivation based on 13 items (see Ref. [4,40,41]). It is now officially used to monitor material and social deprivation in Europe. In our work, as we explore the possible effects of Cohesion Funds on the material dimension of deprivation only, we adopt the definition of MD based on the nine items. However, we carry out a robustness check by using different measures of deprivation: a 0/1 dummy for (severe) material deprivation, as well as a 0/1 dummy for (severe) material and social deprivation. The main findings remain unchanged. Results are available upon request.

[8] Experiencing Basic deprivation in our taxonomy means that a household declares to suffer from at least one item in the Basic category and none in the other categories (affording durable goods and facing unexpected expenses). So if a household flags only one item of that category it belongs to the Basic category. If it flags two, three or all items of that category it belongs to the Basic category. Categories are mutually exclusive as explained in the text, therefore if a household flags an item of the Basic deprivation category and one of the Secondary deprivation category it falls into the (B ⋂ S) category (intermediate level of deprivation, in our taxonomy), and not in the single B or S categories. Finally, in order for a household to be classified as mostly deprived, i.e. belonging to the (B ⋂ S ∩ D) category, it has to flag at least one item in each category.

[9] Notice that the exogenous threshold used to determine materially deprived households (lack of at least three items, for details, see footnote 6) has been criticized recently and a new system of preference is still under evaluation on the data for European countries (see [6,17,18]. The standard approach does not allow to classify households according to their deprivation degree. Our classification enables us to investigate the role of ESIF on different categories and intensity of material deprivation.

[10] Except for the autonomous cities Ceuta and Melilla, that we considered together, as the sample size would have been too small to be significant.

[11] https://ec.europa.eu/regional_policy/en/policy/how/principles/(Last access: 25 June 2022).

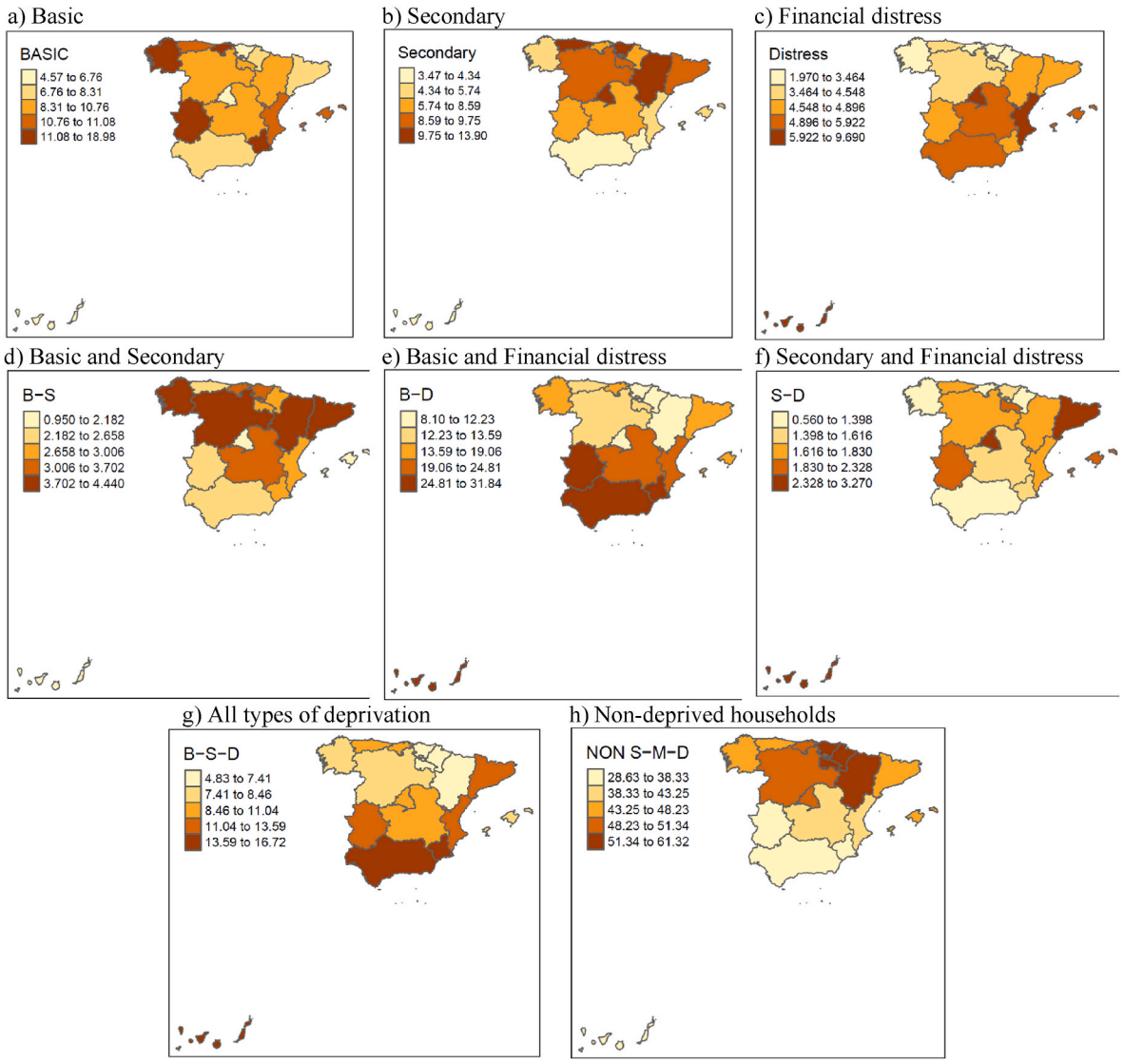

Fig. 1. Distribution of households across regions by category of deprivation.

costs. Madrid, for instance, which receives almost no SQE funds, takes 17.7% of total Spanish SI funds. The other regions, receiving relatively low financing for SQE, maintain relatively low funds for SI as well. Ceuta y Melilla, for instance, receives 0.8% of SI funds, while La Rioja and Illes Baleares receive 1.4% and 2.5%, respectively. The lowest percentage of 0.5% belongs to Murcia, while the highest percentage of the SI distribution belongs to Andalucía (24.1%). As far as the average amount of eligible costs per person, we find relatively high values for Ceuta y Melilla and La Rioja (as well as Galicia and Asturias, higher than €70 per person), while Murcia maintains a relatively low value of €5.4 per person. At the very top level of SI costs per person, we find Extremadura (€102.38). As we read in the Commission Staff Working Document of December 2016 (p.11), at the end of 2014 there was €115.6 billion (going up to €642.7 in 2019) ESIF allocated to the 28 EU members. The main objectives of this allocation were investments in human capital and employment activities (80%), social inclusion (14.3%), and the residual part to strengthening institutional capacity and promoting partnerships. To make an example associated with the SI objective, in 2016 Spanish regional programs for homeless or people affected by housing exclusion involved 44,756 individuals, 13 times more than in 2015: 22% under Educational and Vocational Training, 23.7% under SQE and 54.2% under SI objectives (Cohesion Data, EC 2020).[12]

By joining this information with the one from Table 1, we can say that Extremadura, which is among the most deprived regions (panel e and panel g of Fig. 1) receives the highest funds for both the SQE and SI per person, while Cataluña, and especially Valencia (panel d, f, g), receive a relatively low percentage and average amount of eligible costs per person.[13]

On the one hand, however, a simple correlation between SQE and SI per person and the share of deprived persons by category shows low values, as shown in Table A1 and A2 in Appendix A. On the other hand, the correlation of regional GDP per capita with SQE is −0.34 and with SI is −0.39, and the correlation between the overall structural funds and regions' sum for SQE and SI per capita is 0.91.[14] This demonstrates that

[12] https://cohesiondata.ec.europa.eu/2014-2020-Finances/ESIF-2014-2020-ERDF-CF-Major-Projects/sjs4-8wgj (last access: 25 June 2022).

[13] Values by region and descriptive statistics of both material deprivation and variables used are in Tables A1-A5 in Appendix A.

[14] Data from https://cohesiondata.ec.europa.eu/stories/s/47md-x4nq (last access 17 April 2023).

Table 1
Distribution of ESIF funds among regions.

