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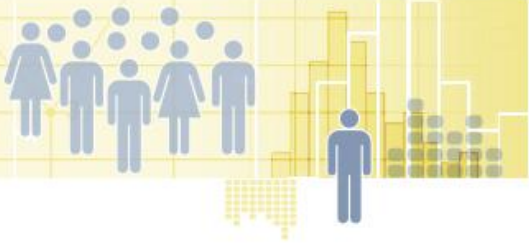

EQUALITAS Working Paper No. 14

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2013

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Abstract

The effectiveness of anti-poverty programs depends on whether they raise the incomes of poor households. This involves an adequate measurement of poverty and appropriate approaches for defining poverty lines. This paper analyzes the extent to which poverty measures are sensitive to alternative ways for adjusting national lines by spatial price differences. First, we analyze how moving from national to regional poverty lines has an impact on the incidence and intensity of poverty. Second, we try to show how poverty patterns vary with alternative definitions of poverty thresholds. Using data from Spanish regions, our results show that regional levels of poverty change with each threshold and the orderings of regions do not remain robust to the choice of poverty lines. We also show that re-rankings are more relevant in explaining differences in the regional distribution of poverty than gap-narrowing effects when a region-specific poverty line is used. A second finding resulting from probability models and decomposition methods is that poverty profiles vary as different lines are used. In general terms, our findings give general support to the notion that poverty policies that do not address the problem of spatial price differences might yield relevant assignment errors.

Keywords: regional poverty lines, spatial price differences, poverty profiles, targeting.
JEL: I32, R13

1. INTRODUCTION[1]

In many countries, state provision of a minimum level of resources is a corner-stone of the social model and the different social protection systems must make provision not only for an adequate measurement of poverty but also for the monitoring and evaluation of poverty reduction policies. The adequate measurement of poverty has therefore become a subject of increasing concern to analysts and policy-makers alike. The effectiveness of anti-poverty programs depends on whether the programs do, in fact, raise the incomes of the low-income population. However, as stressed by Ben-Shalom *et al.* (2013), the magnitudes of their effects are not obvious. It is possible that some benefits go to non-poor families and another distributional question is whether the programs lower poverty disproportionately among some demographic groups leaving others relatively underserved.

The wide range of identification and aggregation procedures has given rise to an extensive literature examining different approaches. There remains, however, considerable debate around some key issues. Among the different options, the setting of poverty lines can impact greatly upon the measures obtained and, consequently, upon the inferences drawn for policy (Ravallion, 2001). When measuring the impact of programs on poverty, an overall conceptual issue is whether any single arbitrary line should be used. While a poverty line helps focus the attention of governments and civil society on the living conditions of the poor, in practice there is typically not one monetary poverty line but many, reflecting the fact that poverty lines serve distinct roles (Ravallion, 1998).

Much of the literature on poverty lines and antipoverty policies remains wedded to measuring poverty based on spatial price differences. In many countries, the vastly different socio-economic environments of regions might yield a variety of price levels. As stated by Deaton and Dupriez (2011), there are good grounds for suspecting that price levels differ across regions. According to the Balassa-Samuelsson theorem we would expect prices to be lower in poorer areas within countries, at least if people are not completely mobile across

[1] Luis Ayala acknowledges financial support from the Ministerio de Ciencia e Innovación (ECO2010-21668-C03-01). Antonio Jurado and Jesús Pérez-Mayo acknowledge financial support from the Junta de Extremadura and European Regional Development Fund (ERDF) (PRI08A137).

space. Therefore, adjusting for prices differences could affect both the poverty rate itself and its geographical distribution. Furthermore, it might also affect the way funding for social protection is territorially targeted, especially since, in many countries, the responsibility for such anti-poverty alleviation strategies and targeted transfers has been increasingly transferred from national to regional governments. Using a fixed nominal poverty line across a country with great diversity might yield remarkable inequity losses. This policy strategy implicitly assumes that social needs are not associated with spatial price differences and no kind of heterogeneous treatment should be given to individuals facing higher local prices. Households with the same income level living in territories with different prices would receive the same level of benefits.

There are different examples of how adjusting poverty thresholds would alter the distribution of Central Government funds. In the United States, the formula used to determine state level funding for the SCHIP program includes estimates of the number of children in families with low-income –below 200 percent of federal poverty thresholds. Nelson and Short (2003) illustrated that since thresholds increase in areas with higher than average prices and fall in areas with lower than average prices, the number of children considered low-income would increase in higher cost areas and decrease in lower cost areas. If thresholds were adjusted to account for differences in prices, funds would flow toward high cost areas and away from low cost areas.

The need for more accurate methods of addressing the problem of spatial price differences has been met by a wide range of approaches. Most consider housing prices as the key variable for adjusting geographical disparities. In the United States, the National Academy Panel on Poverty and Family Assistance (Citro and Michael, 1995) recommended that local prices levels be approximated by using indexes of house prices across space. A rapidly expanding literature has focused on this proposal provided evidence that when these prices are taken into account to define real incomes, poverty incidence and patterns change drastically across regions (Short *et al*., 1999, Aten *et al*., 2011, Renwick, 2011, Early and Olsen, 2013). In general terms, poverty is higher in metropolitan than in other areas when region-specific poverty lines adjusted by housing prices are applied (Jollife, 2006, Mogstad

et al., 2007). As shown by Moretti (2010), skilled workers are overrepresented in metropolitan areas that have a high cost of housing, while unskilled workers are overrepresented in metropolitan areas that have low cost of housing.

While there are convincing arguments in favor of housing prices as a proxy for regional prices differences, the implicit assumption that the prices of all other goods have no spatial variation greatly complicates the analysis. There is a need, therefore, to build a set of prices based on a broader bundle of goods and services representative of the purchases of consumers in different regions. Unfortunately, in many countries there are no cross-sectional data available on regional purchasing power parities (PPPs), but only time series of regional price indexes. Whereas some studies have examined the case where prices of housing and those of other goods are correlated (Jollife, 2006), we still have relatively little insight into what effects regional price differentials might have on poverty.

A second challenge for the appropriate assessment of the effectiveness of anti-poverty programs taking into account territorial differences is that there are many dimensions of poverty that are rarely covered by this strand of the literature. Adjusting poverty thresholds for spatial price differences may yield very different results in terms of poverty incidence, intensity and composition. Standard analyses have paid special attention to re-rankings of regional poverty rates. There is a need, however, for research that provides a more complete picture of the effects such adjustments might have not only on the geographical distribution of poverty but also on the overall changes in the aggregate measures of poverty. This should include changes over time, in incidence and intensity and in poverty profiles.

This paper tests the extent to which poverty results are sensitive to alternative ways of adjusting national lines by spatial price differences using data for Spanish regions. In general terms, it aims at providing a general picture of the proper identification of who are the poor using alternative poverty lines. The principal reason for choosing Spain is that the extent of regional differences and the scope of territorial decentralization make it a very singular experience among OECD countries. The paper has two objectives. The first is to

discuss how sensitive regional poverty measures are to alternative thresholds adjusted for regional price differences.[2] We analyze how a regional focus may affect regional poverty rankings and the geographical distribution of poverty. Secondly, we attempt to show how poverty patterns vary accordingly with these alternative definitions of the poverty threshold.

Our paper advances knowledge in a number of respects. Firstly, we propose new poverty lines adjusted for price differences by means of specific purchasing power parities for each region. Secondly, we provide a more comprehensive set of results, including both regional re-rankings and changes in the incidence and intensity of poverty rates. Thirdly, we extend the analysis of poverty profiles by using both alternative probability models and poverty decomposition methods.

Our results give general support to the notion that regional poverty levels change with each threshold and that regional rankings do not remain robust to the choice of the poverty line. The regional distribution of poverty changes radically when region-specific rather than national poverty lines are used. We also show that re-rankings are more relevant than gap-narrowing effects in explaining differences in the distribution of poverty rates when such region-specific rather than national poverty lines are used. Another important finding is that poverty profiles vary as different lines are used. Marginal effects differ most acutely in the case of regional thresholds and when incomes are adjusted for housing costs and imputed income. These findings give general support to the notion that poverty policies that do not address the problem of spatial price differences might yield relevant assignment errors.

The paper is organized as follows. In Section 2 we revise the literature on regional poverty thresholds and discuss the various alternative approaches to adjusting poverty lines for spatial price differences. Section 3 describes the data used in the analysis. In Section 4 we analyze the sensitivity of regional poverty rates to different thresholds accounting for

[2] The paper focuses more on spatial price indices than on cost-of-living indices. As stated by Deaton (1998), there are some important differences between the two approaches. Spatial Price Indices do only account for differences in prices levels across regions while cost-of-living indices include more dimensions related to individual well-being. Furthermore, the rate of growth of the Consumer Price Index, in some sense, likely overstates the rate of increase of the cost of living, suitably defined.

spatial price differences. Section 5 tests how poverty patterns change when alternative regional poverty lines are used. Section 6 concludes.

