Risk of poverty in Southern Europe

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Abstract

We analyze whether the risk of poverty deteriorates with the crisis in France, Greece, Italy, Spain, for different categories of households, individual features, and policy instruments, such as the regional European Structural Funds.

We find that the impact of the economic recession was heterogeneous, deteriorating the status of temporary workers, self-employed, single, and female-headed households, while the risk of poverty decreased relatively for larger households with dependent children and elderly members. We also find that targeted funds towards human capital investment are associated to decreasing the risk of poverty, but the crisis slowed down their effects.

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1. Introduction

Attention to a formal definition of "poverty" or identification of the "poor" goes back at least to the end of the 19th century with the first studies by Booth and Rowntree in England, but the first antipoverty program was born only in 1975, at the European institutional level (European Parliament, 2017). An original definition considers individuals or families as poor when they lack material resources to reach a minimum acceptable way of life (Townsend, 1979; Hagenaars and de Vos, 1988; Maquet Engsted, 2013). Since then, there has been increasing awareness of how poverty goes arm in arm with more pervasive social exclusion, and the concept became wider in its scope.

The phenomenon of poverty has a multidimensional facet. "Extreme" and absolute poverty exists mostly in least developed countries, where 766 million people live with less than $1.90 per day (2013 data in 2011 PPP prices, Worldbank, 2017). Nonetheless, relative poverty is a condition of hardship in rich economies and European countries as well. Within a country, relative poverty means low standard of living compared to the average, and income levels below the poverty line. In 2008, more than 80 million people across the European Union lived below the poverty line, or 16.5 per cent of total population (European Commission, 2010). The 'status' of poverty changes over time and space, it has to do with economic resources but also with social barriers such as (lack of) access to health services, cultural resources, education, employment and discrimination. Moreover, particular segments of the society may suffer from social exclusion more than others, e.g. women with dependent children, the elderly, disabled, low-skilled individuals, or temporary workers. According to Vaalavuo (2015), children almost everywhere in Europe are in the most exposed category to poverty persistence.

In the past fifteen years, the literature about poverty focused on 'longitudinal' poverty, i.e. analyzed the characteristics of the households that are at risk of being permanently poor or

socially excluded. Cappellari and Jenkins (2004), Poggi (2007), Biewen (2009), and Addabbo et al. (2015), for example, analyze persistence in Europe. At the country level, studies by Addabbo (2000), Baldini and Ciani (2011), Devicienti et al. (2014), Coppola and Di Laurea (2016) and the more recent work by Giarda and Moroni (2018) show that, as other countries in the Mediterranean region of the EU, like Greece, Spain, and Portugal, Italy is characterized by high poverty persistence.

Other papers analyze similarities and differences between long run and current poverty rates. Jenkins and Van Kerm (2011), for instance, compare persistent at-risk-of-poverty rates with current at-risk-of-poverty rates using European Union Statistics on Income and Living Conditions (EU-SILC) longitudinal panels for some European countries. They find that the country rankings according to persistent and current poverty rates are the same, estimating an almost linear relationship between the two rates. They conclude that the EU measure of persistent poverty adds little additional information to that which is revealed by current poverty rates. This is partly due to the characteristics of EU-SILC longitudinal panels. For instance, the four years of length in the panels are too short to give robust evidence on the risk persistence. It is for these reasons that we decided to analyze the current poverty rates by using the cross-sectional version of the EU-SILC data (we discuss these issues in Section 3).

Fighting poverty requires mainly a redistribution of resources; this is even more so in times of low or even negative economic growth, such as the years after the big 2007 crash. That is also why social policy instruments are inevitably managed by national governments (Maquet Engsted, 2013). However, setting common guidelines and monitoring the situation across European Union countries is of utmost importance for completing the objectives of the Nice European Council of December 2000, and to adhere to the more recent Europe 2020 strategy (Marlier, Natali, & Van Dam, 2010). One of the flagship initiatives in the Europe 2020 strategy for smart, sustainable and inclusive growth is the European platform against poverty

and social exclusion, aimed at lifting 20 million people out of poverty and social exclusion by 2020. This indicator corresponds to the sum of persons who are at risk of poverty or severely materially deprived or living in households with very low work intensity. The fight against poverty and social exclusion is one of five ambitious goals of the Europe 2020 strategy, which also targets employment, R&D, climate change and energy sustainability, and education. The platform, launched in 2010, will remain active until 2020. It aims at ensuring economic, social and territorial cohesion, guaranteeing respect for the fundamental rights of people experiencing poverty and social exclusion, and mobilizing support to increase people's integration in the communities in which they live (i.e., to provide training in order to find employment, and provide access to social benefits).

We decided to focus on four Southern European countries, such as France, Greece, Italy and Spain (the latter three harshly hit by the crisis). These countries represent an interesting case study since stylized facts suggest that, despite pertaining to the same region, even before the onset of the 2007 crisis, they look different in relative terms, since they show heterogeneous at risk of poverty rates, either higher or lower than the European average. In 2006, for example, Eurostat estimates that 25.3% of the European population is at risk of poverty or social exclusion. At the time, the 'at risk of poverty' share is above the EU average in Greece (29.3%), Italy (25.9%) and Spain (24%). Interestingly, France with a risk of poverty rate equal to 18.8% is better off than the largest EU economies and the EU average as well.[1]

Whether the 2007 turmoil deteriorated the poverty shares in these countries calls for further concern and policy measures.

To evaluate whether the risk of poverty get worse in those countries after the crisis, we calculate the fraction of the population at risk of poverty before and during the economic

[1] Figures available on the Eurostat website https://ec.europa.eu/eurostat/tgm/refreshTableAction.do;jsessionid=NK178g1Xr6gXRNoWRLSIikQNgIHH7SXBgAOYjwiADWDpmNhRgo_t!-1097325195?tab=table&plugin=1&pcode=t2020_50&language=en.

recessions. We compute those risks for different categories of population, i.e. gender, age, employment status, and education.

We discuss the regional policy response to alleviate the risk of poverty or social exclusion in 2007 and 2014, and in particular, we focus on the European Structural Funds - cycle 2007-2013 - for which regions in Southern Europe were eligible. We discuss what objectives of such funds are appropriate relative to the analysis (Ferrera, 2005). We then conduct a logistic regression analysis to estimate the marginal impact of household and regional policy features, which are associated to the risk of poverty, and their time change.

The structure of the paper is the following. Section 2 offers an overview of the primary poverty indicators. Section 3 presents data and a descriptive analysis of the indicators. Section 4 illustrates the distribution of European Structural Funds to Southern regions (coping with Europe 2020 objectives), emphasizing those allocated to human capital investment. Section 5 offers an empirical investigation of the household and region economic/policy characteristics associated to the risk of poverty in a pre-crisis and a post-crisis year - taking France as reference. Section 6 draws some concluding remarks.

2. Poverty measures: an overview

Poverty indicators used by the Social Protection committee (Europe 2020 strategy) include the 'at risk of poverty' rate (AROP), the 'severe material deprivation' rate (SMD), and the 'work intensity' status of a household (WI). Typically, these measures do not identify the same set of households as poor (Ayala et al., 2011; Hick, 2015). In general, while at-risk-of-poverty rates refer to current income, the material deprivation rate is closely related to permanent income and it is not considered a 'monetary' indicator (Whelan and Maitre, 2010).