	SQE %	SQE € p.c.	SI %	SI € p.c.	total cost†
Galicia	13.8	58.57	12.1	72.75	1772.4
Asturias	1.9	21.93	4.6	72.86	485.5
Cantabria	3.9	76.78	1.6	43.82	350.3
País Vasco	8.7	46.16	1.9	13.97	653.2
Navarra	2.4	43.18	1.1	28.73	232.4
La Rioja	0.7	26.47	1.4	71.14	152.6
Aragòn	4.0	35.19	2.9	36.00	468.4
Madrid	0.01	0.02	17.7	43.44	1431.6
Castilla y León	5.9	28.46	5.5	37.01	789.2
Castilla-La Mancha	8.9	50.77	3.7	29.45	814.6
Extremadura	8.9	96.19	6.8	102.38	1059.7
Cataluña	10.8	16.49	5.9	12.78	1099.9
Valenciana	4.2	9.83	2.7	8.91	463.7
Illes Balears	0.8	8.20	2.5	34.07	248.7
Andalucía	17.1	23.27	24.1	46.34	2925.5
Murcia	3.8	29.15	0.5	5.40	255.5
Canarias	3.3	17.15	4.1	30.65	523.0
Ceuta y Melilla	0.5	36.26	0.8	74.20	93.7
Total	100		100		

Note: Budget related to eligible costs of projects in the period 2014–2018. † total cost in million euro for the two purposes: SQE: Sustainable and Quality Employment, SI: Social Inclusion. € p.c.: euro per capita. Source: elaboration of the authors on data extracted from System for Fund Management in the European Union, last update December 2019, https://ec.europa.eu/sfc/en; https://cohesiondata.ec.europa.eu/themes. (Last access: 25 June 2022).

SI and SQE i) follow the distribution of ESIF; ii) are inversely related to GDP per capita, and iii) are related to deprivation. GDP per capita is a good proxy of the allocation of funds, because the funds are allocated to less developed areas of intervention. Furthermore, the distribution of SQE and SI does not look to follow a different path if compared to the general allocation of financial resources by the European Commission. However, as we show in the Results section, SI looks to play a role at lowering the risk of falling into material deprivation.

3. Model and variables

The empirical objective of the paper is to estimate the relative risk of a household h, living in region r at time t to fall into one category of deprivation, conditioning on households' characteristics $x_{h,t,r}$, described below and on regions' EU per capita funds for social purposes, $z_{t,r}$. The starting specification of the model is a multinomial logit with the following log-odds form:

$$ln\frac{Pr(y_{h,t,r}=c|x_{h,t,r},z_{t,r})}{Pr(y_{h,t,r}=ND|x_{h,t,r},z_{t,r})}=k+\delta_c+\beta_c x_{h,t,r}+\gamma_c z_{t,r}+\tau_t+\varepsilon_{h,t,r} \quad (2)$$

The drift δ_C indicates that each category may have a different intercept, while k is a common intercept, τ_t are time dummies, and $\varepsilon_{h,t,r}$ is the error term, formed by a random effect ω_h and an idiosyncratic term $u_{h,t,r}$. As there are two levels of observation in our data, household level and regional level, our multinomial logit has a constant term, time fixed effects, random effects, regional-time clustered standard errors.

The set of households' characteristics $x_{h,t,r}$ include household features and specific features of the head of the household. The formers are type, size, the number of elderly members over 65 year-old, the number of disabled household members with some or strong limitation in activities,[15] the number of permanent and temporary workers, the average work intensity of the household, the quintiles of the equivalized disposable household income, and the population density of the area of residence. This latter is measured as a discrete variable: densely populated area, intermediately populated, and thinly-populated area (variable DB100 in the EU-SILC code).[16] The 'work intensity' (WI) status of a household is the ratio between the total number of months that all working-age household members have worked during the income-reference year (worked months) to the total number of months the same household members could work in the same period (workable months). Working age ranges between 18 and 59 years old. Such indicator is then aggregated at the household level as the sum of the WIs of all household members. WI ranges between 0 for absence of work and 1 for maximum WI. There are specific WI codes between the two extremes: $0 < WI < 0.5$ means low WI, and $0.5 \leq WI < 1$ means high WI. We add the category 'out of age' to separate those individuals who have no WI because out of the age range considered for its calculation (aged below 18 or over 59). Equivalized disposable household income (variable HX090 in the EU-SILC code) is defined as the total disposable household income (after taxes and social transfers) divided by an equivalized household size, calculated according to the modified OECD equivalence scale.[17] In the regression analysis, we include the quintiles of the income distribution. Unfortunately, a limitation of the survey is the under-representation of the migrant population. This is an obstacle to the introduction of a control for migrant households. The EU-SILC by design targets the whole resident population and not specifically the migrants. There are some coverage issues that arise for the recently arrived migrants; the fact that only private households and not collective households and/or institutions for asylum seekers are covered creates a relatively high non-response of the migrant population, due for instance to language difficulties [18]. For the head of household, we know age, gender, education and home ownership. These characteristics may influence the probability to be in a deprivation status. The set $z_{t,r}$ includes variables relating to EU funds depending on region and time. Moreover, we would like to establish whether residing in regions which received European Structural funds of the 2014–2020 cycle with social purposes might have alleviated some of the risks of deprivation. To reach this purpose, we use European Commission data about the EU budget reserved to Spanish regions in the period 2014–2020, identifying the portion of the budget devoted to employment and social objectives (SQE and SI), as described in section 2.[18] The online Appendix A reports the descriptive statistics of the covariates.

From eq. (2), we then derive the relative risk ratios (RRR) of a change in x:

$$RRR=\frac{\frac{Pr(y_{h,t,r}=c|x_{h,t,r},z_{t,r})}{Pr(y_{h,t,r}=ND|x_{h,t,r},z_{t,r})}}{\frac{Pr(y_{h,t,r}=c|x_{h,t,r}=base,z_{t,r})}{Pr(y_{h,t,r}=ND|x_{h,t,r}=base,z_{t,r})}}=exp(\beta_c(x_{h,t,r}-base_{h,t,r})), \quad (3)$$

which says how higher (or lower) is the odds of falling into material deprivation category c (instead of being non-deprived, ND) for those with characteristics x rather than the x = base characteristics, when x is a discrete/qualitative variable, ceteris paribus. Relative risk refers, as a matter of fact, to the ratio of two odds: the first is the probability to be deprived, given specific characteristics, relative to the probability to be deprived, given a characteristic chosen as the basis (e.g. female versus male); the second refers to the probability of being non deprived given

[15] The information about disability is collected in the EU-SILC survey with the variable PH030 'Limitation in activities because of health problems'. There are three possible answers: yes, strongly limited; yes, limited; no, not limited.

[16] Descriptive statistics of the variables included in the model and their distribution across Spanish regions are in Tables A4 and A5 in Appendix A.

[17] It is an adjustment for household size to calculate the number of "equivalent adults" in a household. The first adult of the household is weighed 1, the following adults weigh 0.5 each, and children (defined as those aged 13 or less) weigh 0.3 each.

[18] More precisely, we downloaded and elaborated EU amounts for regional projects' eligible costs and eligible expenditures for social objectives for every year 2014–2018. Given that eligible costs are mostly zero in 2014–2015, we show estimates relative to the time period 2016–2018. See the Results section for a discussion.

Table 2
Multinomial Logit relative risk ratios (RRR).

