Material deprivation in Spain and the role of European Structural Funds

Chiara Mussida[1], Maria Laura Parisi[2,*], and Nicola Pontarollo[3]

[1]**Università Cattolica del Sacro Cuore, Piacenza, Italy**

[2]**University of Brescia, Italy**

[3]**University of Brescia, Italy**

ABSTRACT

Material deprivation of households has invested European countries in the past decade with worrying intensity. In order to evaluate the degree of this affliction and suggesting eventual solutions, relying on EU-SILC data for Spanish regions, we identify seven disadvantage/deprivation categories of households, with an increasing intensity of deprivation. Then, we identify i) the main household characteristics that determine the (relative) probability to fall into one material deprivation category and ii) which axis of the Cohesion Funds (social inclusion or sustainable and quality of employment) matters to reduce the probability of falling into a certain category of material deprivation. The main results show that living in rural areas, having persons with a disability and a female householder increase the probability of being materially deprived, with increasing intensity. On the contrary, having a householder older than 65, a higher education and income reduces the chances of material deprivation. Regarding European Structural Funds, the regional resources with sustainable and quality employment weakly reduce or have no effect on the probability to fall into material deprivation. Those with social inclusion purpose, on the other hand, are strongly associated to a lower relative risk ratio of material deprivation of any kind. However, there is some regional misalignment regarding this result. Therefore, we suggest to look at the predicted relative risks for households of falling into some level of material deprivation as a parallel criterion to allocate European regional funds, beyond the level of development and the unemployment rates. We call for a better use of Structural and Cohesion Funds based on a "placed based" strategy.

* Corresponding author: Maria Laura Parisi, Department of Economics and Management, University of Brescia,

marialaura.parisi@unibs.it

INTRODUCTION

The European Union has increasingly realized that regional convergence and development can be achieved by promoting and financing regional projects with economic and social objectives, such as for example 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 into an interplay between different political levels. In this context, Cohesion Policy is set to be in line with CSG priorities which, being linked explicitly to the Lisbon Agenda objectives, include social inclusion priorities and measures. Then, with the EU2020 strategy[1] for smart, sustainable and inclusive growth, the focus on fighting poverty and social exclusion becomes even more explicit. A further step ahead in this direction has been made by the European Pillar of Social Rights,[2] an initiative launched by the European Commission in 2017, that 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. It is built upon 20 key principles, structured around three categories: equal opportunities and access to the labour market; fair working conditions; social protection and inclusion.[3]

Following the evolution of EU policy priorities, we think that the relationship between Cohesion Policy and poverty or material deprivation, should be analyzed. The reason for suggesting this new direction lays in the fact that material deprivation (MD) and "severe" material deprivation (SMD) of households have invested European countries in the past decade with worrying intensity. This not only may 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 (Dijkstra et al., 2019).

In order to evaluate the degree of this affliction and suggesting potential solutions, three issues have to be explored. The first aspect refers to measuring. As mentioned, one of the most ambitious goal of the Europe 2020 strategy of the European Commission for smart, sustainable and inclusive growth (European Commission, 2010) is the fight against poverty and social exclusion. The importance of such target is renewed and extended by the 2030 Agenda of the United Nations. The 2030 Agenda for Sustainable Development was adopted at the UN Sustainable Development Summit (United Nations, 2015) in September 2015, considering a set of 17 Sustainable Development Goals (SDGs) which must be reached before the end of 2030. SDG 1 aims to eradicate poverty in all its form for all people everywhere by 2030. Poverty, indeed, has many dimensions, but its causes include unemployment, social exclusion, and high vulnerability of certain populations to disasters, diseases and other phenomena which prevent

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[1] https://ec.europa.eu/social/main.jsp?catId=751&langId=en.

[2] https://ec.europa.eu/commission/priorities/deeper-and-fairer-economic-and-monetary-union/european-pillar-social-rights/european-pillar-social-rights-20-principles_en.

[3] https://www.socialplatform.org/what-we-do/european-pillar-of-social-rights/.