2. POVERTY LINES AT DIFFERENT LEVELS OF TERRITORIAL DISAGGREGATION

2.1. Poverty lines

In the prototypical approach to the measurement of poverty a central question is that of the predetermined poverty line. Once a cut-off point is selected there are straightforward procedures for ascertaining the poverty levels associated with an income distribution. Following Atkinson (1987), consider an income distribution that can be described by a cumulative distribution function $F(y)$, $y \in [o,\infty)$. Assume that the c.d.f. is strictly monotonically increasing and that the first and second moments exist. The poverty line is a positive constant z. A poverty index is a function $\wp(F,z)$ that is increasing in poverty, defined on F and $z \in Z$, where Z is the set of poverty lines.

The head count measure or percentage of the population who are poor is given by

$$H = \int_0^z F(y)dy, \tag{1}$$

This measure provides a direct estimate of the incidence of poverty. A complementary dimension is the intensity of poverty. The normalized poverty deficit that measures the intensity of poverty is defined as

$$D = \int_0^z \left(1 - \frac{y}{z}\right) F(y)dy\,, \tag{2}$$

These poverty measures may provide a set of results both in terms of the incidence –headcount index– and intensity –normalized poverty deficit– of poverty. However, they are largely dependent on the options adopted in choosing a poverty threshold. Central among these options is the classical dilemma between absolute and relative poverty lines. For the

sake of simplicity, in this paper we restrict ourselves to the most commonly used definition of relative poverty. These are poverty measures based on a poor standard of living or an income below a certain percentage (γ) of median income

$$z = \gamma\mu(y) \tag{3}$$

where $\mu(y)$ is median income. This approach bases the poverty line on the distribution of income.

If a relative approach is chosen, it must be decided if a local or a national relative standard is used to define poverty. As stressed by Jesuit *et al.* (2003), 'using a local relative standard takes into account whatever variations in the cost of living are relevant *and* relevant differences in consumption, *and* relevant differences in social understanding of what consumption possibilities mean for social participation and related social activities'. On the other hand, a national-relative standard is sensitive to the wealth of a region relative to the national standard. This means that using one or the other will greatly influence the results obtained yielding alternative assignments of social transfers. National lines allow us to establish a general scheme of how regions compare with national standards. The resulting regional rankings will be conditioned by their relative wealth. In contrast, regional poverty lines allow us to gauge intraregional poverty by spatial price differences. Prior research has shown that relative differences are greater within nations than between nations (Kangas and Ritakallio, 2007). Therefore, failing to allow for price differences between regions might produce biased estimates of poverty and less effective targeting of poor households.

There is not, however, a clearly defined strategy to address the problem of how to set regional poverty lines based on price differences. One popular approach is the aforementioned procedure of using regional poverty lines directly. In doing so, it is assumed that the regional standard approximates much better, although not perfectly, the community standards for social standing. Recently, new approaches have challenged this underlying assumption. Several arguments have been put forward to suggest that poverty

lines should take intraregional price differences into account. An examination of these differences can yield important insights into the geographical distribution of poverty.

2.2. Poverty lines and spatial price differences: a review

Adjusting poverty lines for spatial price differences implies a precise definition of the poverty threshold and an appropriate index of local prices to deflate it. Recent literature has seen a growing debate around the appropriateness of specific poverty lines. A number of studies have looked at different housing price indices as proxies for local prices under the usual assumption of no variation in the prices of other goods.

Jollife (2006), for instance, proposed an experimental index developed by the U.S. government that uses Fair Market Rent (FMR) data to adjust for geographical differences in the cost of living.[3] Adjusting poverty rates with the FMR index completely reverse the metropolitan and non-metropolitan poverty profile. Renwick (2009) estimated the impact on regional poverty rates of controlling for variation in prices based on three alternative price indices and two of them were based on alternative measures of the variation in the cost of housing (Fair Market Rents and median gross rents). Moretti (2010) calculated a consumer price index that allows for variation in housing costs across metropolitan areas. The index was defined as the properly weighted sum of local housing costs and non-housing consumption, assigning the cost of housing to residents in a metropolitan area based on the relevant average monthly rent.[4] Earley and Olsen (2013) introduced adjustments based on a more refined consumer price index at the lowest level of geography using a hedonic regression to construct the housing price index.[5] Controlling for variations

[3] The purpose of the FMR is to determine eligibility of rental housing units for the Housing Assistance Payments program. The index is constructed as a fixed-weight index consisting of two components and assigns a weight of 44 percent for housing expenses and 56 percent on all other goods and services.

[4] The local consumer price index (CPI) computed in this way for city a in year t was a weighted average of housing cost (HP_{at}) and non-housing costs (NHP_{at}): $CPI_{at} = wHP_{at} + (1 - w)NHP_{at}$, where w is the CPI weight used for housing. Non-housing costs can be divided into two components: $NHP_{at} = \pi HP_{at} + v_{at}$, where πHP_{at} is the component of non-housing costs that varies systematically with housing costs; and v_{at} is the component that is orthogonal to housing costs. If $\pi > 0$ it means that cities with higher cost of housing also have higher costs of non-housing goods and services.

[5] The housing price index is based on data on the rent received by the landlord plus tenant paid utilities and numerous housing, neighborhood, and location characteristics of more than 440,000 units occupied by families in HUD's Section 8 housing voucher program throughout the United States.

in prices increases the rates of poverty for groups living disproportionately in higher cost areas.

Although the bulk of this literature has almost exclusively focused on the U.S., similar adjustments have also been developed for some European countries. Mogstad *et al.* (2007) used housing prices in Norway in order to test the sensitivity of poverty results to specific local poverty lines. They used the price per square meter for detached houses sold in each municipality.[6] According to their results, both the geographic and demographic distribution of poverty are shown to depend heavily on whether regional or national poverty thresholds are used. As might be expected, the results demonstrate that the analysis of poverty based on national thresholds produces downward biased poverty rates in urban areas and upward biased poverty rates in rural areas.

Despite the promising results of these studies, many important questions remain. The assumption that non-housing goods have no spatial price variation is a contentious issue. Additional work needs to be done to build a set of prices for a broader bundle of goods and services representative of the purchases of consumers in different territories. Unfortunately, in many countries there are no cross-sectional data available on regional purchasing power parities, but only time series of regional price indexes. One alternative is to set a predetermined level of correlation between housing prices and those of the other goods.[7]

The most direct approach to address this issue is defining specific poverty lines using local PPPs. However, there are many theoretical and empirical obstacles to this approach. Few countries have managed to solve the task of establishing an adequate bundle of items for each region. The biggest problem in selecting items is the conflict between comparability and representativeness (Ahmad, 2003). Items that are representative in a region may not be

[6] They divided the municipalities into quartiles according to their average housing price per square meter. The first quartile consisted of the 25 per cent of the municipalities with the lowest average price per square meter, while the fourth quartile included the 25 per cent with highest prices. Next, they divided the municipalities into three groups corresponding to their quartiles. The first quartile was given the characteristic of low housing prices, the second and third quartiles were denoted medium housing prices, while the fourth quartile was denoted high housing prices. By combining the three housing price categories with 7 regions, 21 groups were constructed.

[7] Jollife (2006) assumed a ρ=0.2 to impose spatial variation in these prices.

comparable, and comparable items may not be representative. If items are not comparable, comparisons cannot be made; if they are not representative, results may be misleading.

Despite these constraints, some researchers have attempted to answer the question of how to construct regional PPPs for poverty measurement (Prasada Rao, 2003). Firstly, since PPPs are essentially spatial price index numbers for comparisons across regions, it is necessary to collect data on prices paid by the poor. Secondly, data on shares of expenditure that reflect the consumption patterns of the poor are required. Thirdly, both the prices and weightings of data from different regions need to be aggregated using a suitable index number methodology that can result in a set of PPPs.

Prasada Rao (2003) estimated these PPPs for Ethiopia, finding that poorer households face slightly lower prices and this difference could be even lower if it were possible to make adjustments for differences in the quality of the items consumed. Coondoo, Majumdar and Ray (2003) estimated regional consumer price differentials and differences in prices paid by poor and non-poor households in rural and urban India. In rural and urban South and Western India, poorer households generally pay higher prices than households above the poverty line. Aten and Menezes (2002) also used adjustment methods for poverty PPPs and estimated them for different income groups in eleven Brazilian cities. The data were based on detailed household expenditure surveys under approximately 40 headings in each of the eleven cities. Their results showed that the prices levels for low income groups in some cities were above the national average. In the United States, Renwick (2009) considered alternative poverty thresholds using the aforementioned data from the U.S. Department of Housing and Urban Development's Fair Market Rents (FMR) and Regional Price Parities (RPP) estimated by the Bureau of Economic Analysis. Using the RPP instead of the FMR index generated statistically significant differences in the poverty rates for every state. The RPP index resulted in higher poverty rates 14 states and lower poverty rates in 35 states.

This brief overview supports the notion that the level and composition of poverty might be radically affected by adjustments made in the poverty line in order to account for spatial price differences across regions. There is, however, no unique formula for making these

adjustments. What we set out to do here is to test the sensitivity of poverty results to different adjustments for region-specific poverty lines, poverty lines adjusted by regional PPPs, and alternative thresholds adjusted by housing costs in each region.