AROP depends on the 'poverty line', a threshold equal to 60% of the national median equivalized-household disposable income of each individual, after taxes and social transfers (Eurostat, 2012). To the purpose of our analysis, however, we use the disposable income of a

household as a unit of observation, so the reference will be the 'household poverty line'. Equivalized-household disposable income 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-scale.[2] This measure of poverty has a long tradition. Its calculation is based on a highly standardized methodology; it has a clear interpretation and strong policy relevance. Nonetheless, it has been criticized under many respects, and in the European Union, it has been complemented by other measures (Marlier et al., 2012; Kis and Gábos, 2015). Some criticisms, for example, relevant to our analysis, are those that follow. AROP is a unidimensional measure that reduces poverty to just non-availability of an adequate income at the household level. Additionally, being the calculation based on a reference year, such income neglects inter-temporal transfers and income smoothing. The definition of total disposable income has some limitations as well: for example, it includes the imputed rent of an owned house, but does not subtract the mortgage interest paid as a negative component (Maestri, 2015), leading to an optimistic evaluation of the economic conditions of indebted households during the recent economic downturn. The reference threshold is based on the average national income; consequently, comparisons are difficult over time as the threshold changes from one year to another. The fact that the threshold is national makes the AROP rate unsuitable for cross-country comparisons, but also for comparing regions within the same country, if characterized by high geographical disparities (Maquet Engsted, 2013).

To overcome these limitations, there are alternative poverty measures, such as 'severe material deprivation' rates. Severe material deprivation shares are multidimensional poverty measures more oriented to the actual standard of living instead of the income levels. The Social Protection committee (Europe 2020 strategy) adopted these indicators to quantify the percentage of households that cannot afford some of the following nine items - considered by

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

most people to be desirable or even necessary to reach an adequate standard of living. The items are: 1) avoiding arrears (in mortgage or rent, utility bills or hire purchase instalments); 2) one week's annual holiday away from home; keeping the home adequately warm; 3) a meal with meat, chicken, fish or vegetarian equivalent every second day; 4) coping with unexpected expenses; a meal with meat, chicken, fish or vegetarian equivalent every second day; 5) one week's annual holiday away from home; 6) possessing a color TV; 7) a washing machine; 8) a personal car; 9) a telephone. A deprivation score ranging from 0 to 9 stems from the number of items a household cannot afford. Therefore, a person is said to be severely materially deprived if she/he lives in a household with a score that is greater than or equal to four (items).

As mentioned above, AROP is based on income of a given year, while SMD is a non-monetary measure of poverty, relating to a set of resources and functioning that pertain more naturally to the concept of permanent income (Ayala et al., 2011). Moreover, the SMD threshold (4) does not vary from year to year, and accommodates naturally for differences in the price levels of different groups of items in a country. Although theoretical motivations of multidimensional poverty measures are sound, operationalization is difficult: the choice of the items, their volatility, aggregation of the indexes and reliability of the scale can be critical (see e.g., European Commission, 2012; Guio and Marlier, 2013).

Finally, another important indicator often used to measure poverty has to do with the labor market involvement of the household, that is the ‘work intensity’ status of a household (WI). Work intensity 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 64 years old. Such indicator is then aggregated at the household level as the sum of the work intensities of all household members. WI ranges

between 0 for absence of work and 1 for maximum work intensity. There are specific WI codes between the two extremes. $0 < WI < 0.5$ means low work intensity. People living in households with very low work intensity, for instance, are working age individuals living in households where adults worked less than 20% of their total work potential during the past year. $0.5 \leq W < 1$ means high work intensity.

We decided to focus on the income measure of poverty AROP because, as explained above, (despite its limits) it has a long tradition, clear interpretation and strong policy relevance. Moreover, we use work intensity WI as one explanatory variable of the economic conditions of the household in our regression analyses (see Section 5 and Table A2 in the Appendix).

Plenty of evidence exists from the analysis of poverty and social inclusion over the last ten years. The key insights at the European level follows. Having a job is not always enough to avoid poverty and/or material deprivation (Eurostat, 2018). The spread of precarious contracts, low-paid and low-skilled jobs and underemployment in most countries, especially during the crisis, implies that the labor market has stopped being a stable source of prosperity for many people and their families. In this context, a more reliable indicator of the labor market involvement of the household is the household work intensity. Maque Engsted (2013), for example, finds that higher work intensity significantly reduces the risk of poverty and material deprivation. Certain groups appear to be persistently outside or at the margin of the labor market, often facing multiple barriers to entry and therefore high risk of falling under the poverty line. Factors such as low skills, care responsibilities, age, precarious jobs, migration background all contribute to the risk. Households in which nobody works (zero or low household work intensity) face particularly acute challenges. Finally, the design of the tax-benefit system is a crucial determinant of income inequalities and the degree of redistribution to the poor. Evidence from Member States shows that social transfers other than

pensions effectively reduce poverty risks, but the degree to which they do so varies substantially across countries (Fabrizi et al., 2014).

Yet much remains to be done, especially after the economic recession, which exacerbated the poverty and social exclusion conditions of specific population groups. In this work we target the analyses on four Southern European countries (France, Greece, Italy and Spain) to evaluate whether the risk of poverty deteriorated with the economic crisis and to discuss the impact of policy/structural funds (copying with Europe 2020 objectives) to alleviate poverty at regional level.

3. Data and indicators

We use data from the EU-SILC survey, which is based on a methodology and definitions that have been standardized across most members of the European Union (see Eurostat, 2010, for further information and technical details about the EU-SILC database). The topics covered by the survey are living conditions, income, social exclusion, housing, work, demographics, and education of individuals. We select data for France, Greece, Italy, and Spain. We use cross-sectional data from each country for years 2007 and 2014, corresponding to the income year 2006 and 2013, respectively, before and after the economic recession.

The GDP growth rate was indeed positive in all countries before 2007 (with respect to the previous year), while it was negative in 2014 in all countries with the exception of France (for details see http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nama_10_gdp&lang=en).

We also observe an increase of tension in the labor market registered by the unemployment rate between 2007 and 2014. While the unemployment rate in France increased by 2.3 percentage points, from 8% in 2007 to 10.3% in 2014, the indicator more than doubled in

Italy (from 6.1% in 2007 to 12.7% in 2014) and was approximately three times higher in Spain and Greece (from 8.2% to 24.5% in Spain, and from 8.4% to 26.5% in Greece).[3]

The poverty indicator of interest in this research is AROP or current at risk of poverty rate. This is a household-level measure, calculated on cross-sectional EU-SILC data. We use cross sectional datasets rather than longitudinal panels, since the larger sample size of the former is likely to lead to more reliable and precise estimates, given that the median income is crucial to determine the poverty line. Moreover, longitudinal data suffer from attrition (Jenkins and van Kerm, 2011). However, longitudinal data could address important issues, such as poverty persistence, but this goes beyond the aim of this paper.

The burden of poverty is unevenly distributed among several household types. In general, a single-parent household, that is a single person with dependent children,[4] is characterized by much higher incidence rates (OECD, 2014). We calculate our poverty indicator by country, year of observation, as well as household type, and report them in Table 1. Specifically, we focus on four household types: single (without kids), single-parent, cohabiting couple or married couple without dependent children, and cohabiting couple or married with kids/dependent children (including one, two, and three or more dependent children).