them from being productive. In this work, we focus on social exclusion. The European Commission (Europe 2020 strategy), as well as the United Nations (2030 Agenda), recommend the monitoring of a number of indicators for social exclusion (European Commission, 2012, 2014). Material deprivation (MD) and "severe" material deprivation (SMD) of households are among the most important indicators for social exclusion. The indicator is measured using a battery of nine questions with yes/no answer, relating to the inability to afford items considered by most people to be desirable or even necessary to reach an adequate standard of living. The indicator for (severe) material deprivation currently adopted in the EU suffers from some limitations, however, such as the small number of items, their validity and relevance (see European Commission (2012), and Guio and Marlier (2013), for a discussion of these issues). Second, to identify disadvantaged categories of households in terms of their economic and social characteristics, is important to ease policy intervention. The existing literature on the determinants of material deprivation primarily focuses on household features and the characteristics of heads of household (see, for instance, Fusco et al. (2010), Figari (2012), Verbunt and Guio (2019), Mussida and Parisi (2020)). Third, to evaluate whether the most recent European regional funds have been playing a significant role or they have to be tuned towards the objective of reducing poverty and deprivation. We focus on the second and third issues, using the regions of Spain as a case study. In fact, measures of poverty for this country give indications that it manages to contain the phenomenon of severe material deprivation more than income poverty, compared to other Southern European countries (see Mussida and Parisi (2020), Ubago et al. (2019), Whelan and Maître (2012)). We then analyze whether European Structural Funds (ESIF) have a potential role at this containment. We choose Spain because it presents an interesting example of regional differences in GDP, employment growth rates (Ubago et al., 2019), and at risk of poverty and social exclusion rates over recent years (Llano Ortiz, 2017). In Spain there are 19 $NUTS2$ regions/Autonomous Communities, of which 17 autonomous regions and 2 autonomous cities (see Figure 2 in Appendix A). This context enables us to study the potentially-varying behaviour of some explanatory factors (primarily household characteristics) and gain some insight into the determinants of household material deprivation across Spanish regions. Furthermore, regional differences might contribute to explain the regional/local destination of some ESIF in this country, as well as their role to alleviate social exclusion at regional level. The structure of the paper is the following. Section 2 discusses regional heterogeneity and policy engagement in Spain; Section 3 describes data and variables; Section 4 illustrates the empirical methodology; Section 5 shows the results and Section 6 draws some conclusions.

REGIONAL HETEROGENEITY AND POLICY ENGAGEMENT IN SPAIN

In 1978 Spanish democratic Constitution established a decentralised state, with Autonomous Communities/ (NUTS2) regions enjoying a high degree of fiscal and political autonomy, making this administrative level the most interesting to be analysed from a political economy perspective (Márquez et al., 2015). Communities have assumed increasing competences in social policies with a large component of service provision, such as healthcare, active labour market

policies and social care (Bonoli et al., 2019). Spain is characterized historically by deep territorial inequalities. (Martínez-Galarraga et al., 2015) show that, in analysing regional convergence and inequality patterns between 1860 and 2000, while at the beginning of the period growth was concentrated in few regions, since the beginning of the twentieth century a fast convergence of regional economic structures provoked the decline in income inequality. Nevertheless, productivity differentials did not vanish, preventing further advances in the reduction of income inequality. Tirado et al. (2016) using provincial (NUTS3) data over the period 1860-2010, identify a rising spatial polarization since the 1980s, with areas in the north-eastern part of the country becoming richer and southern provinces becoming comparatively poorer. Faura-Martínez et al. (2020), by using a composite indicator measuring social exclusion risk at NUTS2 level for period 2009–2014, confirm the coexistence of economic and social disparities. In a situation characterized by particular territorial socio-economic unbalances, the devolution of decision making and taxing power has been used to allow diverse social and political communities to live together in a common nation (Lago-Peñas et al., 2017). Fiscal and political autonomy, according to various authors, might have mitigated territorial unbalances. Bosch et al. (2003), for instance, show that in Spain 'federal' budgets expenditures have higher redistributive, and combined stabilising, and insurance effects than the revenues. Furthermore, if before the Great Crisis public deficits for the central government encourage larger fiscal imbalances at the regional level and mimicking effects among Autonomous Communities (González-Alegre, 2018b), after the crisis regional governments have been forced to accept significant cuts in their budgets, with territorial differences in welfare state remaining stable or decreasing, thanks to a significant expansion of regional safety nets (Del Pino and Pavolini, 2015). Among these safety nets, a minimum income scheme was introduced, which, however, at the regional level did not result in a redistribution of resources from richer to poorer parts of the country (Natili (2019)). Moreover, the regions which introduced minimum income for the first time were not those with a higher incidence of unemployment and poverty. According to Bonoli et al. (2019), for example "no less than 12 ACs introduced legislative improvements, the number of beneficiaries has more than doubled and total regional expenditure on minimum income schemes increased from around €360 million in 2006 to almost €1.4 billion in 2015." However, according to Mora (2008), the territorial unbalanced socio-economic situation have reduced the ability of the central government to retain higher regional tax-revenue-retention shares, probably because autonomous communities' governments have less incentive to consider the macroeconomic impact of their policies. The author guesses that this may result also from diminished regional pressure due to the relevant amount of European funds added to the Spanish central government public expenditure.