3. DATA AND POVERTY LINES

3.1. Data

In this paper we use the Spanish sample from the 2009 EU Survey on Income and Living Conditions (EU-SILC). The main aim of EUROSTAT in creating this database was to achieve comparability of results from different European Union Member States. More precisely, it was intended as a source for allowing income distribution and social exclusion to be compared within the European context. In order to achieve this, the data gathering, coding and weightings systems were harmonized as much as possible. The Spanish sample consists of 13,000 households comprising information for approximately 37,000 individuals.

The design of the Survey on Income and Living Conditions allows to gather detailed information on each household member's income along with material and demographic conditions, financial situation in a wider sense, working life, housing situation, social relations, health and biographical information of respondents. The survey also offers housing and demographic data at both a regional and national level. The richness of the data allows us to create both national and regional databases on income and poverty. It provides territorial disaggregation for NUTS-2 regions, which constitute the ideal unit of analysis to study territorial differences in Spain since this one is the geographical division corresponding to the current level of territorial decentralization (Autonomous Communities). In the Spanish case, one of the main goals of the new survey was providing data statistically representative at that level. The prior harmonized European survey – European Community Household Panel– provided data at a more aggregate level of

geography.[8] However, it must be noted that results obtained for the smallest regions in EU-SILC should be interpreted with caution due to their reduced sample size (see Annex 1). [9]

We take households as the reference unit for the analysis of poverty. The income variable we use is annual disposable income. EU-SILC data refer to income for the previous year. It includes all household monetary income after direct taxes and social security contributions: earnings, cash property income, regular social transfers, private transfers and other cash income. It does not include in-kind earnings or imputed rents. This variable is adjusted for each household by the so-called modified OECD equivalence scale.[10]

3.2. Region-specific poverty lines

In order to test the sensitivity of both the incidence and intensity of poverty to alternative regional thresholds we consider four different poverty lines:

- First, we use a national poverty threshold common for each region using a relative approach –60 per cent of national median income– (z_N).
- Second, we use regions as the reference group and compute specific poverty lines for each region (z_R).
- Third, we estimate new poverty lines adjusting for household disposable income using regional purchasing power parities (z_{PPP}).
- A fourth poverty line takes into account housing costs and imputed incomes (z_{HI}).

Regarding the third poverty line, there is not at present any reliable official estimate of these PPPs. The National Institute of Statistics (INE) provides monthly data on the evolution of prices in each region. However, this does not allow us to gain much insight into absolute differences in purchasing power across the Spanish regions. To overcome this

[8] Northeast, Madrid, Central, Eastern, Southern, Canary Islands.
[9] Ceuta and Melilla have been dropped from the sample because the number of available observations is too small.
[10] The modified OECD equivalence scale assigns a value of 1 to the first adult in the household, 0.5 to each other adult, and 0.3 to each child.

problem we use a special survey conducted by the INE on regional price differences in 1989.

This survey was carried out at the behest of the Statistical Commission of the European Union. The survey provides information on the prices of 333 goods and services. The results appeared in Lorente (1992). Some researchers have used this survey to update regional prices with monthly data on the evolution of regional prices (Lorente, 1992, López i Casasnovas and Padró i Miquel, 2000, Ayala *et al.*, 2001, López-Bazo and Motellón, 2009). We adopt a similar procedure to estimate regional PPPs. The parity for each region *i* at a given moment *t* is

$$PPP_i^t = \frac{p_i^0 \lambda_i^t}{p_N^0 \lambda_N^t} \tag{4}$$

where p_i^0 and p_N^0 are, respectively, the price level in each region and the national average in the first year ($p_N^0 = \Sigma P_i \phi_i$, where ϕ is the weight for each region) and λ^t_i, λ^t_N, represent changes in inflation both in each region *i* and the national average. We use these PPP to produce a poverty line for each one of the regions adjusting the national poverty line (z_N) by the corresponding PPP_i.

Regarding the fourth line, rather than considering external sources we draw information on housing costs and imputed incomes from a set of housing variables included in the survey. Every household is assigned a net income from housing (y_H) estimated as

$$y_H = y_R + h_b - h_c \tag{5}$$

where y_R is a rental equivalent amount –imputed rental income–, h_b represents housing benefits and h_c are housing costs. $y_R > 0$ for owner-occupied housing, $y_R = 0$ if the house is rented, and $y_R \geq 0$ if the house is rented at a price lower than the market price.[11] In the first

[11] The imputed rental income is an estimate of how much rent a homeowner –or if the house is rented at a price lower than the market price– would have to pay for the house she or he lives in. The survey subtracts some amounts from this value. In the cases where rental prices are lower than the market average the amount

and third cases public benefits are added to obtain y_H. In those cases where rental prices are lower than the market average the amount paid is subtracted from the total. Annual housing costs include rental prices –when households face these payments–, mortgage interests –for owner-occupied housing– and other related costs –water, electricity, gas, community maintenance fees, repairs and other dwelling costs. This final net income from housing (y_H) is added to disposable income (y).

Each one of these thresholds represents a different approach to assess the effect of spatial price differences on the measurement of poverty and on the equity notion embedded in social policies. Considering the same national poverty line for each of the regions implies an equity concept in which individuals with equal income are assumed to have similar well-being regardless of the region where they live and the extent of spatial price differences. In contrast, using regional poverty lines entails that these price differences are central in the measurement of poverty and households' well-being is completely dependent on the level of local prices. Using PPPs is an intermediate option between the two, holding the national poverty line but adjusting it by a general measure of prices in each region. The fourth threshold is also an intermediate option providing a measure of prices more focused on cost-of-housing differences.

The Spanish national poverty line –set at 60 per cent of the national median income– remains the same for the first three options (7,930 euros) while it is higher with the fourth threshold (8,560 euros). As a consequence, aggregate poverty indicators will only differ in the last case while regional poverty measures will be different in all cases.

[Figure 1]

Figure 1 shows the scatter plot between poverty rates with the national and regional poverty lines. As expected, the relationship between the two rates is weak. As mentioned above, these thresholds are sensitive to the wealth of each region relative to the national average.

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paid is subtracted from the estimated rental income. Any public benefit should be subtracted to obtain the imputed rental income in this case and in the owner-occupied housing.

While poverty lines in wealthier regions are higher than those calculated using national standards, in poorer regions the opposite is the case.

4. CHANGES IN REGIONAL POVERTY

4.1. The distribution of regional poverty

Once different poverty lines have been defined it is possible to analyze the sensitivity of regional poverty measures to each one of them. We use the most common measures, summarized by Foster, Greer and Thorbecke (1984), to analyze the incidence and intensity of poverty:

$$FGT(\alpha) = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z - y_i}{z}\right)^{\alpha} \tag{6}$$

with $\alpha \geq 0$, where y is income, $z>0$ is the poverty line and n the number of individuals in the population. When $\alpha=0$ the FGT is equal to the headcount ratio and when $\alpha=1$ the FGT is the average poverty gap. We use the four different z values (z_N, z_R, z_{PPP}, and z_{HI}). Our income poverty threshold is set at 60% of the median income adjusted by the OECD modified equivalence scale. All the poverty measures have been estimated using population weights. These weights are adjusted so that they reproduce the totals of external variables.

[Table 1], [Figure 2]

Table 1 shows the poverty rates ($\alpha=0$) for each Spanish region and the corresponding standard errors using the four thresholds. Standard errors have been estimated using bootstrapping accounting for sample design.[12] Figure 2 provides a thumbnail sketch of the incidence of poverty, showing the confidence intervals by regions. In this chart the estimated poverty rates are plotted, while the bars extending above and below the estimates

[12] Bootstrapped standard errors have been estimated using DASP software taking full account of the survey design including population weights (Araar and Duclos, 2007).

show the 95 percent confidence interval. In general terms, results give support to the notion that the regional levels of poverty change with each threshold and the regional rankings do not remain robust to the choice of the poverty line. The evidence with a common national threshold for each region (z_N) is consistent with the idea that wealthier regions present lower poverty rates.[13] There is not, however, a linear relationship since the high levels of administrative decentralization in Spain give rise to remarkable differences in social protection across regions. Nevertheless, the regions with the highest average income are within the groups with the lowest rates. Conversely, the poorest regions in terms of average income show a higher incidence of poverty. This is noteworthy when compared with the picture emerging from the other poverty lines, suggesting that the territorial distribution of poverty in Spain can be characterised in terms of clusters. Navarra and the Basque Country, for instance, have substantially lower rates while five regions –Murcia, Castilla-La Mancha, Andalucía, Canary Islands and Extremadura– are in the opposite side. Although the width of the intervals makes it difficult to talk in terms of dominance, the estimated rates provide a rough indication of regional divisions.