In the pre-crisis year, total AROP (last column of Table 1) is at its highest level in Greece (29.3%) with close rates in Italy and Spain (25.9% and 24%, respectively) and at its lowest value in France (18.8%, which is even below the EU average). The poverty measure increases with the crisis in all countries with the exception of France, though. Greece maintains its top position and shows the highest change of the indicator, by approximately 6.4 p.p. Spain and Italy again show similar increases and rates after the crisis (in 2013, AROP is 28.5% in Italy

[3] Figures available at http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tps00203

[4] Dependent children are household members aged below 18 as well as aged 18 to 24 years, living with at least one parent and economically inactive. For details, see http://ec.europa.eu/eurostat/statisticsexplained/index.php/EU_statistics_on_income_and_living_conditions_(EU-SILC)_methodology_-_definition_of_dimensions.

and 27.3% in Spain, with about 3 p.p. change each). In France, we note a slight reduction from 18.8% to 18.1%.

These numbers allow drawing some preliminary facts. First, Greece is the country with an urgent need of policies/interventions to alleviate poverty. Second, Italy and Spain show relatively high indexes, increasing with the recession, and policy intervention is pressing too. Moreover, as said above, poverty most importantly is not homogeneous across types of households.

[TABLE 1 ABOUT HERE]

From Table 1 it is evident that the type of household suffering from the highest AROP is 'single with kids' in both years. The AROP rate for this household type increases in all countries with the crisis (even in France). On the other hand, couples without dependent children have the lowest AROP rates, reducing after the economic downturn. Our findings confirm the crisis asymmetric effect in income distribution, pushing a larger number of single parents under the poverty line, while relatively relieving married couples. This second fact gives a direction for anti-poverty measures to establish priorities.

Next, it is not only the presence of dependent children that affects the risk of poverty, but also other household characteristics, such as, for example, the gender of the head of household. Table A1 in Appendix reports the composition of our samples by gender of the head of household. We then explicitly take into account the gender of the head of household in our estimates (Section 5). We find interesting gender differences by household type. There is a prevalence of women as head of single parent households. On average, the household head is female in approximately 85% of the single parent households in 2007. Such percentage slightly reduces to 82% in 2014. Italy and France show the highest values in both years (see Table A1). Even in 'single' household type without children, the head is mainly a woman. Single women represent more than 60% of singles in all countries before and after the recession. This fact helps explaining why single-parent households have the highest AROP

rates. Indeed, single parent households might have a double disadvantage. On the one hand, there is a single person with income related problems. On the other hand, quite often (see Table A1) the single person is a woman who bears a heavy burden when trying to balance work and family duties. The disadvantage of women in the specific single-parent household category is a common feature of many European countries, as found by the main research institutions. In Europe, especially in Southern Europe, low socioeconomic positions and poverty are more common among single parent households headed by women (see, for instance, Fondazione Brodolini, 2007, and Federal Interagency Forum on Child and Family Statistics, 2015).

For the remaining household categories, there is a prevalence of men at the head of the household (on average more than 70% of married men, and more than 75% of married men with dependent children). Their risk of poverty is definitely lower.

4. Policy Response

In the period 2007-2013, the two sequential crises threw most European countries into a deep recession, deteriorating the employment and unemployment rates, and raising the share of people under risk of poverty and social exclusion. This was particularly true in Southern Europe (Greece, Italy, and Spain). During these same years, however, operating programs of the European Structural and Investments Funds (ESI) including the European Regional Development Fund (ERDF) and the European Social Fund (ESF)[5] strengthened their activities, and complemented national and regional plans to finance anti-crisis measures.[6] These funds aimed at the economic and social cohesion among EU members, with the objective of 'convergence' (for less developed EU regions) or 'favoring

[5] For details on ESF see Regulation (EC) No 1081/2006 and http://ec.europa.eu/esf/home.jsp

[6] See Fabbris and Michielin (2010) for a discussion of comprehensive regional measures in Italy to contrast the economic crisis in 2009 and 2010.

competitiveness/employment' (in transitional and more developed regions). The level of development for each region is defined by Regulation EU n.1303/2013 Art. 90(2). Each eligible project to finance was categorized according to 86 intervention priorities, in order to improve workers employability and firm adaptability; improve access to sustainable employment in the labor market; foster social inclusion for disadvantaged people and fighting discrimination; empower human capital and sustain partnerships. Moreover, the Convergence objective aimed also at expanding investments in human capital and strengthening institutional capacity (European Commission, 2015, p.62).

To our research purpose, we select allocations and received funds corresponding to 19 such priorities, listed in Table 2, referring to the broad Human Capital theme.[7]

Additionally, in 2010, the new Europe 2020 strategy introduced a new set of employment policies and headline targets, such as reducing poverty by aiming to lift at least 20 million people out of the risk of poverty and social exclusion (European Commission, 2016) and ESF had to comply with these more recent guidelines.

[TABLE 2 ABOUT HERE]

Until 2013, Italy and Spain's allocations went mostly to less-developed regions under the Convergence objective (about 85% of the ERDF funds in Italy and 75% in Spain). In Greece, all funds are allocated with that purpose too. On the other hand, the only less-developed regions of France, eligible to ERDF with Convergence target, are the oversea territories, that we exclude from our analysis. This distribution of funds is particularly interesting when projects deal with Human Capital Investment (HCI). Notice that in 2013 the absorption rate of the ERDF funds ranges from 45.9% of Greece to more than 100% in Spain. Since operations could continue until December 2015, by 2016 almost all available funds have been absorbed

[7] Among projects with priorities, there are developing life-long learning systems within firms, promoting and supporting entrepreneurship and start-up, specific work skills, encouraging active aging and prolonging working lives.

in these countries. As far as Human Capital projects, in 2013 Italy absorbed only 27% of allocated funds for less-developed regions (Convergence target) while Spain absorbed 87.7% of funds with the same purpose.

The second important ESI fund to finance human development projects is the European Social Fund (ESF). In the period 2007-2013, ESF had the same objectives as ERDF (Convergence to less developed and Competitiveness to transitional/more developed regions). However, ESF could finance few actions in the same field as ERDF (overlapping) but only for 10% of total costs. Southern European countries cover 32.4% of total European eligible ESF co-financing (see http://ec.europa.eu/esf/main.jsp?catId=574&langId=en). By the end of 2013, the absorption rate of ESF was about 59.7% in France, 59.5% in Greece, 63.3% in Italy and 63.4% in Spain.

5. Econometric framework and results

The risk of poverty (AROP) of a household, y_{jr}, in this study is associated with household and economic factors, as well as the implementation of policies aimed at reducing poverty. In the following logistic regression analysis, we consider the amount of European Structural Funds received by the different regions in Southern Europe, distinguishing by objective (*Objective*) and priorities (*Theme*), controlling for the expenditure absorption rate, as described in the previous section. The model specification depends on the year of observation and the period of programming. The (predictive) index of the *j* family in year *t* (=2007 or 2014) is:

$$I_{t,jr} = c + \beta' \underline{x}_{t,jr} + \delta_1 Fund_r + \delta_2 Objective_r + \delta_3 Theme_r + \delta_4 Absorption_{t,r} + D + \varepsilon_{t,jr} \quad (1)$$

$$y_{t,jr} = \frac{exp(\hat{I}_{t,jr})}{1+exp(\hat{I}_{t,jr})} \quad (2)$$

The latter is the predicted probability of a positive outcome (being at risk). The odds-ratio for each coefficient is $\varphi_i = \exp(\beta_i)$, with a standard error equal to $s_i^{\varphi} = \varphi_i \cdot \beta_i$. We assume alternatively that $V(\varepsilon_{t,jr})$ is based on an observed information matrix or that it is clustered across countries. The sub-index *r* refers to each region in Southern European countries (France, Greece, Italy and Spain) for which we observe regional data. The predictors *x* include family characteristics, mean household characteristics (such as mean age) and economic characteristics. Among household characteristics we include whether the head of the household is a woman, the number of household members, household type, the number of less than 16 years-old children, the number of older than 65, the number of disabled persons. Economic characteristics are the number of unemployed in the household, the number of employees, self-employed, temporary workers, NEET, whether the household live in a densely populated, intermediate or scarcely populated area, whether the head is homeowner, household work intensity, whether the household lives in a less-developed, transitional or more developed region. *Fund* refers to either ERDF or ESF. *Objective* is one of the two objectives of the funds: Convergence (Conv) or Regional Competitiveness & Employment (RCE). *Theme* is the group of HCI priorities of the funds about "Employability" or "Social inclusion", as explained in Table 2 and subsection 5.1. *Absorption* is the expenditure absorption rate. *D* is a set of country dummies. There are also the interactions of factors variables such as female head of the household and type of household (see Section 3). These help at identifying whether women are at a disadvantage in specific household structures, as turning out in the stylized facts. Table A2 in Appendix reports descriptive statistics about AROP, all the explanatory variables and policy indicators.