The important socio-economic differences across Autonomous Communities are at the basis of the distribution of Cohesion Funds, with around 54% of the € 28.6 billion for period 2014-2020 devoted to less developed and transition regions (Extremadura, Andalucía, Canarias, Castilla-La Mancha, Melilla and Murcia).[4] Despite the

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[4]https://ec.europa.eu/regional-policy/sources/information/cohesion-policy-achievement-and-future-investment/factsheet/spain_en.pdf

big amount of Cohesion Funds devoted to Spain over time (in programming period 2014-2020 it is still the tenth biggest recipient),[5] empirical evidence on their effectiveness is limited. González-Alegre (2015), considering 17 Spanish regions for the period 1993-2007, analyses whether fiscal decentralization from government to regions plays a role in the effectiveness of the ESIF in increasing and promoting public investment in key areas for growth. The results suggest that ESIF are good for public investment with a decreasing impact, i.e for larger levels of decentralization structural funds become less effective. Herrero-Alcalde and Tránchez-Martín (2017), consider another perspective and test which factors affect Cohesion Funds allocation on total social expenditure and by category: health expenditure, education expenditure, and social services. The authors, examining 17 regions over the period 2002-2012, show that the current design of institutional architecture is creating large horizontal inequalities, with main drivers of regional social expenditure being population structure (age and location), development level (GDP) and regional government ideology. Regarding the effectiveness of Cohesion Funds, Faiña et al. (2020) explore the effect of the transport infrastructure investments financed with European Regional Development Fund (ERDF) and Cohesion Fund on Total Factor Productivity (TFP), considering 17 Spanish regions over the period 1989–2010. The results find that transport infrastructure investments partially offset the negative trend followed by regional TFP. Finally, González-Alegre (2018a) use data for period 1989-2010 to check for the effectiveness of European Social Funds (ESF) in promoting expenditure on active labour market policies in Spanish regions. Results indicate not only that the ESF is not effective in promoting active labour market policies, but also evidence of rent-seeking exacerbated in the presence of imitation. The result is in line with Puig-Junoy and Pinilla (2008) that, in analysing regional technical efficiency of Spanish regions in the period 1964-1996, find that regional inefficiency is significantly and positively correlated with the ratio of public capital to private capital. In our study we refer to the latest EC 2014-2020 programmed cycle, where there are nine different ESIF: some have national scope, others have regional/local destination. Each fund has a priority rank and thematic objectives. Four themes apply to social purposes:

- SQE: Sustainable & Quality Employment (Promoting sustainable and quality employment and supporting labor mobility),
- SI: Social Inclusion (Promoting social inclusion, combating poverty and any discrimination),
- EVT: Educational and Vocational Training (Investing in education, training and vocational training for skills and lifelong learning),
- EPA: Efficient Public Administration (Enhancing institutional capacity of public authorities and stakeholders and efficient public administration).

We focus on the first two of such objectives, which we deem directly linked to limiting households from falling

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[5]https://www.dw.com/en/how-the-eu-funds-its-economically-disadvantaged-regions/a-48354538

into material deprivation and poverty.

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
Paìs 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 Leòn	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
Andalucìa	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.

Table 1 reports the distribution of ESIF funds (based on eligible costs of projects) among Spanish regions with the purpose of SQE (column 1) e SI (column 3). Column 2 and 4 report the average amount of eligible costs per person (column 5 reports the total costs for both purposes, SQE and SI, by region). We note that the funds are distributed quite heterogeneously among regions. For the SQE purpose the percentages range from less than 1% in Madrid, where it stands around 0, Ceuta Y Melilla (0.5%), La Rioja (0.7%), and Illes Balears (0.8%), to more than 10% in Cataluña (10.8%), Galicia (13.8%) and Andalucìa (17.1%). If we look at the distribution of SQE purpose per person, at the very bottom we find again Madrid with the lowest level (per capita SQE equal to €0.02), as well as