	Categories of household deprivation						
	Low			Medium			High
	Basic	Secondary	Distress	$B \cap S$	$B \cap D$	$S \cap D$	$B \cap S \cap D$
Intercept	0.95	168.89***	3.03***	75.99***	7.45***	129.16***	466.19***
	(-0.159)	(8.608)	(3.280)	(8.892)	(5.791)	(14.069)	(21.978)
Head of household features							
age	0.978*	0.819***	0.951***	0.833***	0.994	0.849***	0.884***
	(-1.894)	(-9.935)	(-3.307)	(-10.982)	(-0.656)	(-12.785)	(-13.412)
age squared	1.00	1.00***	1.00	1.00***	0.998*	1.002***	1.001***
	(1.151)	(11.77)	(1.603)	(12.459)	(-1.673)	(14.872)	(12.696)
female	1.119**	2.594***	1.221***	2.289***	1.385***	2.901***	2.745***
	(2.475)	(15.11)	(3.951)	(9.391)	(8.307)	(11.644)	(15.506)
Head of household education - Reference: Primary or lower secondary education							
secondary edu.	0.732***	0.817***	0.729***	0.533***	0.584***	0.560***	0.442***
	(-5.392)	(-2.657)	(-4.796)	(-6.058)	(-9.511)	(-5.23)	(-6.807)
tertiary edu.	0.503***	0.663***	0.504***	0.368***	0.286***	0.303***	0.173***
	(-10.89)	(-7.29)	(-10.84)	(-11.031)	(-23.11)	(-17.443)	(-30.490)
homeowner	1.001	0.474***	0.618***	0.389***	0.563***	0.232***	0.196***
	(0.018)	(-7.457)	(-5.244)	(-7.738)	(-7.764)	(-13.124)	(-21.147)
Household features							
Household type - Reference: Single (without children)							
single parent	1.073	0.362***	0.826	0.589	1.057	0.556***	0.481***
	(0.371)	(-4.773)	(-1.403)	(-1.570)	(0.255)	(-2.854)	(-4.824)
couple	0.859*	0.28***	0.754***	0.259***	0.918	0.223***	0.243***
	(-1.765)	(-9.689)	(-2.768)	(-7.494)	(-0.670)	(-11.516)	(-13.493)
parent couple	0.686***	0.159***	0.493***	0.108***	0.669*	0.157***	0.140***
	(-2.715)	(-7.429)	(-5.872)	(-5.845)	(-1.807)	(-6.931)	(-9.052)
other household	0.969	0.172***	0.528***	0.200***	1.029	0.149***	0.201***
	(-0.163)	(-6.379)	(-4.434)	(-4.313)	(0.139)	(-6.785)	(-8.449)
hh size	1.041	0.707***	1.126**	0.872	1.172***	0.883	1.092*
	(0.887)	(-3.294)	(3.814)	(-0.927)	(3.933)	(-1.276)	(1.903)
#≥65	0.897*	1.444***	0.908*	0.952	0.659***	1.125	0.667***
	(-1.807)	(4.178)	(-1.782)	(-0.308)	(-7.253)	(0.979)	(-5.623)
#disabled	1.552***	1.316***	1.317***	2.009***	1.859***	1.619***	2.409***
	(12.70)	(6.615)	(6.675)	(11.923)	(15.91)	(7.575)	(29.45)
#employees	0.879*	0.937	0.802***	0.704**	0.540***	0.858**	0.419***
	(-2.090)	(-0.734)	(-4.974)	(-2.336)	(-17.91)	(-2.414)	(-8.857)
#temporary	1.334***	1.100	1.322***	1.764***	1.852***	1.419***	2.007***
workers	(8.054)	(1.374)	(4.190)	(3.080)	(14.257)	(2.965)	(11.332)
Work intensity - Reference: WI = 0							
$0 < WI < 0.5$	1.321***	1.046	1.307***	0.915	1.098	0.891	0.859
	(4.453)	(0.243)	(2.855)	(-0.888)	(0.978)	(-0.565)	(-1.537)
$0.5 \leq WI < 1$	1.085	1.347	1.409***	1.016	1.015	0.730	0.836
	(0.842)	(1.531)	(3.443)	(0.107)	(0.175)	(-1.613)	(-1.585)
WI = 1	0.788**	0.794	1.294**	0.639**	0.764**	0.485***	0.398***
	(-2.529)	(-1.233)	(1.976)	(-2.119)	(-2.454)	(-3.869)	(-6.672)
out of age	0.678***	0.733**	1.105	0.786	0.7631***	0.826	0.825
	(-4.038)	(-2.164)	(0.692)	(-1.590)	(-2.621)	(-0.975)	(-1.526)
Quintiles of the household income distribution - Reference: 1st quintile							
2nd quintile	0.695***	0.957	0.829***	0.687***	0.564***	0.751***	0.448***
	(-6.184)	(-0.584)	(-3.225)	(-3.145)	(-14.24)	(-2.772)	(-8.563)
3rd quintile	0.468***	0.699***	0.533***	0.323***	0.274***	0.359***	0.164***
	(-11.595)	(-4.817)	(-10.26)	(-6.881)	(-14.98)	(-4.92)	(-11.736)
4th quintile	0.261***	0.496***	0.296***	0.158***	0.121***	0.184***	0.063***
	(-12.766)	(-7.149)	(-13.89)	(-9.833)	(-24.99)	(-9.00)	(-18.442)
5th quintile	0.173***	0.356***	0.185**	0.076***	0.052***	0.090***	0.026***
	(-13.501)	(-9.658)	(-16.776)	(-9.494)	(-21.301)	(-9.513)	(-20.996)
Density of area of residence - Reference: densely populated area							
intermediate	1.286***	0.451***	0.794***	0.533***	0.992	0.417***	0.495***
	(3.228)	(-8.992)	(-2.983)	(-5.434)	(-0.11)	(-8.399)	(-7.538)
scarcely populated	1.371***	0.359***	0.736***	0.545***	0.934	0.314***	0.419***
	(4.151)	(-8.265)	(-4.256)	(-4.104)	(-0.761)	(-9.079)	(-5.464)
Funds objectives							
SQE	0.995*	0.997	1.001	0.996	1.003	0.999	0.999
	(-1.898)	(-0.622)	(0.099)	(-1.189)	(0.887)	(-0.089)	(-0.084)
SI	1.007	0.993	0.977**	0.989*	0.981***	0.976*	0.976***
	(0.874)	(-0.815)	(-2.432)	(-1.874)	(-3.309)	(-1.819)	(-3.777)
Number of obs.	3429	3343	2113	1237	6746	891	4403
Time dummies	yes						
Akaike AIC	105150.9						

Note: ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Z-values in parentheses. Region-year clustered standard errors. Basis dependent category: non-deprivation. Reference category: male, less than secondary education, non-homeowner, single, without children, zero work intensity, living in a densely populated area.

the same characteristics (as the first) versus the probability of being non deprived with the base feature. When x is a continuous or numerical variable, then RRR measures the relative risk of a unit change in x. In other words, the ratio of odds-ratios is the relative risk ratio to fall into a category for those households with characteristics $x_{h,t,r}$ compared to a household with base characteristics. RRR might be above, below or equal 1. When RRR = 1 the relative risk of falling into category c is the same for households with characteristics x and base category (see e.g. Ref. [19]). As an example, we are going to estimate the relative risk of falling into the three deprivation categories at the same time (high deprivation, B ∩ S ∩ D), when a household has a female head relative to a household with a male head. All other variables given, the relative risk ratio is 2.78 significant at 1% level (see Table 2, last column). This means that the "risk" of falling into serious deprivation for female head of household is about 2.8 times higher than male head of household, across the Spanish regions.

It is worth noting that the model is estimated without considering the sampling weights provided in the EU-SILC survey, for at least two reasons. First, we do not have access to all the relevant sampling design information (i.e. the stratum and cluster identifiers) that would be needed to obtain consistent estimates of standard errors associated with weighted estimators of model parameters. Second, following the procedure proposed by Ref. [20], we tested the assumption that the sampling design is non-informative given the covariates, with the result that we cannot reject that hypothesis. For a discussion see, for instance, Ref. [21].

4. Results and discussion

Table 2 reports the relative risk ratios of eq. (3) and their z-statistics for our model with random effects. The relative risks for the variables used are compared to the relative risk of being in material deprivation for a reference category: male, less than secondary education, non-homeowner, single, household without children, zero work intensity, living in a densely populated area. It is relevant to notice that a female head is always at greater relative risk than a male head, especially in Secondary deprivation (2.59 times), Secondary deprivation plus Financial Distress (2.91 times), and Basic, Secondary and Distress deprivation (2.75 times). A high degree of education, especially if tertiary educational attainment, significantly reduces all the relative risks of deprivation [22]. As suggested by the literature, homeowners are less likely to report material deprivation than renters (e.g. Refs. [3,23]). From these results, it turns out that single individuals with children have the highest relative risk of deprivation in all categories, if compared to other types of households. Households with elderly members have higher risk of Secondary deprivation (RRR = 1.44) and Secondary plus Distress (1.13), but they are at lower risk to be contemporaneously in Basic, Secondary and Distress deprivation (0.67). The negative relationship between age and material deprivation, as well as the U-shaped relation we note for some deprivation categories are confirmed by the existing literature. These should be related to the individual's position in either the housing market (in several countries most elderly people are homeowners), or to the fact that older people might have accumulated (a sufficient level of) permanent income both during their working life and through elderly pensions (see, for instance, Refs. [7,24]). Unfortunately, households with disabled members are at higher risk of deprivation in all categories, especially in the worst case of Basic, Secondary and Distress (2.41). Workers are at lower relative risk, unless they are temporary. In the latter case, the relative risk is always greater than 1, going up to 2.01 for the risk of Basic, Secondary and Distress deprivation. Spain is characterized by a relatively high presence of temporary contracts in the labor market. According to the Spanish Ministry of Labor statistics (Encuesta Anual Laboral), in 2017, 29% of Spanish workers had temporary contracts (ranging across regions from 24.6% in Aragón to 41.9% in Andalucía). The OECD claimed that addressing the 'abuse' of temporary contracts was a top priority for the Spanish government, as a high and persistent share of temporary jobs increases unemployment risks, especially for the youth, and reduces productivity and wage growth [25]. Interestingly, we note that even households with maximum work intensity (WI = 1) do not reduce all the risks of material deprivation, as WI = 1 is positively associated with the risk of Distress (1.29). The RRRs of the quintiles of the household income distribution reveal that, as expected, the risk of falling in all the categories of deprivation reduces as we move from the bottom (1st quintile, our base category) to the top (5th quintile). Households living in intermediate or scarcely populated areas are at lower relative risk of deprivation with respect to densely populated areas, except for Basic deprivation, where both intermediately and scarcely populated areas seem to be at higher relative risk (1.29 and 1.37, respectively).