Table 4 below reports the estimated odds ratios φ for being AROP in 2007 and 2014, when the estimator variance-covariance matrix is clustered across regions (s.e. cluster). Indeed, we need to correct the standard errors of the estimates because of a higher level of aggregation

(regional) of policy indicators (Moulton, 1990). Statistically significant estimates of odds in the two separate years are highlighted in dark grey (for significantly lower than 1 odds) and light grey (significantly higher than 1, i.e. the odds of being at risk of poverty for that category is higher than for the reference category). We then use Wald tests to compare the estimated coefficients in the two years to check whether being at risk of poverty has significantly changed after the crisis period. Significant changes are marked with asterisks.

5.1 Being at risk of poverty

Table 4 organizes the estimated odds ratios into groups of characteristics, for which the base category is indicated in parentheses. Keeping 'single parent with kids' as the base category, only married couples have lower odds, but this is not statistically significant in 2007. Married couples odds become statistically significant in 2014, though, with an improvement with respect to 2007 (i.e. lower odds, light gray scale).

If we look at the head of household's gender, women score 14 percentage points higher probability to be at risk than men, however this odds is not statistically significant in 2007. Nonetheless, women worsen their relative position in 2014, when their risk grows to a significant 53 p.p. higher than men's risk. We are interested to check in which type of household women score better/worse than men do. Estimates do not appear to be statistically significant. This means that women risk of poverty is likely independent from the type of household they belong.

The odds of being at risk increases with household size only in 2014, when size odds is significantly equal to 1.35, worsening significantly since 2007 (Wald test of parameter equality is significant at 1% level). If the household includes young children (younger than 16 years old) its odds is significantly equal to 1.16 in 2007 and drops to 0.90 in 2014, with significant improvement. Whether the household includes elderly persons, over 65 year-old,

and/or young children, provides different results. The reference category is a household without children and without elderly. Households with elderly and no kids have significant odds equal to 0.76 and even improves significantly to 0.52 in 2014. Households with elderly and kids have odds equal to 0.86 but it becomes about half in 2014, with significant improvement. These results are due to the fact that the elderly usually provide a further source of income, such as private pensions, which represent a secure and valuable insurance against the risks of poverty. The literature on poverty dynamics already pointed out the role of secondary earners (for instance grandparents) in lifting up poor households above the low-income cut-off (Jenkins, 2000).

If the household includes a disabled person, its odds is significantly higher than 1 in both years (no change over time). This result finds support in the existing literature. Parodi and Sciulli (2011), for instance, analyze the economic effect of the presence of disabled members on Italian households and find that the risk of poverty is higher for households with disabled. Whether the head of household is a homeowner, the odds is significantly lower than 1 in both years, with a significant improvement in 2014.

Results about household economic 'condition' come next. Although being employed is an insurance against the odds of AROP, those for self-employed and temporary workers-households are significantly greater than 1 in 2007, and much worse in 2014, when the 'self-employed' ratio increases to 3.45 and the 'temporary work' ratio to 2.56 (temporary workers are those suffering the most from the burden of the crisis, see Mussida and Parisi, 2019). Odds for NEET-households is greater than 1 but not statistically significant (likely due to the small number of observations on this feature) in 2007, and significantly improving its position in 2014. This apparently awkward result could stem from the fact that in Southern countries NEET are mostly young individuals living with their (working) parents.

If we look at the household 'work intensity' as defined in section 2, the base category is 'no work intensity' in the household. All the other work intensities (small, high, maximum) have significantly lower than 1 odds ratios in both years, as expected. However, the odds of work intensity worsen substantially in 2014, especially for households with low and medium intensities. These findings confirm that the labor market might have stopped being a stable source of prosperity for many people and their families, after the crisis (Maque Engsted, 2013).

Next, we report results about urbanization and regional development. The risk of those living in a scarcely populated area is 38% higher than the risk of those in an intermediate area, while living in a densely populated area decreases the ratio by 17 percentage points, in 2007. In 2014, the ratio increases slightly in dense areas. Households living in less developed or transitional regions have very high odds to be at risk of poverty, but these odds slightly improve in 2014 (however, Wald tests are not significant).

Special attention deserve the role of the 2007-2013 ESI funds in affecting the risk of poverty in those years.[8] We build dummy variables for those regions receiving funds under ERDF and ESF program. We also build dummies for those regions whose funds fall under the Convergence (Conv) or the Regional Competitiveness and Employment (RCE) target. Again, we build two dummies for HCI priorities. The first one called "Employability" is equal to 1 for those regions receiving funds under themes 62-70 and 80 of Table 2. The second dummy is called "Social inclusion" and includes themes 71-79 of Table 2. Moreover, we calculate the expenditure absorption rates in 2013 and 2014, and use either one as a control variable.

ERDF has a significant odds ratio equal to 0.37, which means that such fund is associated with much lower risk of poverty than ESF, either because it is available to more developed regions or because it helps relatively more at reducing AROP, in 2007. However, the odds

[8] The new cycle of programmed funds 2014-2020 might have an influence too on the predicted probability of being at risk, or on the magnitude and sign of the odds ratios. However, this piece of research will be developed in the next future.

goes up to 0.96 in the subsequent period. In fact, there is no significant difference between ERDF and ESF after the crisis (we control for the level of regional development separately and the absorption rate). The objectives of Convergence or Regional Competitiveness and employment seem not to be different at influencing the odds of poverty. Nonetheless, the type of priorities, for human capital investment, of the financing matters. 'Employability' (Priority1) has an odds ratio equal to 0.96, which means that such priority works just as much as 'Social inclusion' priority (Priority2) at reducing the risk of poverty. In 2014, the odds reduces to 0.89, working (significantly) better than Priority2. Our results about work intensity, employability conditions and employability priority dummy signal that in 2014 the functioning of labor markets had a crucial role in the economic crisis.

Finally, we condition the estimates on country dummies. Only Greece scores higher than 1 odds ratio (with respect to France, the base category) in 2007, and only for Greece this estimate is significant. Italy and Spain see a worrying increase in their odds in 2014.

5.2 Marginal effects

Figure 1 reports the predictive marginal effects of being at risk of poverty conditional on specific covariates. The graphs included in the figure (six graphs for the couple of years 2007 and 2014, for a total of twelve graphs) show the estimated marginal effects on AROP (on the vertical axes) at specific covariates values (on the horizontal axes) before (year 2007, left panel) and after (year 2014, right panel) the crisis. This gives immediate evidence of changes in poverty risk due to the crisis. Indeed, we draw some interesting facts. From the first and second graph, we learn that female heads of household are at a higher risk of poverty than male when they are especially 'single without children', but this holds in general with the exception of the 'married with children' case in 2007. Female heads are at higher risk than

male for every type of household in 2014, and the gap from 2007 widens for single mothers and for married mothers.