Illes Balears (€8.20) with the addition of Comunidad Valenciana (€9.83). At the top level, we find again Galicia with a per person SQE equal to €58.57, with the addition of Cantabria (€76.78), and Extremadura at the very top level (€96.19).
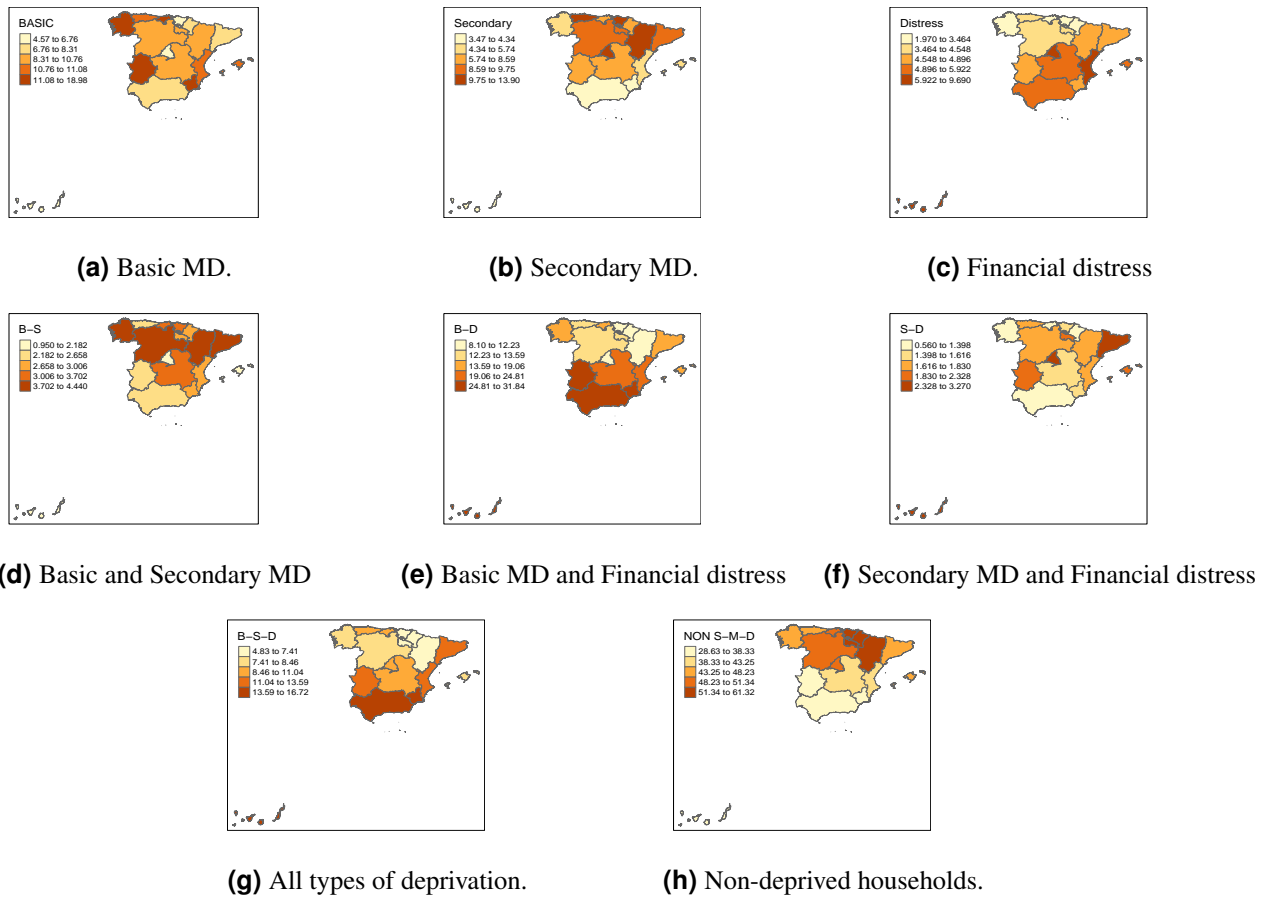
For the purpose SI, we find a somehow different distribution by region. Madrid, for instance, which receives almost no SQE funds, receives 17.7% of SI. The other regions receiving relatively low SQE maintain relatively low SI. Ceuta y Melilla, for instance, only receives 0.8% of SI, while La Rioja and Illes Balears receive 1.4% and 2.5%, respectively. The lowest percentage of 0.5% is for Murcia, while the highest percentage of the SI distribution is for Andalucia (24.1%). Looking at the average amount of eligible costs per person, we find relatively high values for Ceuta y Melilla and La Rioja (higher than € 70 per person), while Murcia maintain a relatively low value of € 5.4 per person. At the very top level of the per person SI, 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 are €115.6 billion (going up to €642.7 in 2019), allocated by the ESIF to all 28 EU members (59 regions with Regional C&E objective, 42 regions with Convergence objective and 16 regions with both).[6] The main objectives of this allocation are investments in human capital and employment activities (80%), social inclusion (14.3%), and the residual part goes to strengthening institutional capacity and promoting partnerships. Column 5 of Table 1 shows the ESIF funds (based on eligible costs of projects) by region for purposes SQE and SI, that are associated with social themes. To make an example associated with the SI objective, in 2016 programs for homeless or affected by housing exclusion involved 44756 individuals, 13 times higher than in 2015: 22% under EVT, 23.7% under SQE and 54.2% under SI objectives (source: Cohesion Data, EC 2020).