The picture changes radically if we turn our attention to the rates estimated with regional thresholds (z_R). The most remarkable result is that the spread in regional poverty rates narrows considerably. This, indeed, is the most comprised cross-regional distribution of poverty of those estimated with the four thresholds. There are also noteworthy re-rankings among regions. Extremadura, for instance, while showing the highest rate with the national threshold, turns out to be the region where the incidence of poverty is the lowest. There is not, however, a strictly inverse relationship. The observed re-rankings depend not only on average income but also on inequality levels within the regions. Some regions where median income is below average might not have significantly lower poverty rates if inequality levels are above average.

The shifts resulting from the other poverty lines do not seem so radical, although there are some changes in the corresponding rates. Moving from national to poverty lines adjusted

[13] The estimated poverty rate for the country as a whole (0.1933) matches the one officially published by the Spanish National Institute of Statistics.

by regional PPPs (z_{PPP}) also reduces the range as differences between the highest and the lowest estimates of the rates are slightly smaller. However, the re-rankings that emerge are not so drastic in this case. The change from national to poverty lines considering housing costs and imputed incomes (z_{HI}) produces a more modest effect than moving to region-specific poverty lines. Regardless, re-rankings are observed within clusters with lower and higher rates but not between them.

Therefore, both poverty rankings and levels change most significantly when a national poverty line, common for all regions, is replaced with region-specific poverty lines. This does not mean, however, that the other poverty lines do not yield relevant information both in terms of rankings and the range of rates. This general picture can be extended further by considering the intensity of poverty. Table 2 shows the results for the FGT index with α=1 and Figure 3 again plots the poverty indicators for each region and threshold, showing the confidence intervals by region.

[Table 2], [Figure 3]

The picture emerging from national thresholds changes drastically when regional poverty lines are used. While the indices with national thresholds show remarkable breaks across regions, these differences seem less marked when region-specific poverty lines are used. It must be noted that there is not, however, a clear link between incidence and intensity. Some regions showing a high incidence of poverty do not show significant levels of intensity. This is true in the case of regions where the elderly comprise a high percentage of total population. Spanish pensions usually have limited levels of income adequacy and provide an income just below the poverty threshold. Comparisons between intensity measures using national thresholds and poverty lines adjusted for PPPs or housing incomes and costs yield very similar results to those found with α=0. In general terms, regional profiles do not vary substantially but do result in some re-rankings and changes in the distribution of the cross-regional intensity of poverty.

4.2. Gap narrowing and re-ranking effects

Previous results provide a rough indication of the effects of using alternative poverty lines for regional or national approaches to the measurement of poverty. In terms of the implications for improving targeted anti-poverty strategies, it is worth noting that regional poverty classifications change considerably when we move from standard national to alternative thresholds. We also observe that regional rates exhibit substantial variability when these alternative poverty lines are used. However, is this due to a narrowing of the interregional poverty gap or is it due to re-rankings? Income distribution and mobility literature has traditionally emphasised the difference existing between the processes caused by an increase in the positions from the lower part of the income scale and those which have their origin in the exchange of positions within that scale (Chakravarty *et al.*, 1985). Extrapolating this distinction to the case of the changes observed in the distribution of poverty among regions, it seems necessary to differentiate between the effect of regional re-rankings on the poverty scale and the changes which may be attributed to the improvements in some regions.

[Table 3]

Table 3 presents estimates of the Gini index for the distribution of poverty rates among regions with each one of the thresholds and the two parameters for the FGT index. In general terms, the most important result is the considerable reduction of inequality when region-specific poverty lines are used. The Gini moves from 0.23 with a national poverty line to 0.08 when specific poverty lines for each region are used. A similar change takes place in the case of the intensity of poverty. Inequality changes for the other thresholds are not so pronounced, although in all cases Gini indices are lower when these alternative poverty lines are used. The least significant change occurs when household income is adjusted for housing income and costs.

One way to disentangle the crucial role of re-rankings and gap-narrowing effects is to look at the traditional decompositions of the Gini index. Wodon (1999) extended the pioneering

work of Lerman and Yitzhaki (1994) to decompose changes in inequality between two sets of poverty measures in these two components. A difference in the Gini is due to gap-narrowing when the change in the index is due to changes in poverty between areas holding ranks constant. On the other hand, a difference in the Gini is due to re-rankings when it results from changes in ranks holding poverty constant.

Denote P the poverty measure by region –FGT (α=0,1)–, r the number of regions, μ the mean poverty measure over all regions, s=P/μ the normalized poverty measure by region, R the rank of the region among all regions ranked by the poverty measure, and F=R/r the normalized rank. The Gini is:

$$G = 2\text{cov}(s,F) \tag{7}$$

Given two sets of poverty measures –the first obtained before a change in disaggregation (b) and the second obtained after the change (a)–, the corresponding Ginis can be expressed as

$$G_b - G_a = 2\text{cov}(s_b - s_a, F_a) + 2\text{cov}(s_b, F_b - F_a) \tag{8}$$

The first term on the right-hand side of the equation is the gap-narrowing effect, while the second term is the re-rankings effect.

[Table 4]

The results of the decomposition are shown in Table 4. As expected, the most significant difference observed when a region-specific rather than a national poverty line is used is principally due to re-rankings. This finding holds for the two values for α. A markedly different result is obtained for the comparison between inequality in regional poverty rates with a national threshold and that resulting from using the poverty line adjusted by regional PPPs. In this case, the gap-narrowing term is larger for α=0 but the re-ranking term is higher when poverty is measured in terms of its intensity. Finally, this last result is also

found in comparisons with the rates resulting from using the poverty line adjusted for housing income and costs. In this case, the changes in inequality are rather small and the re-ranking effect seems to be the basic component. In short, the larger shift in inequality takes place with region-specific poverty lines and its main source is the change in regional rankings.

5. POVERTY PATTERNS

One of the main implications of using alternative regional poverty lines is the extent to which patterns of poverty might change. The identification of the households with higher probabilities of being poor has become an important element in the monitoring and evaluation of targeted anti-poverty policies. This is especially relevant in the case of decentralized policies, where an adequate assignment of public resources to the poorest households has been a subject of increasing concern for both voters and policy-makers. When it comes to public policy discussions around income support programmes, it is increasingly important that resources are allocated effectively and efficiently.

The effectiveness of poverty intervention largely depends on the links between the strategies implemented and the actual distribution of poverty across households. In terms of the sensitivity of poverty to alternative regional thresholds it seems reasonable to test the extent to which poverty profiles vary as different lines are used. A very straightforward way of dealing with this issue is to look at the results of poverty regressions.

To test these differences we estimate logit models for each one of the poverty rates with the alternative thresholds. The characteristics usually considered as relevant factors in the relative risk of being poor have been chosen as explanatory variables. In addition to regional information they include household characteristics, educational attainment and employment status. The household head's gender and age, household size, number of children and the type of household (single person, cohabiting couples with or without children, single-parent households and other households) are included among the first of these. Educational and labour characteristics are key measures in explaining household

living conditions. Three dummy variables reflecting the educational attainment of the household's head are included: pre-primary education, primary education and higher education, with secondary education taken as the reference category. In addition, three variables are considered to reflect employment status (part-time employed, unemployed and inactive), taking full-time employment as the reference category.

[Table 5]

Table 5 presents estimates of the probability of being in poverty for each one of the four defined thresholds. Most of the effects are significant and appear with the expected signs. Household composition and other demographic factors, such as the household head's gender and age seem to have a significant effect on poverty, regardless of the threshold. The higher the age, the higher the probability of poverty is. Households headed by women also exhibit a higher probability. The number of children in a household turns out to have a significant positive effect on poverty except in cases where the poverty line accounts for income and housing costs. Conversely, this is the only case where the effect on poverty of living in single-parent households is well defined.

Education is another factor that stands out among the different variables. Higher education has a strong negative effect on the likelihood of being poor. At the other extreme, a level of educational attainment equivalent to primary education or pre-primary education notably increases the probability of poverty. These findings are similar in the four models. All the effects related to the labour market are also significant. The household head's being in part-time employment stands out, exacerbating the risk of poverty even more than unemployment or inactivity. This result is repeated in the four models.

Regional variables appear to produce the most significant variation. Both signs and statistical significance change with the different poverty lines. In general terms, the effects of living in poorer regions are stronger and highly significant in all models. However, results change considerably when region-specific lines are used to calculate poverty indices. Moving from national to regional poverty lines yields remarkably different results

in terms of the geographical distribution of the probability of being poor. In general terms, the most marked changes take place when regional effects are compared and when incomes are adjusted taking housing costs and imputed income into account. Furthermore, regional variables only seem to produce precise estimates when poverty is measured on the basis of region-specific lines. It should also be stressed that some of the effects differ when we look at household composition and other demographic characteristics. The effects of age, employment, inactivity or couples not having children are statistically different in regressions that consider both national and housing adjusted poverty lines.

Since this last result might have implications for the way in which anti-poverty strategies might be targeted at the poorest groups of households, it seems appropriate to discuss the underlying reasons behind the observed differences. As the most marked changes take place when income is adjusted for imputed rents and costs, some issues related to housing tenure might affect this result. It must be kept in mind that the most common form of housing tenure in Spain is owner-occupied housing. This is especially worthy of note in the case of the elderly, for whom levels of owner-occupancy surpass 90 per cent. Not surprisingly, the variables where the null hypothesis of equality is rejected are strongly related to both age and inactivity. Previous evidence of changes in poverty after imputed rental income is taken into account shows a remarkable drop among elderly households (Martínez and Navarro, 2009).