If we look at household size (third and fourth graph), the probability of being at risk of poverty increases with the number of less than 15-year old children, in 2007, and it is constantly higher for women than for men. Interestingly, the probability diminishes with size in 2014. The risk of poverty is clearly lower for households with grandparents (elderly above 65) than households with only young members (fifth and sixth graph in Figure 1). If children are present, the risk of poverty becomes higher, and even higher when no grandparents are present. In 2014, however, the presence of the elderly definitely decreases the risk of poverty, especially when children are present.

From the seventh and eight graph in Figure 1, we learn that less developed regions have more than twice the probability to be at risk than more developed regions and about 85 p.p. less than transitional regions. However, in 2014, the risk diminished slightly in both types of regions, relatively to the developed ones.

Families in regions receiving ERDF funds are at lower risk than regions receiving ESF (ninth and tenth graph), if they reside in less developed regions (15 p.p. difference), transitional (15 p.p. difference) and more developed (10 p.p. difference). In 2014, there is no difference in predictive AROP between ERDF and ESF, at any level of development. This means that ERDF is now associated to a higher level of risk, while ESF contributed with lower level of risk (on average in any region).

Finally, we calculated the predictive margin of AROP for objectives of the funds and their priorities. Convergence is associated to a lower probability of being poor than RCE, in 2007. The reverse is true for 2014. The priorities included under ‘Employability’ label deliver lower risk of poverty than ‘Social inclusion’ priorities, in both years.

[TABLE 3 ABOUT HERE]

[FIGURE 1 ABOUT HERE]

Table 3 shows the distribution of cumulative allocations and expenditures of ERDF in 2013 across Southern European countries. The funds are divided by objective. French regions in Europe are eligible for the objective of Competitiveness, while its overseas regions (Guadeloupe, Guyane, Martinica, Reunion) receive funds with the Convergence purpose (we exclude such regions from our sample and not report their allocations either). Greek regions eligible for Convergence are Anatoliki Makedonia, Thraki, Thessalia, Ipeiros, Ionia Nisia, Dytiki Ellada, Peloponnisos, Voreio Aigaio, Kriti (for a map of eligible regions see http://ec.europa.eu/regional_policy/archive/atlas2007/index_en.htm). Italian Calabria, Campania, Apulia and Sicily are eligible for Convergence. Basilicata is eligible as well because it is a transitional region, while the rest of the Italian regions fall under the Competitiveness and employment objective. In Spain, less developed Andalucía, Castilla-La Mancha, Extremadura, Galicia belong to the Convergence target. Region de Murcia, Principado de Asturias, Ceuta and Melilla are also eligible to this target (transitional regions). The rest of the Spanish regions fall under the Regional Competitiveness and employment target.

[TABLE 4 ABOUT HERE]

6. Conclusions

The launch in 2010 of the European platform against poverty and social exclusion, designed to help countries reach the target of lifting 20 million people out of poverty and social exclusion by 2020, is indicative of the importance of addressing the issue of poverty.

This paper analyzes whether the risk of poverty and social exclusion deteriorates with the crisis in France, Greece, Italy, and Spain, and for different categories of households, gender, age, and employment status. The analysis is performed on cross-sectional EU-SILC data for a pre-crisis and post-crisis year, 2007 and 2014, respectively. Moreover, we consider the

effectiveness of European Structural Funds to alleviate poverty, those received by regions of Southern Europe distinguishing by type, objectives and priorities.

We find that in the pre-crisis year, larger households (those having dependent children) have high probability of being at risk of poverty. The economic indicators suggest that the number of employed people in the household, as well as household work intensity reduce the odds. Additionally, we find a role for the type of employment, because a self-employed worker increases much more the risk with respect to being an employee, as well as for the contract type, as a temporary job increases it by almost twice as much as having a permanent contract.

In the post-crisis year, we find that AROP for single without children households is significantly higher than the one for single parent households. However, if the head of household is female, her probability is always higher than male, and worsen in 2014. Interestingly, the distance between female and male of being AROP increases in 2014, notwithstanding the type of household. Additionally, the probability of being AROP declines for larger households (it declines with the number of dependent children) only in the after-crisis year.

We also find that ESI funds are associated to decreasing the risk of poverty in Southern Europe (in particular, ERDF). Targeted funds towards human capital investment are important, especially when priority is given to 'employability' projects, but the crisis slowed down the effect of such objectives as developing life-long learning systems within firms or promoting and supporting entrepreneurship and start-up, specific work skills, encouraging active aging and prolonging working lives. Again, according to our results, attention has to be paid to improving access to employment of women and to reconcile work and private life, such as facilitating access to care for dependent persons.

To conclude, the analysis provides evidence of important AROP rates in all countries, with Greece, Italy, and Spain showing stronger poverty rates than France. The impact of the

economic recession was heterogeneous across population categories and household types. On the one hand, the situation deteriorated with the crisis for temporary workers, single households without children, and female-headed households. On the other hand, the risk of poverty decreased for larger households with dependent children and with the presence of elderly members. The new cycle of programming funds 2014-2020 might have an influence on poverty reduction for disadvantaged categories. However, we postpone this additional research for the next future.

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Table 1. At risk of poverty rates by country, year and household type

	household type									
Country	***single***		***single with kids***		***married***		***married with kids***		***total***	
	2007	***2014***	***2007***	***2014***	***2007***	***2014***	***2007***	***2014***	***2007***	***2014***
France	18.7	18.8	28.6	34.4	10.2	7.4	12.7	14.1	18.8	18.1
Greece	24.6	22.4	29.6	37.2	20.5	13.1	24.6	25.7	29.3	35.7
Italy	27.7	23.6	33.1	35.3	15.1	13	26.2	25.2	25.9	28.5
Spain	32.7	19.2	34.6	38	19.1	14.8	28	27	24	27.3

Source: Authors' calculations using 2007 and 2014 EU SILC data.

Table 2. Regional Operating Programs targets by level of development, theme and selected priorities.

ERDF – ESF	**Regions**	**Regional GDP**	**Activities of interest**				
Convergence	Less-developed	<75% of EU27 average	HCI	SI	A2E	PP	SIC
RegionalC&E	Transition/more-developed	≥75% of EU27 average	HCI	SI	A2E	PP	
Financing	**Theme**		**Codes**	**Priorities**			
Human Capital	Increasing the adaptability of workers and firms, enterprises and entrepreneurs		62-64	Priority1 (Employability)			
	Improving access to employment and sustainability		65-70				
	Improving the social inclusion of less-favored persons		71	Priority2 (Social inclusion)			
	Improving human capital		72-74				
	Investment in social infrastructure		75-79				
	Mobilization for reforms in the fields of employment and inclusion		80	Priority1 (Employability)			

Note: Regulation EU n.1303/2013 Art. 90(2) and European Commission, Geography of Expenditure, 2015. The priority themes refer to the 2014 cumulative expenditures of the ERDF and CF funds. HCI = Human Capital Investment, SI = Social Inclusion, A2E = Access to Employment, PP = Promoting partnership, SIC = Strengthening Institutional Capacity.

Table 3. ERDF allocation across countries and objectives, 2013. Million euro.