The heterogeneous regional distribution of households by category of deprivation is represented in Figure 1. From panel (a) to (g) we find the seven disadvantage/deprivation categories of households analysed in this paper, and in panel (h) the base category of non-deprived households. From panel (g), we note that households suffering all types of deprivation (Basic MD, Secondary MD, and Financial Distress) are primarily concentrated into the regions Extremadura, Valencia, and Cataluña. Such households suffer especially of Basic MD and Financial Distress (panel (e). From panel (h), we note that non-deprived households are mainly concentrated into the regions Paìs Vasco, La Rioja, Navarra and Aragòn.

By joining the information from Table 1, we can say that Extremadura, which is among the most deprived regions (panel (g) of Figure 1) is the region that receives the highest ESIF funds for both purposes of SQE and SI (especially per person), while Cataluña and especially Valencia (again, among the most deprived regions) receive a relatively low percentage and average amount of eligible costs per person.

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[6]Spain, 11 regions undergo the C&E objective: Aragòn, Canarias, Cantabria, Castilla y Leòn, Cataluna, Comunidad de Madrid, Comunidad Valenciana, Illes Balears, La Rioja, Navarra, Paìs Vasco. Four regions run under the Convergence objective: Andalucìa, Castilla-La Mancha, Extremadura Galicia. The rest of the regions are in the phasing-out system: Ciudad Autónoma de Ceuta, Ciudad Autónoma de Melilla, Principado de Asturias, Región de Murcia.

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

(a) Basic MD.

(b) Secondary MD.

(c) Financial distress

(d) Basic and Secondary MD

(e) Basic MD and Financial distress

(f) Secondary MD and Financial distress

(g) All types of deprivation.

(h) Non-deprived households.

DATA AND VARIABLES

We use EU-SILC cross-sectional data from 2014 to 2018 for households in Spanish regions ('comunidades')[7] in order to build our dependent variable and explanatory variables referred to the households. The 9-items questionnaire included in these releases of EU-SILC database allows to identify households in deprivation. The debate on the adequacy of such items to build the current material deprivation indicator is ongoing at the European Commission level. There is a new indicator of material and social deprivation, that might replace the currently used material deprivation indicator. The new indicator for material and social deprivation is based on 13 items whose selection results from a systematic item-by-item robustness analysis. Since 2014, these items are collected annually in each European Union country. The overall material and social deprivation indicator, adopted by the Indicators Sub-Group of the Social Protection Committee of Eurostat in April 2017, is henceforth defined as the proportion of people in the whole population who have an enforced lack of at least five out of 13 items (for details, see Guio et al. (2012), Guio et al. (2017), and Verbunt and Guio (2019)). This is now used by individual Member States and the Commission to

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[7]Except for the autonomous cities Ceuta and Melilla, whose sample size is very small to be significant.

monitor material and social deprivation. In this work, we adopt a different strategy to define *MD* based on the nine items. We group items in deprivation categories: 'Basic' category 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' category includes the impossibility to afford a durable good such as a telephone, a colour TV, a washing machine or a car. 'Financial Distress' category includes the incapacity to face unexpected expenses or financial burdens. 'Basic and Secondary' category ($B \cap S$) includes flagged items of both 'Basic' and 'Secondary' type; 'Basic and Distress' category ($B \cap D$) includes items of both 'Basic' and 'Financial Distress'; 'Secondary and Distress' includes items of both 'Secondary' and 'Financial Distress'. Finally, 'Basic and Secondary and Distress' ($B \cap S \cap D$) includes contemporaneously items of those three categories. Let *i* indicate an item of deprivation from 1 to 9. Each household $h = 1, \ldots, H$, residing in a Spanish 'comunidad' $r = 1, \ldots, 19$, may flag zero, one or more items. A household is deprived if $\exists c$ such that $I_{\{i \in c\}} > 0$. Moreover, the household falls into category of deprivation *c* when, at time t,

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

and $c = \{non-deprived, Basic, Secondary, Distress, B \cap S, B \cap D, S \cap D, B \cap S \cap D\}$. We therefore identify 8 mutually exclusive categories (including the non-deprivation one, ND), which (weakly) rank households by deprivation "levels" (see e.g. Mussida & Parisi, 2020). Single categories denote a low level of deprivation. Dual categories reports an intermediate level, while category $B \cap S \cap D$ denotes the highest degree of deprivation.[8] EU-SILC data then allow to identify households features such as type, size, the number of elderly, the number of disabled, the number of permanent and temporary workers, the average work intensity of the household; features of the head of household such as age, gender, education and homeownership; and the population density of the area of residence. These characteristics may influence the probability to be in deprivation. 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 social and employment objectives (SQE and SI), as described in section 2.[9]