An alternative way to check the possible differences in the effects of the chosen characteristics on poverty is to look at the shape of the probability distributions resulting from the estimated models with the four poverty thresholds. Figure 4 plots the estimated probability distributions corresponding to the four logit models with each one of the thresholds. As stated above, the estimated probabilities somewhat differ in terms of the incidence of poverty and the shape of its probability distribution. In other words, the poverty effects of the different characteristics are not completely equal. The estimated distribution for the probability of poverty using a national threshold shows the lowest mode value while that resulting when incomes are adjusted taking housing costs and imputed income into account shows the most different profile.

Therefore, the most remarkable results of using alternative poverty lines for the targeting of anti-poverty strategies are the acute changes that take place in regional effects and possible differences in poverty outcomes when we move to a housing-corrected notion of income. An easy way to confirm these results without using regression coefficients is to look at decompositions of poverty considering the conflicting variables mentioned above. The FGT index satisfies decomposability properties for any income distribution broken down into subgroup vectors $y,...,y^m$

$$FGT_\alpha(y;z) = \sum_{j=1}^{m} \frac{n_j}{n} FGT_\alpha\left(y^j;z\right) \quad (9)$$

The quantity $T_j=(n_j/n)FGT_\alpha(y^j;z)$ may be interpreted as the total contribution of a given subgroup to overall poverty while $s_j=T_j/FGT_\alpha(y;z)$ is the percentage contribution of subgroup j.

[Table 6]

Table 6 presents estimates of the contribution to poverty of some of the factors discussed above. In order to avoid flooding the reader with numbers, we only show the corresponding contributions for some categories. The decompositions seem to confirm the abovementioned changes in poverty patterns. The percentage contribution of the elderly changes from more than 40 per cent using a national poverty line to a 24 per cent when income is adjusted for imputed housing income and costs. The lower weight of the elderly on total poverty is translated into a greater contribution of the age intervals comprising those aged between eighteen and forty-five years old. This, indeed, is the sub-group that faces the highest housing costs.

A similar finding is observed in the distribution of contributions by employment status. While there are no substantial differences between the contributions resulting from the first three poverty lines, they are markedly different when the last threshold is used. Instead of contributing to half of the poverty observed, the corresponding weight of inactive heads of

households is below a third of total contributions. As expected, the main change in the individual contributions takes place in the case of regional variables. The most relevant shift is that resulting from region-specific poverty lines. Some of the richest regions –e.g., Madrid and Catalonia– assume greater importance while the opposite happens to those regions with lower median income.

In short, using one poverty line or another does not seem neutral in terms of poverty patterns and targeting strategies. Although the effects of most socioeconomic variables do not show significant differences, regardless of the threshold, the contribution of certain subgroups depends crucially on the poverty line chosen. This is the case for age, employment status and, perhaps most tellingly, region of residence. It should be stressed, therefore, that the decision taken on the particular poverty line is pivotal not only in terms of the incidence and intensity of poverty but also for the precise identification of the potential recipients of public resources.

6. CONCLUSIONS

Both the design and functioning of poverty monitoring systems need to be grounded in a realistic assessment of the extent and characteristics of poverty. Tackling its roots and developing adequate policy strategies require accurate methods for the measurement of poverty. Among the different methodological options, results might be considerably sensitive to the poverty lines defined. Therefore, the selection of a suitable threshold is of paramount importance, not only at a research level but at an administrative and policy-making level. A debate around the advantages and disadvantages of national poverty lines as compared with region-specific poverty lines or thresholds accounting for spatial price differences seems particularly necessary.

In this paper we have analyzed how the incidence and intensity of poverty, as well as its socioeconomic patterns, might vary when different territorial thresholds are applied. We have used Spanish data from the EU Survey on Income and Living Conditions to define four different poverty lines using a relative approach: a national poverty threshold, region-

specific poverty lines, an alternative threshold adjusting household disposable income by regional purchasing power parities, and a fourth line taking housing costs and imputed incomes into account. Their joint consideration offers a way to assess the robustness of estimates.

Our results give general support to the notion that regional levels of poverty change with each threshold and regional rankings do not remain robust to the choice of poverty line. Rather, the regional distribution of poverty changes radically when regional rather than national poverty lines are used. Particularly worthy of note is the fact that the variability of poverty rates within regions is considerably lesser when regional lines are used. Our results show a rather narrow distribution of poverty across regions using this threshold. The shifts resulting from the other poverty lines are somewhat more modest, although there are some changes in the resulting rates. We also show that the large difference observed in the territorial distribution of poverty when a region-specific poverty line is used in place of a national line is mainly due to re-rankings among regions.

A second important finding is that poverty profiles vary as different lines are used. The estimated logistic models provide an indication of the different effects produced by certain factors in the case of each of our alternative poverty lines. It should be emphasized that regional variables only seem to produce precise estimates when poverty is measured using region-specific poverty lines. It must be also stressed that the effects of age, being retired or inactive are statistically different in regressions using national poverty lines and housing adjusted poverty lines.

Some arguments have been put forward to suggest that there are factual reasons lying behind these results. The variables leading to more different results are strongly related to age issues. Furthermore, since differences tend to emerge most consistently when incomes are adjusted for imputed income and costs, the case might be reasonably made that the Spanish model of housing tenure might affect the results observed. We have carried out different decomposition procedures confirming the key role of age-related variables in explaining these differences.

In short, both the geographical distribution of poverty and the identification of sub-groups are seen to be heavily dependent on the poverty line used. There are several reasons why these findings should interest both policy makers and analysts. Since an adequate assignment of public resources to the poorest households is of increasing importance, there is no doubt that our results provide a warning against making assessments without taking spatial price differences seriously. In general terms, our findings give general support to the notion that poverty policies that do not address the problem of spatial price differences might yield relevant assignment errors.

Our results also offer some suggestions as to the direction further empirical work might take. As a summary of empirical applications, we provide a set of different tests that can be used to check the sensitivity of research results to the use of alternative poverty lines, something that could be of benefit for the adequate monitoring of poverty reduction strategies. Finally, these results might also be relevant for the adequate design of the equality policies embedded in decentralization processes. A robust table of regional poverty rankings is necessary both to evaluate the results of decentralization in terms of social welfare and to assure an adequate distribution of fiscal equalization transfers.

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Table 1. Regional poverty rates with alternative thresholds (FGT, α=0)

	z_N	z_R	z_{PPP}	z_{HI}
Andalusia	0.2831	0.1906	0.2519	0.2299
	(0.013)	(0.010)	(0.012)	(0.012)
Aragón	0.1348	0.1945	0.1054	0.1196
	(0.017)	(0.018)	(0.015)	(0.017)
Asturias	0.1455	0.1512	0.1490	0.1132
	(0.205)	(0.016)	(0.017)	(0.014)
Balearic Islands	0.1667	0.2153	0.2011	0.1979
	(0.023)	(0.022)	(0.024)	(0.025)
Canary Islands	0.3024	0.2062	0.2671	0.2293
	(0.029)	(0.022)	(0.028)	(0.028)
Cantabria	0.1301	0.1716	0.1224	0.1305
	(0.016)	(0.020)	(0.018)	(0.021)
Catalonia	0.1270	0.1835	0.1728	0.1375
	(0.009)	(0.011)	(0.011)	(0.010)
Castilla-LaMancha	0.2789	0.2098	0.2321	0.2544
	(0.021)	(0.019)	(0.020)	(0.021)
Castilla y León	0.2091	0.1645	0.1699	0.1697
	(0.016)	(0.016)	(0.015)	(0.016)
Extremadura	0.3822	0.1388	0.2946	0.3420
	(0.027)	(0.020)	(0.025)	(0.026)
Galicia	0.2052	0.1486	0.2014	0.1642
	(0.015)	(0.012)	(0.014)	(0.014)
La Rioja	0.2256	0.2314	0.2474	0.2078
	(0.024)	(0.020)	(0.025)	(0.022)
Madrid	0.1324	0.2247	0.1324	0.1393
	(0.011)	(0.012)	(0.011)	(0.011)
Murcia	0.2659	0.2048	0.2697	0.2366
	(0.024)	(0.019)	(0.024)	(0.022)
Navarre	0.0806	0.1717	0.1137	0.0795
	(0.014)	(0.021)	(0.017)	(0.014)
Basque Country	0.0958	0.1813	0.1146	0.0680
	(0.013)	(0.015)	(0.014)	(0.011)
C.Valenciana	0.1734	0.1722	0.1713	0.1533
	(0.013)	(0.014)	(0.013)	(0.014)
Spain	0.1933	0.1933	0.1933	0.1716
	(0.004)	(0.004)	(0.004)	(0.004)

Standard errors in brackets.