Regional ESIF have some effect on material deprivation when we distinguish by their social objectives, as in the last two rows of Table 2. Here the funds are measured as per capita effective spending by region in the time period 2016–2018.[19] Funds for Sustainable Employment are weakly associated with reducing the relative risk ratio of Basic material deprivation, while funds for Social Inclusion seem effective in reducing the relative risk of both medium and high deprivation categories.

As a supplementary analysis, in order to identify where these funds may gain greater traction at the margin, we estimated our model by including interaction terms between the social objectives SI or SQE and variables associated with funds' objectives themselves. Specifically, we considered (head of household) education, and employment, i.e. the number of permanent workers and the number of temporary workers in the household. In Appendix A, results of the estimates are reported in Table A6 and A7, and in Tables A8 and A9 we show the marginal effects of the funds with respect to the educational level and number of employees, respectively. Notably, we find that an investment in education associated with the social objective SI (interaction between SI and educational attainment level) might help reducing the risks of low (single categories Basic deprivation and Distress deprivation), medium (Basic and Distress Deprivation) and high deprivation (Basic, Secondary and Distress), as well as increasing the number of non-deprived households. As for employment, we find interesting insights associated with objective SQE especially for permanent workers. Supporting permanent employment, indeed, would help reduce the risk of Secondary deprivation and high deprivation, as well as increasing the number of non-deprived households.

The regions suffering the most from Basic deprivation are Illes Baleares, Cantabria, Galicia and Murcia as in Fig. 1 - panel a, but Table 1 shows that the regions gaining the highest fraction of SQE funds are Andalucía (17.1%), Galicia (13.8%) and Cataluña (10.8%). Baleares obtain only 0.8% of SQE funds, spending €8.20 per person, Cantabria obtains 3.9%, spending €76.78 per person, Galicia has the second highest fraction among regions, with €58.57 per person and Murcia has 3.9% with €29.15 per person. This evidence is in line with [26,27] as far as spatial polarization, confirming a high regional asymmetry in the distribution of funds to the SQE purpose, which, beyond the level of regional development, is due to the fact that regions compete over intergovernmental grants and that this spending is part of a more comprehensive regional active labor market policy response [28]. Our weak correlation of ESIF with SQE purpose with material deprivation may be read as another consequence of the results in Refs. [28,29] which show that the European Social Fund has the special objective of

[19] Multinomial regression analysis is available upon request also for the period 2014–2018 and using eligible costs as the payment variable instead of effective spending. The estimation methods in these other regressions go from using fixed effects and clustered standard errors to random effects and independent errors, or random effects and clustered standard errors. The estimates of the funds' coefficients are less significant in many of these cases. The regional correlation between eligible costs and expenditures for SQE is 0.84 in 2016–18. The regional correlation between eligible costs and expenditures for SI is 0.75.

increasing public spending on such programs but it results to be weak and not addressed especially for regions in need. And yet, investing into the sustainable employment objective may also compensate the need of raising households from Basic material deprivation, as happens in Cantabria and Galicia, while Baleares and Murcia should endeavor to increase the amount of funds towards SQE in order to reach the two targets (more sustainable employment and less Basic material deprivation). Moreover, Ref. [30] argues that the impact of social protection expenditure depends on the macroeconomic condition of a country. According to Eurostat statistics, Spain's GDP growth rate for the observed time range, was positive, but the Big Crisis legacy on the national unemployment rate was still present (though decreasing) ranging from 24.5% in 2014, 19.6% in 2016 and 15.3% in 2018 (Eurostat data), with quite large variability across regions (an average 5.9% standard deviation). More worryingly, the youth unemployment rate in Spain was a remarkable 44.3% on average in the period, with 9.9% regional mean standard deviation. This might have restrained the public budget to satisfy households and individuals' needs and required regions to have an intense lobby process with the national government and the European Commission [31]. Although policies (e.g. based on SQE) usually target the situation of households with low incomes, the latter might still suffer from such a high unemployment rate, with a significant risk of material deprivation and poverty.

The objective of Social Inclusion, on the other hand, is strongly associated with a lower relative risk ratio of material deprivation in the following categories of Table 2: Financial distress (0.977), Basic deprivation and Financial Distress (0.981), Basic, Secondary and Financial distress (0.976). It is weakly (but positively) associated with reducing the relative ratio of Basic and Secondary deprivation (0.989) and Secondary and Financial distress (0.976). All these categories represent an intermediate level of material deprivation, in our MD taxonomy. SI funds have no significant impact on the relative risk to fall into Basic deprivation or Secondary deprivation (separately). Although these are promising results, given that SI funds target poverty as their first aim, there is some regional misalignment. Among the regions with the highest shares of households in Financial Distress there are Comunidad Valenciana and Madrid, and slightly less Andalucía, Canarias and Castilla-La Mancha (Fig. 1 - panel c). Those suffering the most from Basic plus Financial Distress are Andalucía, Extremadura and Murcia and, to a lesser extent, Comunidad Valenciana and Castilla-La-Mancha (Fig. 1 - panel e). Regions with the highest share of households falling into Basic, Secondary and Financial distress are Andalucía and Murcia, and to a lesser extent Extremadura, Comunidad Valenciana and Cataluña (Fig. 1 - panel g). However, as Table 1 shows, Andalucía (24.1% with €46.34 per capita), Madrid (17.7% with €43.44 per person), Galicia (12.1% with €72.75 per person) and Extremadura (6.8% with €102.38 per person) get the highest fraction of SI funds directed to Spain. Again, this regional disparity in funds allocation depends on the level of regional development but also on the quality of government or political institutions of the Autonomous Communities, strongly affecting the capacity to attract [31] and efficiently use these funds [32]. Our analysis then is consistent with [33] about the current design of institutional architecture creating large horizontal inequalities. And yet, financing Social Inclusion programs would be key to all regions to reduce the relative risk of most kinds of material deprivation, as shown in these results. We bring evidence therefore that the regional allocation of funds in Spain are less linked to need, if we measure it by material deprivation probability, as it should be, and we suggest to look at the predicted probability for households (or their relative risks) of falling into some level of material deprivation as a parallel criterion to allocate European regional funds, beyond the level of development, based on regional GDP differentials with the EU average, and the unemployment rate. We should take into account, however, that our analysis runs on a short-time period and therefore our policy suggestions do refer to such a time span. The availability of new data over a wider period might stimulate future research to offer policy implications with long-run effects.