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[8]Notice that the literature established that a household is severely materially deprived when it flags at least 4 (items), i.e. $\sum_{i=1}^{9} I_{\{h,t,r,i \in c\}} > 3$ no matter the type. This means that, differently from our definition, severe MD traditionally involves only those households with 4 or more lacking items (which may belong to the same category). However, this exogenous threshold has been criticized recently and a new system of preference is still tested on the data for European countries (see Guyo et al., 2012, Guyo et al., 2017, Beduk, 2018). In this paper we establish a gradual intensity of deprivation using our classification.

[9]More precisely, we are using 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 2016-2018. See the Results section for a discussion.

METHODOLOGY

The empirical objective of the paper is to estimate the probability to fall into one category of deprivation (relative to the probability of being non-deprived) conditioning on households' characteristics $x_{h,t,r}$ described in section 3 and on regions' EU funds for social purposes, $z_{t,r}$. The specification of the model is in the following ln-odds-form:

$$ln\frac{\Pr(y_{h,t,r} = c | x_{h,t,r}, z_{t,r})}{\Pr(y_{h,t,r} = ND | x_{h,t,r}, z_{t,r})} = k + \delta_c + \beta_c x_{h,t,r} + \gamma z_{t,r} + \tau_t + \varepsilon_{h,t,r} \tag{1}$$

From eq.(1), we derive the relative risk ratios reported in the results. The drift δ_c indicates that each category may have a different intercept, τ_t are time dummies. In a benchmark setting, the model includes fixed effects. However, we also drop this assumption by assuming that random effects are present. The distribution of the errors is Normal,

$$\varepsilon_{h,t,r} \sim \mathcal{N}(0, \sigma_{rt}^2) \tag{2}$$

indicating regional heteroskedasticity at each year t, where the uncorrelation case occurs when:

$$\mathrm{E}[\varepsilon_{h,t,r}, \varepsilon_{h',t,r'}] = 0 \qquad \forall r \neq r', h \neq h', \forall t. \tag{3}$$

The intra-regional correlation case occurs if:

$$\mathrm{E}[\varepsilon_{h,t,r}, \varepsilon_{h',t,r}] = \sigma_{rt}^2 \qquad \forall h \neq h', \forall t. \tag{4}$$

Notice that there are two levels of observation in our data: household level and regional level. We follow two assumptions overall as far as the distribution of the error terms: (i) uncorrelation across households and regions, i.e. eq.(2), eq.(3); (ii) clustered standard errors at regional-time level, i.e. eq.(2), eq.(4).

The natural way to estimate eq.(1) is through a multinomial logit. Following the aforementioned structure of the error terms, we show the results for a Multinomial Logit with constant term, time fixed effects, random effects, regional-time clustered standard errors. Benchmark estimates of the system of eq.(1), eq.(2), eq.(3)) are also available upon request.

RESULTS

Table 2 reports the relative risk ratios of eq.(1) and their z-statistics for model (ii) with random effects. The intercept reveals that the probability to be in Financial Distress (only), independently from the control variables, is more than 1.5 times the probability to be non-deprived. The probability of Secondary and Financial Distress is 4 times higher than the probability of non deprivation. The probability of Basic, Secondary deprivation and Financial Distress is 35 times higher, for Spanish households in 2016-2018. Conditioning on the characteristics of the head of household, it

is relevant to notice that a female head is always at greater relative risk than a male head, especially in Secondary deprivation (2.56 times), Secondary deprivation plus Financial Distress (2.93 times), and Basic, Secondary and Distress deprivation (2.78 times). A high degree of education, especially tertiary educational attainment level, significantly reduces all the risks of deprivation (Nolan et al., 2012). As suggested by the literature, homeowners are less likely to report material deprivation than renters (i.e. Berthoud and Bryan (2011); Figari (2012)). From these results it turns out that single households without children have the highest risk of deprivation in all categories, with respect to other types of households. Households with elderly members have higher risk of Secondary deprivation (1.67) and Secondary plus Distress (1.27), but they are at lower risk to be contemporaneously in Basic, Secondary and Distress deprivation (0.76). The negative relationship between age and material deprivation deprivation, as suggested by the literature, can be related to the individual's position in either the housing market (in several countries most elderly people are home owners), or to the fact that older people might have cumulated (a sufficient level of) permanent income both during their working life and through elderly pensions (see, for instance, Whelan and Maître (2010), Bárcena-Martín et al. (2014)). Unfortunately, households with disabled members are at higher risk of deprivation in all categories, especially in the worst case of Basic, Secondary and Distress (2.46). 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 2.13 for the risk of Basic, Secondary and Distress deprivation. Spain is characterized by the relatively high presence of temporary contracts. According to the Spanish Ministry of Labor statistics (Encuesta Anual Laboral), in 2017, 29% of Spanish workers had temporary contracts (ranging across regions from from 24.6% in Aragòn to 41.9% in Andalucìa). 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 youth, and reduces productivity and wage growth (OECD, 2018). 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 not associated with Secondary deprivation and positively associated with the probability of Distress (1.23). Households living in intermediate or scarcely populated areas are at lower relative risk of deprivation with respect to densely populated area, except for Basic deprivation, where both intermediately and scarcely populated areas seem to be at higher relative risk (1.28 and 1.37, respectively). The 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. This choice is due to the fact that European funds take time in order to release some of the expected effects and because the general practice of using commitments (eligible costs) as a proxy for payments is likely to introduce biases linked to measurement errors (Berkowitz et al. (2020)).[10]