		ERDF (+CF)					
Country	**Objective**	**Cum. Allocated funds**		**Cum. Expenditures**		**Absorption rate**	
		total	HCI	total	HCI	total	HCI
France	Competitiveness	5289.14	423.77	3081.41	256.21	58.3	60.5
Greece	Convergence	21699.36	2769.49	9968.20	1143.50	45.9	41.3
Italy	Competitiveness	3232.77 (15.26)	288.021 (8.64)	1917.61 (18.76)	130.58 (13.72)	59.3	45.3
	Convergence	17957.09 (84.74)	3044.84 (91.36)	8304.65 (81.24)	821.24 (86.28)	46.2	27.0
Spain	Competitiveness	3978.845 (24.71)	284.87 (19.2)	3321.19 (20.67)	234.49 (18.2)	83.5	82.3
	Convergence	12124.68 (75.29)	1199.54 (80.8)	12747.51 (79.33)	1051.74 (81.8)	105.1	87.7

Note: Based on NUTS2 regional programs. Excluding the programs with multi-objectives (Europact in France, Regional multi-objective programs in Greece, Programa Operativo FEDER de Investigación, Desarrollo e innovación por y para el beneficio de las Empresas - Fondo Tecnológico, Programa Operativo de asistencia técnica y gobernanza and Programa Operativo FEDER de Economía basada en el Conocimiento in Spain). Excluding oversea territories of France (which receive funds for Convergence). Accumulated financing up to 2013. HCI = Human Capital Investment.

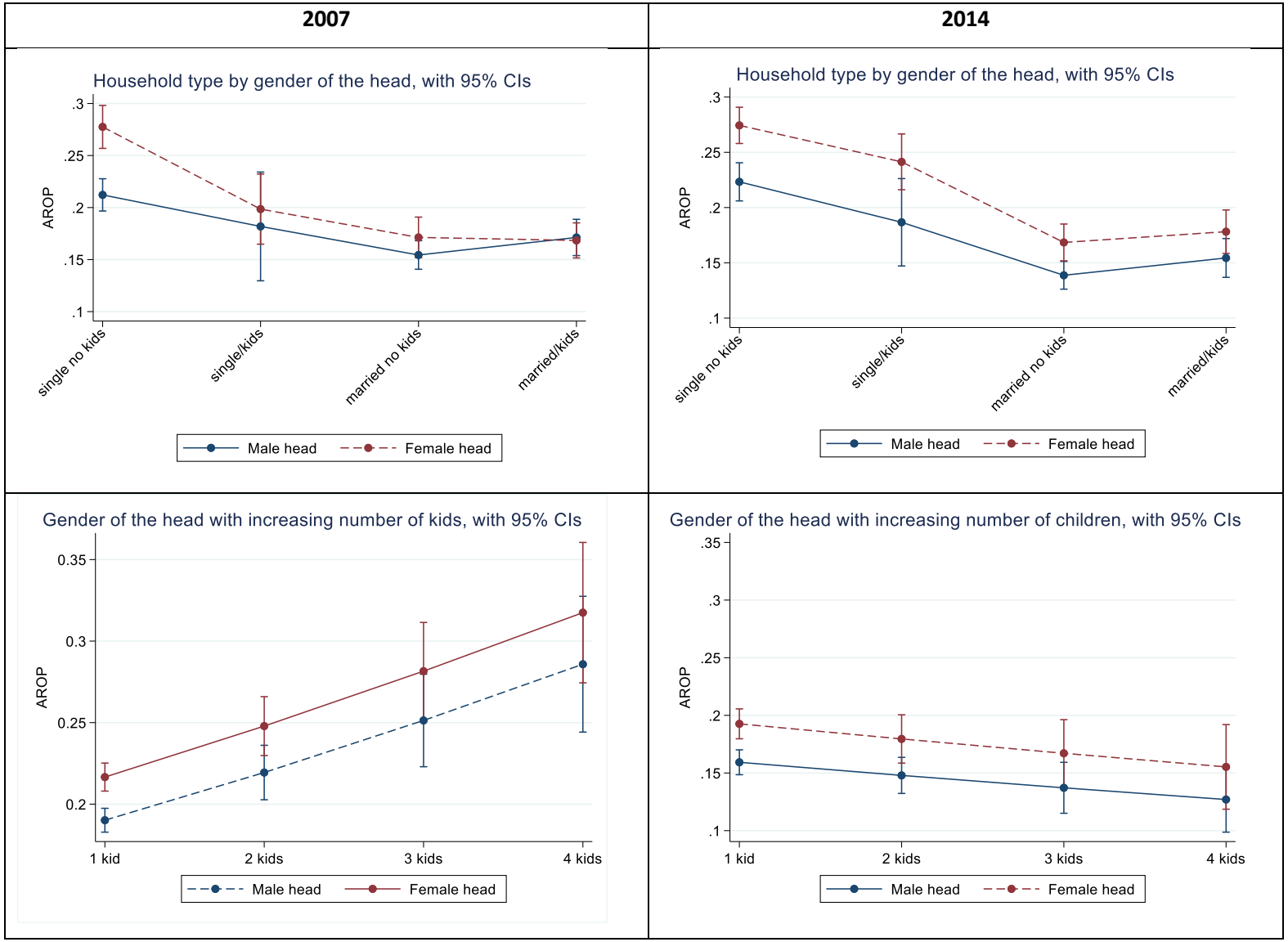
Table 4. Odds ratio of being At-Risk-of-Poverty in Southern European countries

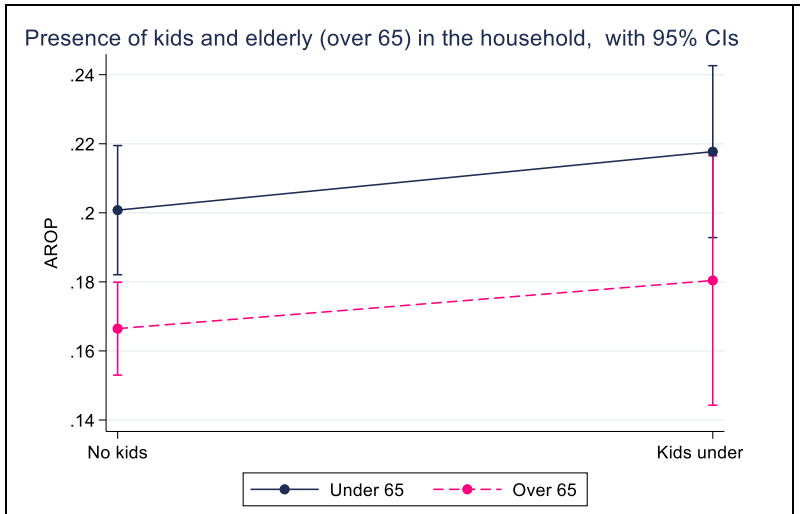
	2007		2014		Wald test
HH type (single with kids)	**ϕ**	**s.e. cluster**	**ϕ**	**s.e. cluster**	
single no kids	1.26	0.28	1.34	0.23*	0.794
married no kids	0.79	0.18	0.64	0.12**	0.357
married with kids	0.92	0.17	0.75	0.12*	0.265
Other HH features					
size	1.05	0.04	1.35	0.04***	0.000***
# kids<15	1.16	0.07***	0.90	0.04**	0.001***
Interaction kids<15*elderly>65	**(no kids; no elderly)**				
no kids; elderly	0.76	0.08***	0.52	0.02***	0.000***
kids; no elderly	1.14	0.11	0.94	0.08	0.191
kids and elderly	0.85	0.14	0.42	0.06***	0.000***
# disabled	1.14	0.03***	1.10	0.03***	0.303
homeowner	0.65	0.02***	0.46	0.03***	0.000***
mean age	0.98	0.01**	0.97	0.00***	0.000***
Gender (male)					
female head	1.14	0.24	1.53	0.25***	0.194
Gender by HH type					
female single no kids	1.35	0.30	0.94	0.14	0.135
female married no kids	1.02	0.22	0.87	0.15	0.535
female married with kids	0.86	0.18	0.81	0.15	0.823
Urbanization (intermediate)					
dense	0.83	0.03***	0.89	0.04***	0.073*
sparse	1.38	0.09***	1.28	0.06***	0.285
Economic conditions					
# employed	0.52	0.03***	0.23	0.01***	0.000***
# self-employed	2.77	0.21***	3.45	0.19***	0.019**
# temporary	1.63	0.12***	2.56	0.11***	0.000***
# NEET	1.13	0.32	0.76	0.05***	0.180
low work intensity	0.49	0.03***	0.91	0.07	0.000***
high work intensity	0.25	0.03***	0.46	0.04***	0.000***
max work intensity	0.20	0.03***	0.26	0.02***	0.117
Level of regional development					
Less	2.45	0.21***	2.13	0.42***	0.173
Transition	1.94	0.19***	1.74	0.11***	0.349
Policy					
ERDF	0.37	0.20**	0.96	0.89	0.380
RCE objective	1.06	0.12	0.94	0.08	0.279