Table 2. Regional poverty rates with alternative thresholds (FGT, α=1)

	z_N	z_R	z_{PPP}	z_{HI}
Andalusia	0.0899	0.0629	0.0829	0.0767
	(0.006)	(0.006)	(0.006)	(0.006)
Aragón	0.0335	0.0464	0.0315	0.0391
	(0.007)	(0.008)	(0.007)	(0.007)
Asturias	0.0449	0.0470	0.0455	0.0392
	(0.007)	(0.007)	(0.007)	(0.006)
Balearic Islands	0.0596	0.0730	0.0669	0.0904
	(0.013)	(0.016)	(0.015)	(0.015)
Canary Islands	0.1038	0.0768	0.0935	0.0865
	(0.018)	(0.019)	(0.018)	(0.015)
Cantabria	0.0435	0.0517	0.0426	0.0500
	(0.008)	(0.009)	(0.008)	(0.009)
Catalonia	0.0361	0.0498	0.0463	0.0585
	(0.003)	(0.004)	(0.004)	(0.006)
Castilla-LaMancha	0.0854	0.0647	0.0730	0.0840
	(0.009)	(0.010)	(0.009)	(0.009)
Castilla y León	0.0498	0.0421	0.0437	0.0557
	(0.005)	(0.005)	(0.005)	(0.007)
Extremadura	0.1072	0.0392	0.0743	0.0867
	(0.010)	(0.007)	(0.009)	(0.009)
Galicia	0.0578	0.0457	0.0568	0.0468
	(0.006)	(0.006)	(0.006)	(0.006)
La Rioja	0.0575	0.0594	0.0640	0.0675
	(0.008)	(0.010)	(0.009)	(0.011)
Madrid	0.0391	0.0639	0.0390	0.0645
	(0.004)	(0.006)	(0.004)	(0.008)
Murcia	0.0826	0.0658	0.0827	0.0932
	(0.011)	(0.011)	(0.011)	(0.013)
Navarre	0.0288	0.0508	0.0370	0.0330
	(0.007)	(0.009)	(0.007)	(0.008)
Basque Country	0.0278	0.0520	0.0329	0.0283
	(0.005)	(0.007)	(0.006)	(0.006)
C.Valenciana	0.0451	0.0447	0.0446	0.0501
	(0.005)	(0.005)	(0.005)	(0.006)
Spain	0.0573	0.0573	0.0573	0.0623
	(0.002)	(0.002)	(0.002)	(0.002)

Standard errors in brackets.

Table 3. Ginis for the territorial distribution of poverty (FGT)

Poverty line	(α=0)	(α=1)
z_N	0.2331	0.2422
z_R	0.0779	0.1059
z_{PPP}	0.1779	0.1858
z_{HI}	0.2197	0.1905

Table 4. Gap narrowing and re-ranking effects in the territorial distribution of poverty

	Inequality difference	Gap-narrowing	Re-rankings
z_N, z_R			
(α=0)	0.1552	-0.0754	0.2307
(α=1)	0.1363	-0.0330	0.1693
z_N, z_{PPP}			
(α=0)	0.0552	0.0383	0.0169
(α=1)	0.0565	0.0043	0.0133
z_N, z_{HI}			
(α=0)	0.0134	0.0034	0.0100
(α=1)	0.0157	0.0092	0.0424

Table 5. Logit estimates for poverty rates (average marginal effects)

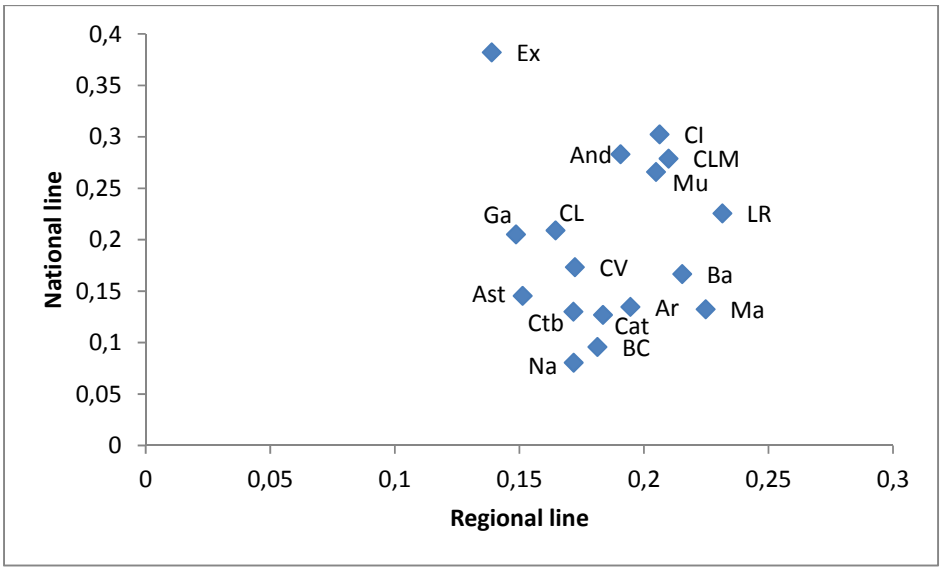
	(1) z_N		(2) z_R		(3) z_{PPP}		(4) z_{HI}	
Age	-0.0013***	(0.0004)°	-0.0015***	(0.0004)	-0.0015***	(0.0004)	-0.0040***	(0.0004)
Sex	0.0290***	(0.0093)	0.0375***	(0.0093)	0.0315***	(0.0092)	0.0286**	(0.0093)
Pre-primary education	0.1481***	(0.0216)	0.1532***	(0.0224)	0.1610***	(0.0222)	0.1575***	(0.0244)
Primary education	0.0916***	(0.0121)	0.0960***	(0.0125)	0.0945***	(0.0123)	0.0806***	(0.0128)
Tertiary education	-0.0952***	(0.0105)	-0.0990***	(0.0104)	-0.0947***	(0.0105)	-0.0886***	(0.0094)
Employee working part-time	0.2312***	(0.0262)	0.2495***	(0.0286)	0.2282***	(0.0270)	0.1994***	(0.0276)
Unemployed	0.2097***	(0.0175)	0.2223***	(0.0189)	0.2202***	(0.0182)	0.2040***	(0.0191)
Retired	0.1844***	(0.0178)	0.1835***	(0.0186)	0.1881***	(0.0181)	0.1224***	(0.0195)
Other inactive	0.3448***	(0.0189)	0.3121***	(0.0195)	0.3404***	(0.0192)	0.2052***	(0.0191)
Children	0.0282**	(0.0115)	0.0277*	(0.0115)	0.3245**	(0.0117)	0.0384***	(0.0106)
Household size	0.0589***	(0.0065)	0.0549***	(0.0067)	0.0586***	(0.0065)	0.0500***	(0.0062)
Couple, no children	-0.1147***	(0.0118)	-0.0858***	(0.0128)	-0.0977***	(0.0124)	-0.0265*	(0.0152)
Couples with children	-0.1058***	(0.0192)	-0.0817***	(0.0206)	-0.0906***	(0.0199)	-0.400**	(0.0216)
Single-parent household	0.0055	(0.0281)	0.0181	(0.0294)	0.01456	(0.0294)	0.0809**	(0.0363)
Other households	-0.1640***	(0.0192)	-0.1378***	(0.0204)	-0.1465***	(0.0202)	-0.0938***	(0.0219)
Andalusia	0.1049***	(0.0189)	-0.0776***	(0.0123)	0.0672***	(0.0180)	0.0392**	(0.0175)
Aragon	-0.0213	(0.0228)	-0.0424**	(0.0190)	-0.0502**	(0.0212)	-0.0203	(0.0234)
Asturias	-0.0167	(0.0212)	-0.0849***	(0.0156)	-0.0189	(0.0217)	-0.0313	(0.0192)
Balearic Islands	0.0151	(0.0277)	-0.0326	(0.0210)	0.0250	(0.0266)	0.0370	(0.0281)
Canary Islands	0.1407***	(0.0282)	-0.0538**	(0.0204)	0.0518**	(0.0277)	0.0452*	(0.0259)
Cantabria	-0.0082	(0.0263)	-0.0502**	(0.0199)	-0.0364	(0.0238)	-0.0103	(0.0274)
Castilla y Leon	0.0516**	(0.0206)	-0.0804***	(0.0137)	-0.0059	(0.0189)	0.0265	(0.0202)
Castilla-La Mancha	0.0976***	(0.0245)	-0.0612***	(0.0159)	0.0238	(0.0220)	0.0688**	(0.0238)
Catalonia	-0.0224	(0.0161)	-0.0549***	(0.0129)	0.0141	(0.0167)	-0.0139	(0.0164)
C.Valenciana	0.0160	(0.0188)	-0.0748***	(0.0131)	0.0067	(0.0182)	-0.0100	(0.0180)
Extremadura	0.1826***	(0.0276)	-0.1214***	(0.0149)	0.0778***	(0.0262)	0.1390***	(0.0279)
Galicia	0.0495**	(0.0199)	-0.0930***	(0.0126)	0.0154	(0.0188)	0.0123	(0.0190)
Murcia	0.0979***	(0.0265)	-0.0593**	(0.0180)	0.0860***	(0.0258)	0.0510**	(0.0252)
Navarra	-0.0827***	(0.0207)	-0.0542***	(0.0196)	-0.0912***	(0.0192)	-0.0734***	(0.0192)
Basque Country	-0.0493**	(0.0207)	-0.0317*	(0.0179)	-0.0339*	(0.0205)	0.0693***	(0.0179)
La Rioja	0.0866**	(0.0285)	-0.0116	(0.0220)	0.1167***	(0.0292)	0.0688**	(0.0274)
Observations	12937		12937		12937		12937	
Wald $\aleph^2$	1472		1211		1375		1370	

***Significant at 99%, **Significant at 95%, *Significant at 90%. [a] Standard errors in brackets. Reference category: male, secondary education, working full-time, single-person, Madrid.