5. Conclusions

In Spain there is no specific policy to reduce severe material deprivation, but a variety of means-tested benefits that help reduce poverty. This system of non-contributory benefits is quite complex for at least two reasons: 1. there are many different benefits that provide different protection for each category; 2. the general risks of poverty and severe material deprivation are covered through the regional minimum income programs, with a high level of inequality across territories [34]. Right from the start (introduced during the 1980s, increased with the Act of 1990 and also during the Great Recession), the increased number of beneficiary households has not been equally distributed among the Autonomous Regions of Spain [35]. The most relevant aspect of such allowance was the variety of experiences, depending largely on the available resources and the different situations of insufficient income and heterogeneity of the political response to the problem [36]. As far as the labor market performance of the past ten years, Spain has undergone a significant increase in employing workers on a temporary basis, much more than other European countries, as well as high unemployment rates, extraordinarily high for the youngsters [37]. The discussion on the policy interventions to contrast severe material deprivation, therefore, is still open and debated in Spain, given that among the European funds there is no specifically designed financial support to reduce material deprivation. This paper makes two interesting points: the first is the large heterogeneity in the distribution of deprived households across Spanish regions. We show that the highest concentration of households with only one item of deprivation is in the smallest regions of the Centre-North; the highest concentration of intermediate level deprivation is in the largest regions of the North, and the highest concentration of the most deprived households is located in the South. The second novelty links specific objectives of the European Structural Funds, those for social inclusion and for sustainable and quality employment, to the relative risk for households to experience material deprivation and financial distress. The analysis employs data on regional funds for projects focusing on social objectives, such as favoring job quality and opportunities, and appropriate social support, whose lack is mostly at the basis of deprivation and poverty. The results shed new light on the effectiveness of the funds on mitigating material deprivation and confirm that a high regional asymmetry in the distribution of funds devoted to sustainable and quality employment, is weakly or unrelated to the risk of falling into material deprivation. On the other hand, the type of funds devoted to social inclusion is strongly associated with a lower relative risk of material deprivation of any kind. Notably, we find that an investment in education associated with the social inclusion objective might help reduce the risks of deprivation. Although this is a promising result, given that SI funds target poverty as their first aim, there is some regional misalignment due to the institutional architecture that makes them less efficient both in their allocation and in their use. In small regions (i.e. with higher SI per capita expenditure) simple correlation coefficients indicate that the share of deprived households is smaller and/or that larger regions receive more SI funds. We bring evidence that the regional allocation of European funds in Spain are less linked to need, if we measure it by material deprivation probability, as it should be, and we suggest to look at the predicted probability for households (or their relative risks) of falling into some level of material deprivation as a parallel criterion to allocate European regional funds, beyond the level of development, based on regional GDP differentials with the EU average, and the unemployment rate. As it is extremely policy-relevant to understand more in detail the effect of the European funds (see Ref. [15]) and, furthermore, to differentiate the analysis by region, with appropriate data, our analysis opens the way for further research on a comparative regional scale. As a final remark, it is worth mentioning the Fund for European Aid to the Most Deprived (FEAD), which is meant to provide food and basic material assistance to the most deprived (after the pandemics breakout, additional resources have been directed to FEAD, and Spain is the second receiver of these additional

funds after Italy).[20] Social policy has to integrate material assistance with social inclusion and non-material assistance projects, which help people out of poverty and exclusion, to integrate better in the society. The use of different funds to reach the objectives is mandatory. One way to make these funds more impactful could be to build a (central) database to gather information about people in need from sparse agencies and services (e.g. anti-violence centers, *caritas Europa*, social services, national/local statistical offices, etc.), in order for local/regional authorities to have a clear view of the scope of the phenomenon within their areas, with the possibility to redirect financing and support, and for researchers to provide further analysis and evidence.

CRediT authorship contribution statement

Chiara Mussida: Conceptualization, Methodology, Writing – original draft, Writing – review & editing.

Maria Laura Parisi: Conceptualization, Methodology, Writing – original draft, Writing – review & editing.

Nicola Pontarollo: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing.

Data availability

Data will be made available on request.

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APPENDIX A

Fig. A1. Regions of Spain

Table A1
Correlations of SI and SQE funds with frequency of deprivation categories.

	Non-SMD	Basic	Secondary	Distress	*B∩S*	*B∩D*	*S∩D*	*B∩S∩D*	Share. Deprived
SQE € p.c.	0.139	−0.051	0.371	−0.190	0.310	−0.359	0.275	0.051	−0.139
SI € p.c.	0.160	0.028	0.137	−0.232	0.176	−0.290	0.077	0.120	−0.160

Source: Authors' elaborations on EU-SILC data. Data is region-based. The share of deprived is calculated over the total population for each region.

[20] https://cohesiondata.ec.europa.eu/stories/s/In-profile-Fund-for-European-Aid-to-the-Most-Depri/tdry-xg55 (Last access 25 April 2023).

Table A2
Frequency of the households belonging to the different deprivation categories by region

	Non-SMD	Basic	Secondary	Distress	*B∩S*	*B∩D*	*S∩D*	*B∩S∩D*	Tot.hh	Tot. deprived hh	Average pop. 2016–2018
Galicia	1157	437	144	39	103	373	14	199	2466	1309	2,705,235
Asturias	797	172	150	59	41	221	31	171	1642	845	1,030,448
Cantabria	1958	162	482	298	79	447	117	385	3928	1970	581,115
Pais Vasco	598	131	104	25	44	169	11	102	1184	586	2,168,419
Navarra	1260	124	309	77	71	176	36	147	2200	940	641,789
La Rioja	724	95	91	46	40	115	10	62	1183	459	312,583
Aragón	616	86	101	52	27	117	23	63	1085	469	1,316,168
Madrid	821	122	177	66	53	160	30	92	1521	700	6,512,664
Castilla-y-Leon	1311	210	241	102	72	285	47	195	2463	1152	2,426,073
Castilla-La Mancha	779	161	110	107	62	340	36	207	1802	1023	2,035,709
Extremadura	4063	629	864	390	336	1086	286	1096	8750	4687	1,073,831
Cataluña	1095	244	126	193	78	536	56	278	2606	1511	7,461,121
Valenciana	530	107	46	67	21	187	24	68	1050	520	4,935,401
Illes Balears	1494	336	156	233	106	1186	60	645	4216	2722	1,159,293
Andalucia	554	165	67	89	43	401	19	199	1537	983	8,404,010
Murcia	618	137	91	84	37	397	35	177	1576	958	1,473,811
Canarias	462	80	61	135	18	402	38	217	1413	951	2,164,655
Ceuta y Melilla	294	31	23	51	6	148	18	100	671	377	169,600
Total	19131	3429	3343	2113	1237	6746	891	4403	41293	22162	46.571.926

Source: Authors' elaborations on EU-SILC data.

Table A3
Row-Distribution of the households belonging to the different deprivation categories

	Non-SMD	Basic	Secondary	Distress	*B∩S*	*B∩D*	*S∩D*	*B∩S∩D*
Galicia	8.07	4.18	0.57	5.84	1.58	17.72	46.92	15.13
Asturias	10.41	2.5	1.89	9.14	3.59	10.48	48.54	13.46
Cantabria	8.61	3.72	0.93	8.78	2.11	11.06	50.51	14.27
País Vasco	6.68	3.23	1.64	14.05	3.5	5.64	57.27	8
Navarra	5.24	3.38	0.85	7.69	3.89	8.03	61.2	9.72
La Rioja	5.81	2.49	2.12	9.31	4.79	7.93	56.77	10.78
Aragón	6.05	3.48	1.97	11.64	4.34	8.02	53.98	10.52
Madrid	9.8	2.01	2.98	12.27	7.59	4.12	49.85	11.38
Castilla y León	7.92	2.92	1.91	9.78	4.14	8.53	53.23	11.57
Castilla-La Mancha	11.49	3.44	2	6.1	5.94	8.93	43.23	18.87
Extremadura	11.23	2.35	2.22	5.77	5.33	8.69	39.21	25.19
Cataluña	12.53	3.84	3.27	9.87	4.46	7.19	46.43	12.41
Valenciana	10.67	2.99	2.15	4.83	7.41	9.36	42.02	20.57
Illes Balears	6.48	2	2.29	4.38	6.38	10.19	50.48	17.81
Andalucía	15.3	2.51	1.42	3.7	5.53	7.97	35.44	28.13
Murcia	12.95	2.8	1.24	4.36	5.79	10.74	36.04	26.09
Canarias	15.36	1.27	2.69	4.32	9.55	5.66	32.7	28.45
Ceuta y Melilla	14.9	0.89	2.68	3.43	7.6	4.62	43.82	22.06
Total	10.66	3	2.16	8.1	5.12	8.3	46.33	16.34

Source: Authors' elaborations on EU-SILC data. The row-sum is 100%.