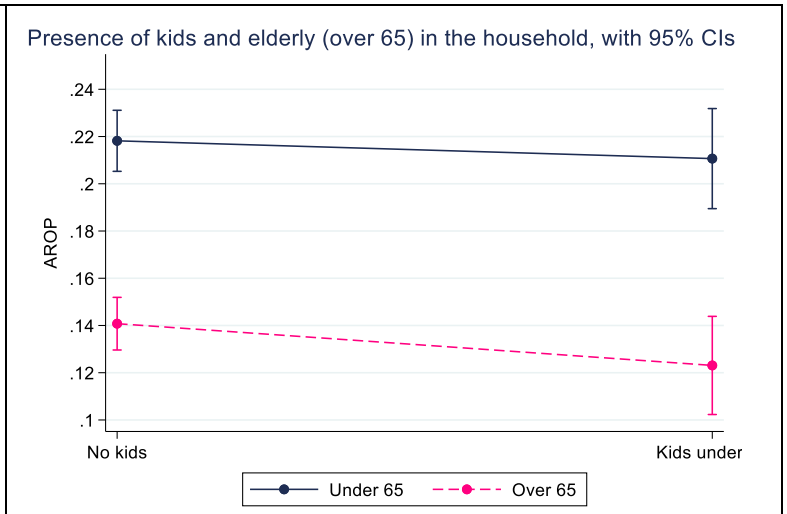
Employability priority	0.96	0.09	0.89	0.06**	0.696
Absorption rate	0.96	0.11	0.92	0.09*	0.803
Country (France)					
Greece	1.31	0.15**	1.05	0.12	0.126
Italy	0.64	0.33	1.82	1.71	0.334
Spain	0.76	0.40	1.53	1.42	0.490
Constant	1.89	1.30	2.65	2.60	0.827
Pseudo R^2	0.165		0.213		
Observations	49,410		51,461		

Note: Base categories in parentheses. Dark gray color means worsening odds, light gray color means better odds. ERDF=1 region receives that fund; =0 it receives ESF. RCE=1 under 'Regional Competitiveness and employment'; =0 under 'Convergence'. Employability=1 the fund finances priorities 62-70 & 80 in Table 3; =0 the fund finances priorities 71-79 (Social inclusion). Source: Authors' calculations using 2007 and 2014 EU-SILC data, and ESI Funds 2007-2013, Eurostat.

Figure 1. Predictive margins of AROP (vertical axes) conditional on specific covariates (horizontal axes), with 95% confidence intervals




Presence of kids and elderly (over 65) in the household, with 95% CIs
AROP
.24
.22
.2
.18
.16
.14
No kids
Kids under
Under 65
Over 65


Presence of kids and elderly (over 65) in the household, with 95% CIs
AROP
.24
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.18
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.14
.12
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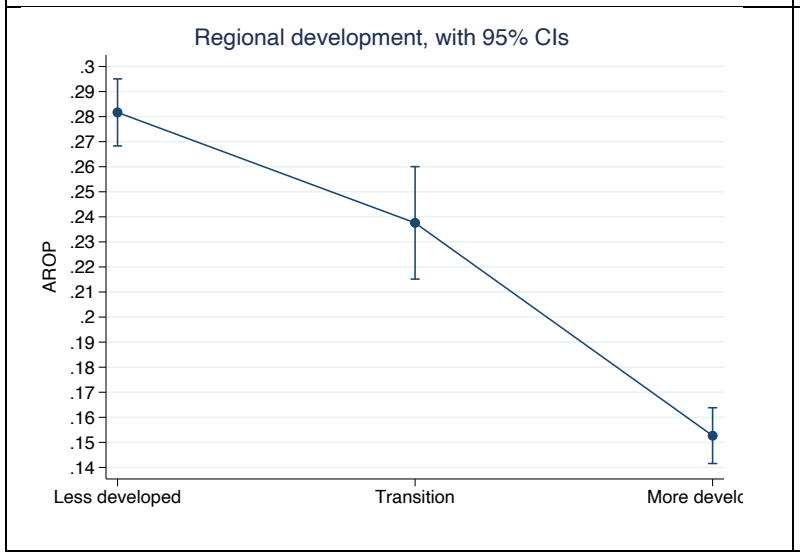
No kids
Kids under
Under 65
Over 65


Regional development, with 95% CIs
AROP
.3
.29
.28
.27
.26
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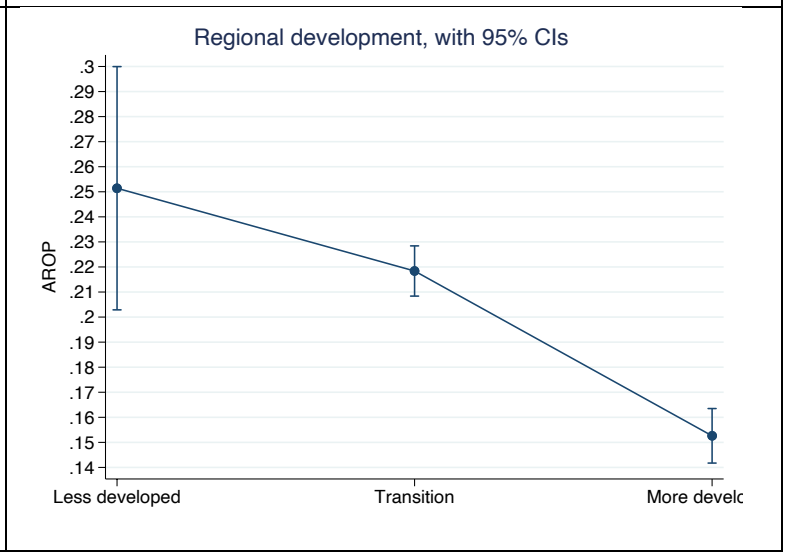
Less developed
Transition
More develc