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[10]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' objectives coefficients are less significant in many of these cases.

Funds to Sustainable Employment are weakly associated with reducing the relative risk ratio of Basic material deprivation. The regions suffering the most from Basic deprivation are Baleares, Cantabria, Galicia and Murcia as in Figure 1a, but Table 1 shows that the regions gaining the highest fraction of SQE funds are Andalucìa (17.1%), Galicia (13.8%) and Cataluña (10.8%). Baleares islands 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. These results confirm 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 (González-Alegre (2018a)). The European Social Fund has the special objective to increase public spending on such programs but it resulted to be weak and not addressed especially to regions in need (González-Alegre (2015)). However, 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. Moreover, Visser et al. (2014) argue 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, 2020), 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 9.90% regional mean standard deviation. This might have restrained the public budget to satisfy households and individuals' needs and required regions to an intense lobby process with the national government and the European Commission (Charron (2016)). 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.

The objective of Social Inclusion, on the other hand, is strongly associated to 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 to 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 probability 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 including the highest shares of households in Financial distress there are Comunidad Valenciana and Madrid, and slightly less Andalucìa, Canarias and Castilla-La Mancha (Figure 1c). Those suffering the most from Basic plus Financial distress are Andalucìa, Extremadura and Murcia and to a lesser extent Comunidad Valenciana

and Castilla-La-Mancha (Figure 1e). Regions with the highest share of households falling into Basic, Secondary and Financial distress are Andalucìa and Murcia, and to a lesser extent Extremadura, Comunidad Valenciana and Cataluña (Figure 1g). However, as Table 1 shows, Andalucìa (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 Comunidades, strongly affecting the capacity to attract these funds (Charron (2016)). 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 rates.

Table 2. Multinomial Logit RRR with regional random effects and clustered st. errors

	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	0.71*	0.81	1.62**	0.48**	9.5***	4.01***	35.37***
	(-1.843)	(-0.704)	(2.510)	(-2.365)	(8.518)	(4.533)	(18.475)
Head of household features							
age	0.991***	1.02***	0.978***	1.022***	0.981***	0.991*	0.992***
	(-3.797)	(6.346)	(-7.199)	(4.901)	(-10.474)	(-1.871)	(-3.825)
female	1.115**	2.565***	1.218***	2.308***	1.376***	2.927***	2.782***
	(2.407)	(15.909)	(3.845)	(9.734)	(8.308)	(11.859)	(15.380)
secondary edu	0.729***	0.767***	0.726***	0.508***	0.582***	0.535***	0.432***
	(-5.463)	(-3.336)	(-4.838)	(-6.392)	(-9.451)	(-5.634)	(-7.247)
tertiary edu	0.501***	0.661***	0.502***	0.373***	0.285***	0.298***	0.170***
	(-10.882)	(-6.814)	(-10.898)	(-10.699)	(-22.886)	(-18.312)	(-31.536)
homeowner	0.993	0.422***	0.612***	0.357***	0.558***	0.218***	0.189***
	(-0.096)	(-9.414)	(-5.329)	(-8.393)	(-7.911)	(-13.347)	(-21.234)
Household features							
single parent	1.062	0.334***	0.816	0.549*	1.04	0.519***	0.450***