Table 6. FGT(α=0) decomposition by population subgroups

		z_n		z_r		z_{ppp}		z_{hi}	
	(n_j/n)	s_j	Std.error	s_j	Std.error	s_j	Std.error	s_j	Std.error
<18	0.0006	0.0011	(0.0008)	0.0009	(0.0008)	0.0012	(0.0009)	0.0010	(0.0009)
18-44	0.4479	0.3423	(0.0123)	0.3504	(0.0126)	0.3445	(0.0125)	0.5013	(0.0136)
45-64	0.3099	0.2507	(0.0101)	0.2519	(0.0104)	0.2547	(0.0103)	0.2584	(0.0111)
65+	0.2416	0.4058	(0.0117)	0.3968	(0.0120)	0.3997	(0.0119)	0.2394	(0.0107)
Employed	0.6088	0.3456	(0.0117)	0.3635	(0.0121)	0.3487	(0.0119)	0.4871	(0.0136)
Unemployed	0.0813	0.1504	(0.0102)	0.1483	(0.0104)	0.1537	(0.0104)	0.1902	(0.0117)
Retired	0.2425	0.3362	(0.0111)	0.3410	(0.0114)	0.3413	(0.0113)	0.2266	(0.0103)
Other inactive	0.0671	0.1673	(0.0088)	0.1473	(0.0086)	0.1558	(0.0086)	0.0961	(0.0075)
Andalusia	0.1691	0.2479	(0.0112)	0.1684	(0.0099)	0.2368	(0.0112)	0.2263	(0.0119)
Aragon	0.0300	0.0202	(0.0028)	0.0307	(0.0036)	0.0168	(0.0025)	0.0209	(0.0031)
Asturias	0.0247	0.0176	(0.0020)	0.0196	(0.0023)	0.0195	(0.0023)	0.0163	(0.0021)
Balearic Islands	0.0242	0.0209	(0.0031)	0.0283	(0.0035)	0.0239	(0.0034)	0.0279	(0.0038)
Canary Islands	0.0437	0.0679	(0.0080)	0.0477	(0.0074)	0.0540	(0.0078)	0.0585	(0.0081)
Cantabria	0.0123	0.0083	(0.0012)	0.0118	(0.0014)	0.0079	(0.0012)	0.0094	(0.0016)
Castilla y Leon	0.0577	0.0629	(0.0050)	0.0502	(0.0045)	0.0504	(0.0046)	0.0571	(0.0058)
Castilla-La Mancha	0.0424	0.0608	(0.0050)	0.0466	(0.0044)	0.0497	(0.0047)	0.0629	(0.0056)
Catalonia	0.1642	0.1091	(0.0079)	0.1622	(0.0096)	0.1470	(0.0091)	0.1314	(0.0098)
C.Valenciana	0.1123	0.1019	(0.0080)	0.1031	(0.0080)	0.1049	(0.0082)	0.1004	(0.0092)
Extremadura	0.0229	0.0455	(0.0039)	0.0172	(0.0027)	0.0358	(0.0036)	0.0456	(0.0043)
Galicia	0.0607	0.0636	(0.0048)	0.0480	(0.0043)	0.0607	(0.0048)	0.0581	(0.0051)
Madrid	0.1360	0.0945	(0.0076)	0.1631	(0.0098)	0.1034	(0.0080)	0.1102	(0.0091)
Murcia	0.0291	0.0400	(0.0039)	0.0314	(0.0034)	0.0426	(0.0041)	0.0401	(0.0042)
Navarra	0.0137	0.0057	(0.0010)	0.0130	(0.0018)	0.0061	(0.0010)	0.0064	(0.0012)
Basque Country	0.0502	0.0251	(0.0034)	0.0499	(0.0047)	0.0305	(0.0038)	0.0199	(0.0032)
La Rioja	0.0071	0.0081	(0.0010)	0.0088	(0.0010)	0.0100	(0.0011)	0.0086	(0.0010)
TOTAL	1.00	1.00		1.00		1.00		1.00	

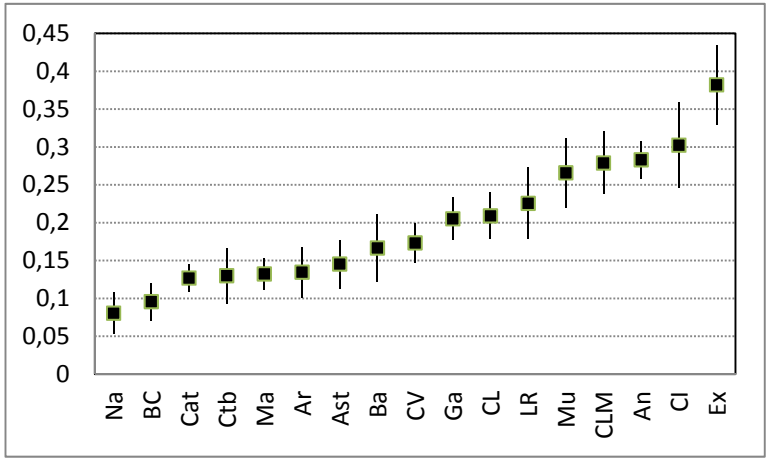
Figure 1. Poverty rates with regional and national poverty lines



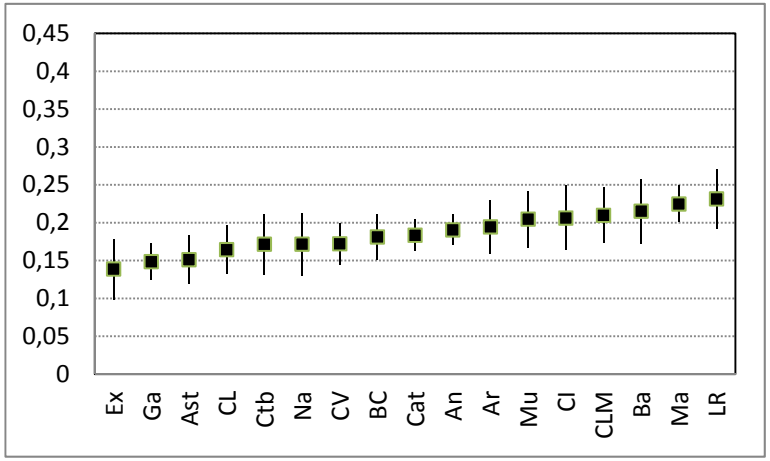
An=Andalusia, Ar=Aragón, Ast=Asturias, Ba=Balearic Islands, Cl=Canary Islands, Ctb= Cantabria, Cat=Catalonia, CLM=Castilla-La Mancha, CL=Castilla y León, Ex=Extremadura, Ga=Galicia, LR=La Rioja, Ma=Madrid, Mu=Murcia,

Figure 2. Poverty rates with confidence intervals by regions, (FGT, α=0)