Table A4
Descriptive statistics of the multinomial logit regression variables

Variables	N hh	Min	Mean	St. Dev.	Max
hh size	41,293	1	2.539	1.256	13
female head	41,293	0	0.401	0.490	1
age of head	41,293	17	54.777	15.682	81
#employees	41,293	0	0.953	0.893	3
#temporary workers	41,293	0	0.196	0.462	3
#≥65	41,293	0	0.531	0.750	4
#disabled	41,293	0	0.953	0.893	6
homeowner	41,293	0	0.799	0.401	1
Fund SI €pc	41,293	5.403	36.117	24.552	102.380
Fund SQE €pc	41,293	0.000	28.805	22.180	96.193
	N hh		Freq		
Categories of material deprivation					
Basic	3429		0.083		
Secondary	3343		0.081		
Distress	2113		0.051		
B∩S	1237		0.030		
*B∩*D	6746		0.163		
S∩D	891		0.022		
B∩S∩D	4403		0.107		

(*continued on next page*)

Table A4 (*continued*)

Variables	N hh	Min	Mean	St. Dev.	Max
Head of household education					
Primary edu.	20,282		0.491		
Secondary edu.	7951		0.193		
Tertiary edu.	13,060		0.316		
Work intensity - Reference					
WI = 0	5152		0.125		
0 < WI < 0.5	5422		0.131		
0.5 ≤ WI < 1	10,556		0.256		
WI = 1	10,183		0.247		
out of age	9980		0.242		
scarcely populated	21,285		0.516		
intermediate	8850		0.214		
densely populated area	11,158		0.270		
Household type					
single (without children)	9477		0.230		
single parent	1439		0.035		
couple	12,360		0.299		
parent couple	10.033		0.243		
other household	7984		0.193		
Quintiles of the household income distribution	65,597	1	2.706	1.273	5
1st quintile	8971		0.217		
2nd quintile	8969		0.217		
3rd quintile	8970		0.217		
4th quintile	8969		0.217		
5th quintile	5414		0.131		

Source: Authors' elaborations on EU-SILC data.

Table A5
Descriptive statistics and distribution of the variables across Spanish regions

	Galicia	Asturias	Pais Vasco	Navarra	La Rioja	Aragóon	Madrid	Cantabria	Castilla-y-Leon	Castilla La Mancha	Murcia	Extre madura	Cataluña	Valenciana	Illes Balears	Andalucia	Canarias	Ceuta y Melilla
hh size	2.57	2.42	2.54	2.41	2.49	2.46	2.48	2.52	2.42	2.58	2.47	2.45	2.55	2.57	2.68	2.73	2.56	3.39
female head	41.2	41.1	43.4	40.5	37.3	37.1	39.3	42.9	36.4	34.8	36.7	41.9	39.5	42.7	38.7	37.7	45.3	37.4
age of head	56.2	55.6	55.1	55.2	0	54.6	56.2	54.3	57.3	54.8	55.1	54.6	54.5	0.000	54.0	53.8	0.000	50.3
#employees	0.9	0.88	0.99	0.97	0.99	1.01	0.97	1.04	0.90	0.89	0.821	1.019	0.959	1.201	0.801	0.958	0.864	1.037
#temporary	0.19	0.21	0.18	0.20	0.20	0.21	0.19	0.18	0.18	0.18	0.265	0.154	0.198	0.264	0.244	0.241	0.220	0.238
#over65	0.70	0.61	0.57	0.53	0.54	0.53	0.58	0.50	0.63	0.53	0.526	0.513	0.480	0.423	0.503	0.463	0.469	0.368
#disabled	0.61	0.58	0.39	0.41	0.42	0.47	0.47	0.40	0.50	0.52	0.468	0.386	0.437	0.341	0.505	0.610	0.594	0.444
homeowner	82.6	82.2	82.3	86.3	85.0	84.4	85.7	77.4	84.0	82.6	84.9	72.6	83.2	71.8	83.2	81.0	75.7	72.0
fund SI €pc	72.75	72.86	43.81	13.97	0.00	71.13	36.00	43.44	37.0	29.45	102.3	12.77	8.90	0.000	46.33	5.40	0.000	74.20
fund SQE €pc	58.57	21.92	76.79	46.15	0.00	26.46	35.18	0.02	28.4	50.77	96.19	16.48	9.83	8.20	23.27	29.14	0.000	36.25
densely populated	35.8	48.4	26.6	63.2	36	52.6	54.4	84.2	40	26.1	15.3	65.8	38.7	40.8	41.4	49.1	50.2	100
intermediate	22.3	18.5	50.7	29	21	20.8	8	10.3	19.4	11.4	10	23.1	41.3	23.4	19	16.5	36.4	0
scarcely populated	41.8	33.1	22.7	07.8	42	26.5	37.5	05.5	40.6	62.5	74.7	11.2	20	35.8	39.6	34.4	13.4	0
WI = 0	13.9	15.5	11.3	11	10	9.5	10.1	9.8	12.7	13.3	12.8	10.2	12.5	5.1	18	12.7	20.8	21.5
0 <WI < 0.5	16.1	13.3	13.8	09.5	9	12.9	10.5	11.1	11.4	13.9	18.9	9.2	13.2	10.8	20.2	17.7	16	21.3
0.5 ≤ WI < 1	24.1	25.6	27.4	25.3	26	28.2	26.4	26.9	24.3	25.1	24.5	24.3	27.2	33.1	24.2	26.8	24.7	27.7
WI = 1	19.4	20.7	23.9	29.5	28	25.3	25.2	28.8	22.8	22.3	17.8	31.1	23.9	31.6	15.7	20.8	20	18
WI out of age	26.6	24.8	23.6	24.7	25	24.1	27.9	23.3	28.7	25.4	26	25.3	23.2	19.3	21.8	22.1	18.5	11.5
primary edu	52.3	46.3	44.9	38.9	43	48.8	47.2	37.3	54.9	62	65	45.4	51.9	41.4	57.6	58.6	48.9	51.6
secondary edu	20	19.8	24.1	19	21	21.5	22.2	21.2	15.3	15	13.7	19.8	19.6	23.9	17.1	18.3	19.8	19.8
tertiary edu	27.7	33.9	31	42.1	35	29.8	30.6	41.5	29.7	22.9	21.3	34.8	28.5	34.7	25.3	23.1	31.3	28.6
Household type																		
single	21.7	22.6	22	24.7	23	22.6	21.8	23.9	23.2	22.3	24.1	25.5	22.7	22.9	19.1	19.9	24.6	14.3
no child	3	3	3.9	4.2	2	2.3	3	4	2.5	3	3	3.7	3.5	4.8	3.1	3.1	5.1	6.1
couple	30.5	33.7	30.6	30.8	33	32	33.5	28.9	34.4	27.9	30.6	30.5	28.5	27.5	28.3	28	26.3	16.2
parent couple	19.4	19.2	23.3	25.5	25	23.6	25.8	23.9	21.7	26.5	23.7	23.6	27.2	27.4	27.1	28.8	20	28.9
other	25.4	21.5	20.2	14.8	15	19.5	16.0	19.4	18.2	20.3	18.5	16.7	18.1	17.4	22.3	20.3	24.1	34.4
income class 1q	23.5	16.2	19.7	11.4	9	13.4	16.7	17.1	19.7	31.5	37.5	15.9	24.9	16.2	33.5	31.9	35	31.6
income class 2q	24.5	20.1	24.1	14.9	15	21.1	20.6	17.1	25.1	26	28.6	18.9	25.7	21.2	26.1	26.2	23.6	15.5
income class 3q	21.9	26.9	24	21.1	24	28.8	23.3	21	23	19.9	16.4	22.8	22.1	21.8	18.8	20.4	17.4	17.7
income class 4q	20	24.1	20.5	30.6	32	22.8	26.3	26.8	21	15.2	11.6	25.5	17.6	25.7	13.4	14.3	16.1	19.7
income class 5q	10.1	12.7	11.7	22	17	13.9	13	18.1	11.2	7.4	5.9	16.8	9.8	15	8.3	7.2	7.9	15.5

Source: Authors' elaborations on EU-SILC data.