Regional development, with 95% CIs
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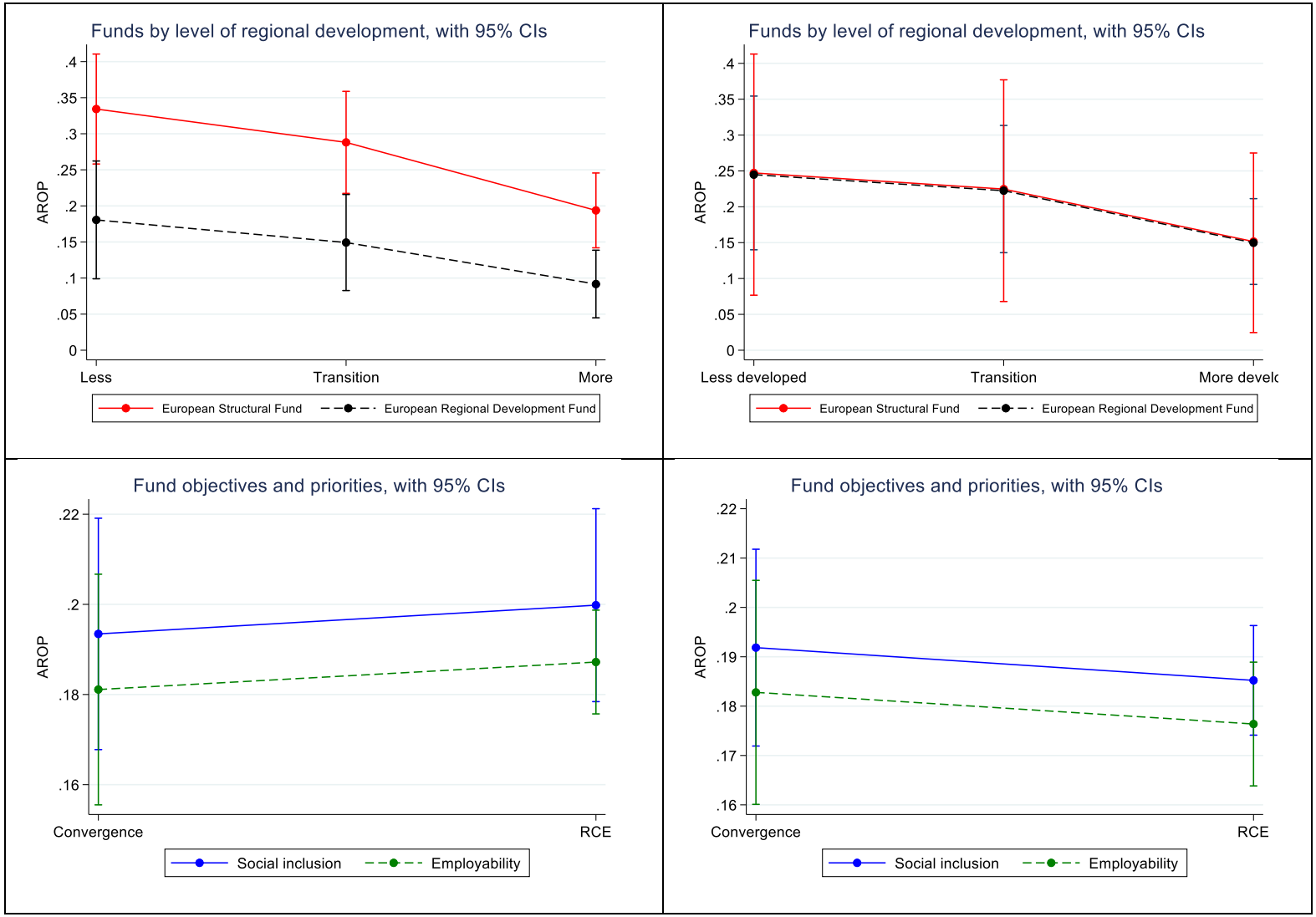
Less developed
Transition
More develc



Note: the label RCE in the bottom graphs is for the objective (and priority) Regional Competitiveness & Employment.
Source: Authors' calculations using 2007 and 2014 EU SILC data.

Appendix A. Additional tables and figures

Table A1. Household type by gender of the head (%)

	2007		2014	
France	male head	female head	male head	female head
single	38.00	62.00	38.10	61.90
single with kids	21.40	78.60	23.40	76.60
married	70.10	29.90	70.10	29.90
married with kids	77.30	22.70	72.30	27.70
Greece				
single	33.50	66.50	37.60	62.40
single with kids	11.50	88.50	21.40	78.60
married	73.50	26.50	71.60	28.40
married with kids	81.60	18.40	73.50	26.50
Italy				
single	38.50	61.50	39.70	60.30
single with kids	15.60	84.40	12.30	87.70
married	71.60	28.40	70.10	29.90
married with kids	81.20	18.88	78.45	21.55
Spain				
single	34.90	65.10	39.30	60.70
single with kids	12.10	87.90	14.10	85.90
married	73.30	26.70	67.60	32.40
married with kids	79.20	20.80	69.00	31.00

Source: Authors' calculations using 2007 and 2014 EU SILC data.

Table A2. Summary statistics

	(1)2007		(2)2014	
Dependent variable	**mean**	**s.d.**	**mean**	**s.d.**
AROP	0.189	0.391	0.182	0.386
HH type				
single	0.238	0.426	0.266	0.442
single with kids	0.032	0.467	0.036	0.455
married	0.407	0.491	0.414	0.492
married with kids	0.323	0.467	0.283	0.451
Other HH features				
size	2,590	1.315	2,448	1.278
n. kids<16	0,414	0.785	0,367	0.753
n. disabled	0,510	0.711	0,545	0.723
homeowner	0.870	0.337	0.760	0.427
mean age	47,840	19.578	50,358	19.444
Interaction kids<15*elderly>65				
no kids; no elderly	0.382	0.488	0.398	0.491
no kids; elderly	0.356	0.472	0.370	0.483
kids; no elderly	0.249	0.432	0.221	0.415
kids and elderly	0.013	0.114	0.011	0.105
Work intensity				
No	0.344	0.475	0.402	0.490
Low	0.214	0.410	0.127	0.333
Medium	0.300	0.458	0.241	0.427
Max	0.142	0.349	0.231	0.421
Gender (male)				
female head	0.355	0.478	0.392	0.488
Gender by HH type				
female head single	0.150	0.357	0.163	0.369
female head single with kids	0.671	0.255	0.637	0.238
female head married	0.114	0.318	0.126	0.331
female head married with kids	0.065	0.246	0.074	0.262
Urbanization				
Sparse	0.279	0.449	0.308	0.462
Intermediate	0.313	0.460	0.273	0.443
Dense	0.408	0.492	0.419	0.493

Economic conditions				
# employed	1,282	1.131	0,865	0.867
# self-employed	0,275	0.579	0,186	0.461
# temporary	0,154	0.419	0,110	0.346
# NEET	0,003	0.054	0,150	0.429
no hh work intensity	0.344	0.475	0.402	0.490
low hh work intensity	0.214	0.410	0.127	0.333
medium hh work intensity	0.300	0.458	0.241	0.427
max hh work intensity	0.142	0.349	0.230	0.421
less developed region	0.070	0.256	0.077	0.267
transition region	0.279	0.448	0.281	0.450
more developed region	0.651	0.477	0.642	0.469
Policy fund				
ERDF	0.327	0.469	0.387	0.487
Objective				
Regional Competitiveness and Employment	0.826	0.379	0.800	0.400
Priority				
Employability	0.653	0.476	0.689	0.463
Absorption	0.154	0.314	0.193	0.314
Country				
France	0.212	0.409	0.220	0.414
Greece	0.114	0.318	0.167	0.373
Italy	0.424	0.494	0.381	0.486
Spain	0.249	0.432	0.231	0.422
Observations	49,410		51,461	

Source: Authors' calculations on 2007 and 2014 EU-SILC data.