	Basic	Secondary	Distress	$B \cap S$	$B \cap D$	$S \cap D$	$B \cap S \cap D$
Continuation of Table 2							
	(0.318)	(-5.239)	(-1.508)	(-1.788)	(0.189)	(-3.122)	(-5.333)
couple	0.857*	0.228***	0.759***	0.243***	0.884	0.222***	0.239***
	(-1.771)	(-10.056)	(-2.619)	(-7.978)	(-0.981)	(-11.870)	(-13.315)
parent couple	0.683***	0.166***	0.496***	0.108***	0.659*	0.159***	0.137***
	(-2.724)	(-7.187)	(-5.704)	(-5.86)	(-1.906)	(-7.150)	(-9.047)
other household	0.971	0.181***	0.540***	0.201***	0.990	0.16***	0.207***
	(-0.154)	(-6.164)	(-4.211)	(-4.375)	(-0.049)	(-6.846)	(-8.376)
size	1.039	0.691***	1.122***	0.866	1.175***	0.866	1.081*
	(0.843)	(-3.527)	(3.88)	(-0.989)	(4.033)	(-1.540)	(1.655)
≥65	0.902*	1.668***	0.917	1.142	0.650***	1.268**	0.758***
	(-1.785)	(6.135)	(-1.566)	(0.814)	(-7.484)	(2.060)	(-3.865)
#disabled	1.558***	1.399***	1.324***	2.103***	1.868***	1.686***	2.461***
	(12.775)	(8.198)	(6.774)	(12.342)	(16.257)	(8.234)	(29.166)
#workers	0.879**	0.883	0.798***	0.659***	0.545***	0.818***	0.403***
	(-2.073)	(-1.467)	(-4.791)	(-2.743)	(-17.739)	(-2.920)	(-8.952)
#temporary workers	1.339***	1.282***	1.333***	2.023***	1.849***	1.543***	2.130***
	(8.011)	(3.334)	(4.205)	(3.729)	(14.043)	(3.729)	(12.496)
0 <WI≤0.5	1.301***	0.918	1.266**	0.821*	1.111	0.781	0.787**
	(4.124)	(-0.414)	(2.506)	(-1.933)	(1.111)	(-1.250)	(-2.418)
0.5 <WI<1	1.070	1.232	1.371***	0.960	1.023	0.67**	0.790**
	(0.727)	(0.965)	(3.208)	(-0.303)	(0.259)	(-2.093)	(-2.169)
WI=1	0.780***	0.820	1.273*	0.683*	0.765**	0.478***	0.393***
	(-2.725)	(-1.006)	(1.914)	(-1.833)	(-2.431)	(-3.834)	(-6.618)
out of age	0.701***	1.136	1.206*	1.123	0.677***	1.335	1.173
	(-3.330)	(1.079)	(1.939)	(0.703)	(-4.73)	(1.466)	(1.227)
Density of area of residence							
intermediate	1.287***	0.453***	0.796***	0.535***	0.994	0.416***	0.494***
	(3.258)	(-8.931)	(-2.954)	(-5.499)	(-0.077)	(-8.277)	(-7.471)
scarcely populated	1.373***	0.365***	0.739***	0.557***	0.933	0.318***	0.423***
	(4.175)	(-7.904)	(-4.237)	(-3.979)	(-0.775)	(-8.680)	(-5.428)

Continuation of Table 2							
	Basic	Secondary	Distress	$B \cap S$	$B \cap D$	$S \cap D$	$B \cap S \cap D$
Funds objectives							
SQE	0.995*	0.998	1.001	0.996	1.003	0.999	0.999
	(-1.880)	(-0.554)	(0.116)	(-1.152)	(0.905)	(-0.067)	(-0.052)
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)
Akaike AIC	105790.65						
Time dummies	yes						
Income classes	yes						

Note: $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. Z-values in parentheses. Region-year clustered st. errors. Basis dependent category: non-deprivation. Reference: male, less than secondary education, non homeowner, single, zero work intensity, densely populated area.

CONCLUSIONS

In Spain there is no specific policy to reduce severe material deprivation, but a variety of means-tested benefits that help reducing 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 (Ayala et al. 2016). 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 (Ayala et al. 2014). The most relevant aspect of such allowances has been 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 (Ayala et al. 2011). As far as the labor market performance of the past ten years, Spain has seen 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 (Parisi 2018). The discussion on the policy interventions to contrast severe material deprivation, therefore, is still open and debated in Spain. This paper shows that turning to regional ESIF have some effect on material deprivation when we distinguish by their social objectives. These results, however, confirm that a high regional asymmetry in the distribution of funds, devoted to the sustainable and quality employment objective, weakly reduces or has no effect on the probability to fall into material deprivation. The objective of Social Inclusion, on the other hand, is strongly associated to a lower relative risk ratio of material deprivation of any kind. Although this is a promising result, given that SI funds target poverty as their first aim, there is some regional misalignment as well.

We bring evidence therefore 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 rates.

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Appendix: Comunidades Autònomas

Figure 2. Regions of Spain.