Table A6
Multinomial Logit with SI interacted with education level

	Categories of household deprivation						
	Low			Medium			High
	Basic	Secondary	Distress	$B \cap S$	$B \cap D$	$S \cap D$	$B \cap S \cap D$
Intercept	−0.328*	−0.234	0.526***	−0.764**	2.222***	1.369***	3.522***
	(0.179)	(0.301)	(0.193)	(0.327)	(0.269)	(0.310)	(0.208)
Head of household features							
age	−0.009***	0.02***	−0.022***	0.022***	−0.019***	−0.009*	−0.009***
	(0.002)	(0.003)	(0.003)	(0.005)	(0.002)	(0.005)	(0.002)
female	0.109**	0.942***	0.196***	0.837***	0.319***	1.074***	1.025***
	(0.045)	(0.059)	(0.051)	(0.086)	(0.038)	(0.089)	(0.067)
Head of household education - Reference: Primary or lower secondary education							
secondary	−0.3557***	−0.251*	−0.3988***	−0.4716***	−0.4644***	−0.5439***	−0.6433***
edu	(0.06)	(0.132)	(0.098)	(0.158)	(0.087)	(0.167)	(0.192)
tertiary edu	−0.7082***	−0.364***	−0.784***	−0.939***	−1.174***	−1.199***	−1.608***
	(0.098)	(0.118)	(0.08)	(0.177)	(0.088)	(0.156)	(0.128)
homeowner	−0.007	−0.864***	−0.490***	−1.031***	−0.585***	−1.526***	−1.670***
	(0.073)	(0.090)	(0.092)	(0.123)	(0.074)	(0.115)	(0.078)
Household features							
Household type - Reference: Single (without children)							
single parent	0.0585	−1.098***	−0.2025	−0.6008*	0.0408	−0.6547***	−0.8002**
	(0.1927)	(0.2086)	(0.1335)	(0.3385)	(0.2172)	(0.2092)	(0.1466)
couple	−0.1547*	−1.4767***	−0.2767***	−1.4136**	−0.122	−1.503***	−1.4276***
	(0.0875)	(0.1475)	(0.1061)	(0.1778)	(0.1264)	(0.1282)	(0.1074)
parent	−0.3809***	−1.797***	−0.7011***	−2.2266***	−0.4178*	−1.8424***	−1.9863***
couple	(0.1408)	(0.2559)	(0.1223)	(0.3788)	(0.2202)	(0.2741)	(0.2185)
other	−0.0309	−1.7086***	−0.617***	−1.6057***	−0.0094	−1.8312***	−1.5759***
household	(0.1948)	(0.2771)	(0.1463)	(0.3656)	(0.2025)	(0.2794)	(0.1863)
hh size	0.0378	−0.3693***	0.1153***	−0.1424	0.1611***	−0.1434	0.0787*
	(0.0451)	(0.1061)	(0.0298)	(0.1458)	(0.0398)	(0.0969)	(0.0477)
#≥65	−0.1037*	0.5117***	−0.0872	0.1334	−0.4311***	0.2371**	−0.276***
	(0.0579)	(0.0834)	(0.0553)	(0.1639)	(0.0572)	(0.1139)	(0.0712)
#disabled	0.4434***	0.3352***	0.2805***	0.7434***	0.6249***	0.5223***	0.901***
	(0.0345)	(0.0407)	(0.0407)	(0.0613)	(0.0381)	(0.0649)	(0.031)
#employees	−0.1288**	−0.1247	−0.2249***	−0.4167***	−0.6074***	−0.2009***	−0.9113***
	(0.0628)	(0.0855)	(0.0468)	(0.151)	(0.0345)	(0.0713)	(0.0995)
#temporary	0.2912***	0.2491***	0.2872***	0.7064***	0.6155***	0.4344***	0.759***
workers	(0.0368)	(0.0755)	(0.068)	(0.1897)	(0.0437)	(0.1193)	(0.059)
Work intensity - Reference: WI = 0							
0 < WI < 0.5	0.263***	−0.0835	0.2342**	−0.2013*	0.1059	−0.2487	−0.2405**
	(0.064)	(0.2061)	(0.0949)	(0.1052)	(0.0942)	(0.2014)	(0.0973)
0.5 ≤ WI < 1	0.0667	0.2094	0.3141***	−0.0427	0.0237	−0.4003**	−0.2377**
	(0.0928)	(0.2143)	(0.0985)	(0.134)	(0.0884)	(0.1904)	(0.1086)
WI = 1	−0.2489***	−0.198	0.2413*	−0.3865*	−0.2693**	−0.7386***	−0.941***
	(0.0911)	(0.1971)	(0.1254)	(0.2095)	(0.1101)	(0.1927)	(0.1409)
out of age	−0.3547***	0.1267	0.1877*	0.1141	−0.3909**	0.2881	0.1556
	(0.1064)	(0.1189)	(0.0966)	(0.165)	(0.0822)	(0.1965)	(0.1296)
Quintiles of the household income distribution - Reference: 1st quintile							
2nd quintile	−0.3618***	−0.0361	−0.1879***	−0.3726***	−0.5672***	−0.2814***	−0.7974***
	(0.0593)	(0.0703)	(0.0574)	(0.1118)	(0.0396)	(0.1088)	(0.0972)
3rd quintile	−0.7595***	−0.4077***	−0.6345***	−1.1778***	−1.2869***	−1.0628***	−1.8304***
	(0.0639)	(0.0738)	(0.0597)	(0.1677)	(0.087)	(0.2136)	(0.1545)
4th quintile	−1.3442***	−0.8136***	−1.2274***	−1.9512***	−2.107***	−1.7686***	−2.8241***
	(0.104)	(0.0995)	(0.086)	(0.1891)	(0.0828)	(0.1864)	(0.1474)
5th quintile	−1.7599***	−1.2032***	−1.7009***	−2.7447***	−2.949***	−2.525***	−3.7502***
	(0.1275)	(0.1081)	(0.1006)	(0.2724)	(0.1379)	(0.2572)	(0.1729)
Density of area of residence - Reference: densely populated area							
intermediate	0.2518***	−0.7896***	−0.2296***	−0.6257***	−0.0044	−0.8751***	−0.7051***
	(0.0774)	(0.0883)	(0.0763)	(0.1129)	(0.0758)	(0.1068)	(0.0946)
scarcely	0.3164***	−1.0095***	−0.3***	−0.59***	−0.0706	−1.1475***	−0.8674***
populated	(0.0756)	(0.13)	(0.0721)	(0.1489)	(0.0892)	(0.1338)	(0.163)
Funds objectives							
SQE	−0.0053*	−0.0023	7e-04	−0.0045	0.0026	-5e-04	-4e-04
	(0.0028)	(0.0041)	(0.0045)	(0.0038)	(0.003)	(0.0064)	(0.0036)
SI	0.0064	−0.0055	−0.0275***	−0.0074	−0.0165**	−0.023	−0.0199***
	(0.0081)	(0.0116)	(0.0098)	(0.0049)	(0.0065)	(0.0145)	(0.0072)
SI × secondary	0.0025	-9e-04	0.0075	−0.0177*	−0.0061*	−0.0069	−0.0175
edu.	(0.0031)	(0.0099)	(0.0046)	(0.0092)	(0.0036)	(0.0079)	(0.0118)
SI × tertiary	0.0011	−0.0041	0.0091	−0.0036	−0.0068	-5e-04	−0.0153
edu.	(0.0035)	(0.0091)	(0.0058)	(0.0094)	(0.0048)	(0.0131)	(0.0117)
Number of obs.	3429	3343	2113	1237	6746	891	4403
Time dummies	yes						
Akaike AIC	105795.3						

Notes: ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Std. errors in parentheses. Region-year clustered standard errors. Basis dependent category: non-deprivation. Reference category: male, less than secondary education, non-homeowner, single, without children, zero work intensity, living in a densely populated area. Source: Authors' elaborations on EU-SILC data.

Table A7
Multinomial Logit with SQE interacted with number of workers

	Categories of household deprivation						
	Low			Medium			High
	Basic	Secondary	Distress	$B \cap S$	$B \cap D$	$S \cap D$	$B \cap S \cap D$
Intercept	−0.3535**	−0.2807	0.4784**	−0.7819**	2.215***	1.3074***	3.4906***
	(0.1802)	(0.3112)	(0.1915)	(0.315)	(0.2684)	(0.2979)	(0.1947)
Head of household features							
age	−0.0087***	0.0199***	−0.0222***	0.0219***	−0.0191***	−0.0093*	−0.0085***
	(0.0023)	(0.0034)	(0.0031)	(0.0045)	(0.0018)	(0.0049)	(0.0022)
female	0.1089**	0.9382***	0.1977***	0.8336***	0.3175***	1.069***	1.0198***
	(0.0452)	(0.0597)	(0.0513)	(0.0838)	(0.038)	(0.0907)	(0.0664)
Head of household education - Reference: Primary or lower secondary education							
secondary	−0.3142***	−0.2621***	−0.3208***	−0.6746***	−0.5394***	−0.6233***	−0.8392***
edu	(0.0574)	(0.0795)	(0.0666)	(0.1042)	(0.0578)	(0.1143)	(0.1162)
tertiary edu	−0.6895***	−0.4149***	−0.6902***	−0.9835***	−1.2536***	−1.2157***	−1.7775***
	(0.0632)	(0.0606)	(0.0634)	(0.0921)	(0.0549)	(0.0669)	(0.055)
homeowner	−0.0048	−0.8544***	−0.4905***	−1.0234***	−0.5815***	−1.5154***	−1.6597***
	(0.0733)	(0.0917)	(0.0919)	(0.1219)	(0.0735)	(0.1181)	(0.0789)
Household features							
Household type - Reference: Single (without children)							
single parent	0.058	−1.0952***	−0.2038	−0.6004*	0.0389	−0.648***	−0.7941***
	(0.1886)	(0.2052)	(0.1346)	(0.3379)	(0.2168)	(0.2046)	(0.1497)
couple	−0.1559*	−1.4822***	−0.2763***	−1.4166***	−0.1276	−1.5082***	−1.433***
	(0.087)	(0.1453)	(0.1042)	(0.1777)	(0.1234)	(0.1274)	(0.107)
parent	−0.3833***	−1.7943***	−0.7018***	−2.2268***	−0.4223*	−1.833***	−1.9798***
couple	(0.1401)	(0.2459)	(0.1211)	(0.3819)	(0.2175)	(0.2557)	(0.2146)
other	−0.0327	−1.7252***	−0.6173***	−1.6145***	−0.0179	−1.856***	−1.5913***
household	(0.1943)	(0.2768)	(0.1448)	(0.3691)	(0.1987)	(0.2726)	(0.1851)
hh size	0.0386	−0.3722***	0.1156***	−0.1426	0.1618***	−0.1501	0.0752
	(0.045)	(0.1045)	(0.0296)	(0.1446)	(0.0399)	(0.0917)	(0.0468)
#≥65	−0.1036**	0.5194***	−0.0863	0.1356	−0.4298***	0.2479**	−0.2721***
	(0.0583)	(0.0833)	(0.0553)	(0.1631)	(0.057)	(0.1143)	(0.0704)
#disabled	0.4431***	0.3344***	0.2808***	0.7418***	0.624***	0.5216***	0.9***
	(0.0347)	(0.0406)	(0.0414)	(0.0607)	(0.0385)	(0.063)	(0.0305)
#employees	−0.118*	−0.0089	−0.2247***	−0.3685***	−0.5712***	−0.051	−0.7655***
	(0.0674)	(0.0843)	(0.0476)	(0.14)	(0.0413)	(0.071)	(0.0984)
#temporary	0.2925***	0.2683***	0.2889***	0.716***	0.6198***	0.4668***	0.7928***
workers	(0.0362)	(0.0751)	(0.0693)	(0.1882)	(0.0424)	(0.1117)	(0.0535)
Work intensity - Reference: WI = 0							
0 < WI < 0.5	0.263***	−0.0835	0.2342**	−0.2013*	0.1059	−0.2487	−0.2405**
	(0.064)	(0.2061)	(0.0949)	(0.1052)	(0.0942)	(0.2014)	(0.0973)
0.5 ≤ WI < 1	0.0667	0.2094	0.3141***	−0.0427	0.0237	−0.4003**	−0.2377**
	(0.0928)	(0.2143)	(0.0985)	(0.134)	(0.0884)	(0.1904)	(0.1086)
WI = 1	−0.2489***	−0.198	0.2413*	−0.3865*	−0.2693**	−0.7386***	−0.941***
	(0.0911)	(0.1971)	(0.1254)	(0.2095)	(0.1101)	(0.1927)	(0.1409)
out of age	−0.3547***	0.1267	0.1877*	0.1141	−0.3909***	0.2881	0.1556
	(0.1064)	(0.1189)	(0.0966)	(0.165)	(0.0822)	(0.1965)	(0.1296)
Quintiles of the household income distribution - Reference: 1st quintile							
2nd quintile	−0.36***	−0.0331	−0.1847***	−0.3719***	−0.5663***	−0.2793**	−0.7972***
	(0.0596)	(0.0722)	(0.0571)	(0.1127)	(0.0409)	(0.1102)	(0.0976)
3rd quintile	−0.7568***	−0.401***	−0.6303***	−1.1771***	−1.2871***	−1.0555***	−1.828***
	(0.0659)	(0.0767)	(0.0594)	(0.1668)	(0.087)	(0.2123)	(0.1544)
4th quintile	−1.3427***	−0.8079***	−1.2244***	−1.9479***	−2.1075***	−1.7642***	−2.8188***
	(0.1041)	(0.1013)	(0.0856)	(0.187)	(0.0837)	(0.1848)	(0.1506)
5th quintile	−1.7595***	−1.198***	−1.6992***	−2.741***	−2.9486***	−2.5181***	−3.7418***
	(0.1277)	(0.1095)	(0.1005)	(0.2737)	(0.1383)	(0.2515)	(0.1709)
Density of area of residence - Reference: densely populated area							
intermediate	0.2523***	−0.7872***	−0.2282***	−0.6236***	−0.0063	−0.873***	−0.7036***
	(0.0778)	(0.0868)	(0.0774)	(0.1158)	(0.0763)	(0.1044)	(0.0961)
scarcely	0.3157***	−1.0117***	−0.3039***	−0.5848***	−0.0705	−1.1498***	−0.8613***
populated	(0.076)	(0.1281)	(0.0713)	(0.1482)	(0.0896)	(0.1348)	(0.1627)
Funds objectives							
SQE	−0.0038	0.0048	2e-04	5e-04	0.0064*	0.0087	0.0076**
	(0.0029)	(0.0036)	(0.0048)	(0.0049)	(0.0033)	(0.0055)	(0.0035)
SI	0.0071	−0.0062	−0.0231**	−0.01*	−0.0189***	−0.0234*	−0.0232***
	(0.0081)	(0.0087)	(0.0095)	(0.0056)	(0.0058)	(0.0132)	(0.0062)
SQE ×	−0.0015	−0.0195***	1e-04	−0.0064	−0.004***	−0.0276***	−0.0228***
#employees	(0.001)	(0.0045)	(9e-04)	(0.0053)	(9e-04)	(0.0051)	(0.0052)
Number of obs.	3429	3343	2113	1237	6746	891	4403

(*continued on next page*)

Table A7 (*continued*)

	Categories of household deprivation						
	Low			Medium			High
	Basic	Secondary	Distress	$B \cap S$	$B \cap D$	$S \cap D$	$B \cap S \cap D$
Time dummies	yes						
Akaike AIC	105706.4						

Notes: ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Std. errors in parentheses. Region-year clustered standard errors. Basis dependent category: non-deprivation. Reference category: male, less than secondary education, non-homeowner, single, without children, zero work intensity, living in a densely populated area. Source: Authors' elaborations on EU-SILC data.

Table A8
Marginal effects of Social Inclusion Funds with respect to education level

	Non_SMD	Low			Medium			High
		Basic	Secondary	Distress	$B \cap S$	$B \cap D$	$S \cap D$	$B \cap S \cap D$
	(1)	(4)	(3)	(4)	(5)	(6)	(7)	(8)
Primary	0.002***	0.001***	0.001	−0.001***	0.000	−0.001***	−0.001**	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secondary	0.003***	0.002***	0.000	−0.001*	−0.000	−0.002***	−0.0003	−0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0003)
Tertiary	0.002***	0.001***	−0.000	−0.001**	0.000	−0.002***	−0.0002	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Notes: ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Std. errors in parentheses. Results based on averages of the independent variables. Source: Authors' elaborations on EU-SILC data.

Table A9
Marginal effects of Sustainable & Quality Employment Funds with respect to #employees in the household

	Non_SMD	Low			Medium			High
		Basic	Secondary	Distress	$B \cap S$	$B \cap D$	$S \cap D$	$B \cap S \cap D$
	(1)	(4)	(3)	(4)	(5)	(6)	(7)	(8)
1 empl	0.001***	−0.000*	−0.001**	0.000	0.000	0.001***	−0.000	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
2 empl	0.003***	−0.000	−0.002***	0.000*	0.000	0.001**	−0.001*	−0.001***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
3 empl	0.004***	−0.000	−0.003***	0.001*	0.000	0.000	−0.001*	−0.001***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)

Notes: ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Std. errors in parentheses. Results based on averages of the independent variables. Source: Authors' elaborations on EU-SILC data.

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