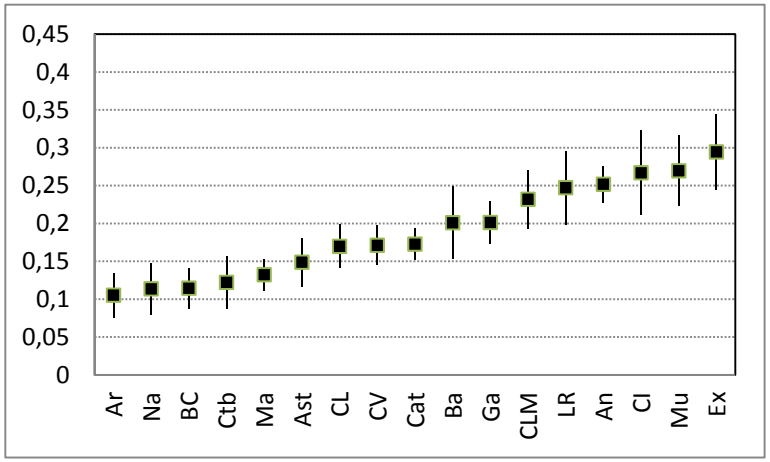
z_N



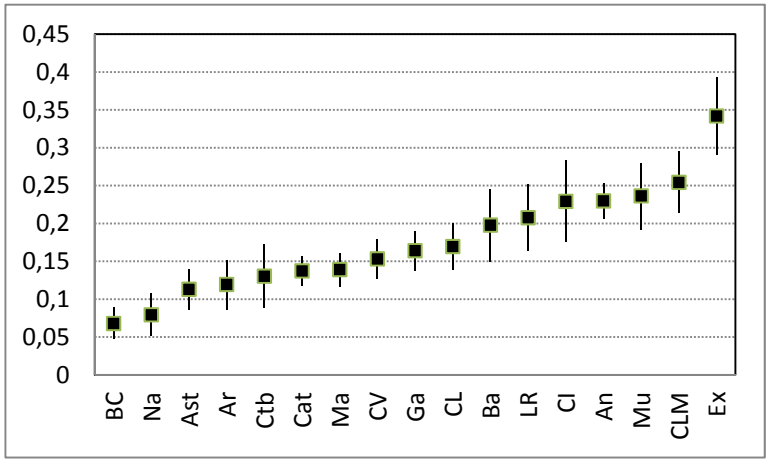
z_R



z_{PPP}



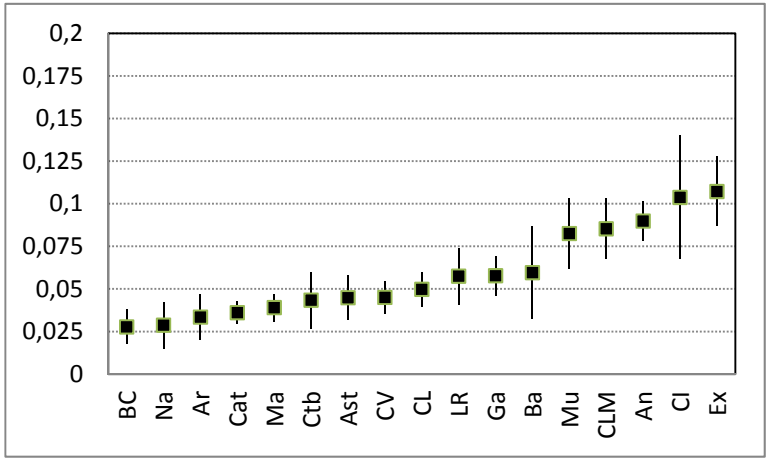
z_{HI}



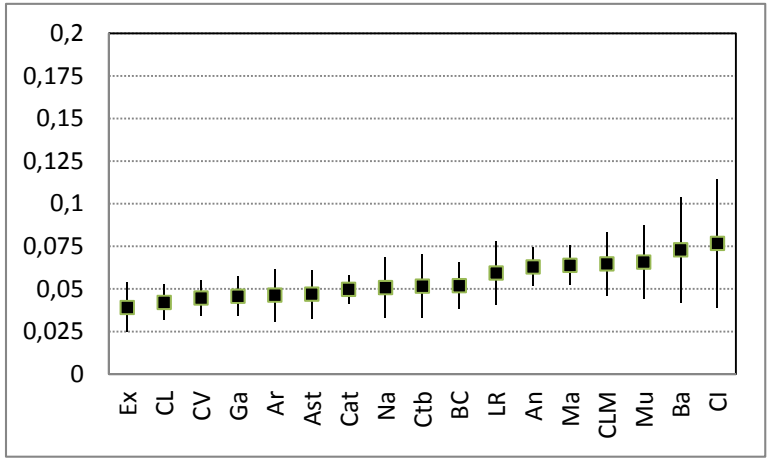
An=Andalusia, Ar=Aragón, Ast=Asturias, Ba=Balearic Islands, Cl=Canary Islands, Ctb= Cantabria, Cat=Catalonia, CLM=Castilla-La Mancha, CL=Castilla y León, Ex=Extremadura, Ga=Galicia, LR=La Rioja, Ma=Madrid, Mu=Murcia, Na=Navarre, BC=Basque Country and CV=C.Valenciana)

Figure 3. Poverty rates with confidence intervals by regions, (FGT, α=1)

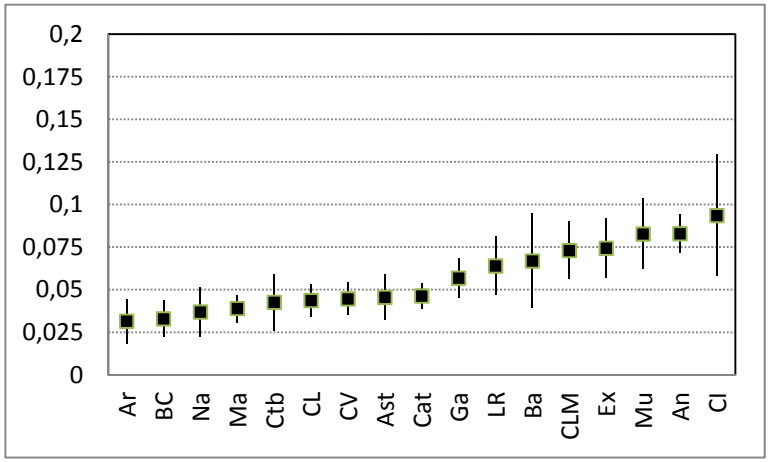
z_N



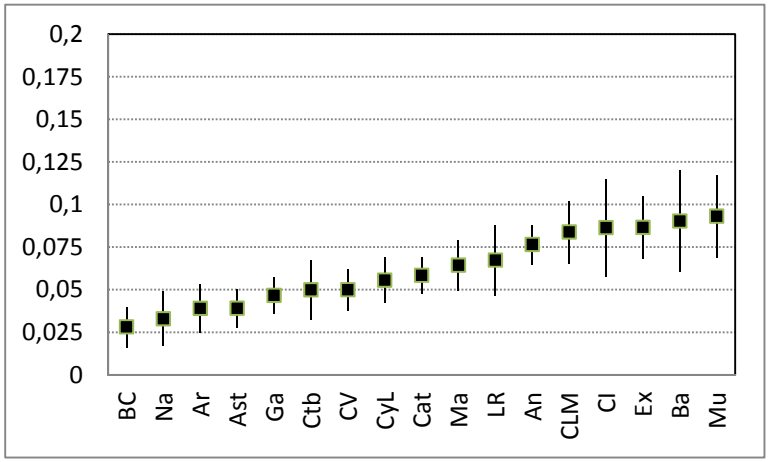
z_R



z_{PPP}

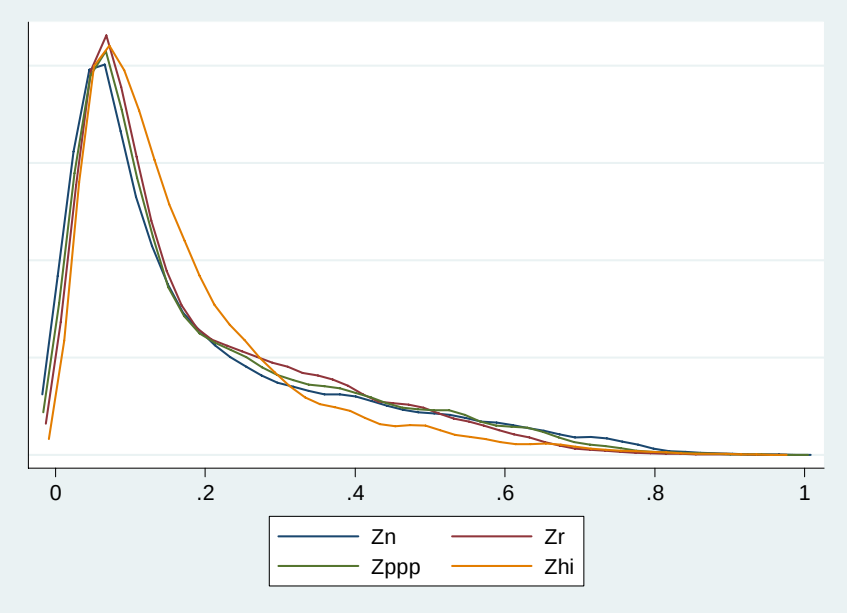


z_{HI}



An=Andalusia, Ar=Aragón, Ast=Asturias, Ba=Balearic Islands, CI=Canary Islands, Ctb= Cantabria, Cat=Catalonia, CLM=Castilla-La Mancha, CL=Castilla y León, Ex=Extremadura, Ga=Galicia, LR=La Rioja, Ma=Madrid, Mu=Murcia, Na=Navarre, BC=Basque Country and CV=C.Valenciana)

Figure 4. Estimated probability distributions



Annex 1. Sample size

	Current Population[a]		EU-SILC sample			
	Individuals		Households		Individuals	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Andalusia	8370,975	17.80	1,585	11.86	4,679	12.69
Aragon	1347,095	2.86	566	4.24	1,532	4.16
Asturias	1084,341	2.31	632	4.73	1,599	4.34
Balearic Islands	1106,049	2.35	453	3.39	1,161	3.15
Basque Country	2178,339	4.63	726	5.43	1,904	5.16
C.Valenciana	5111,706	10.87	1,024	7.66	2,729	7.40
Canary Islands	2118,519	4.51	598	4.48	1,806	4.90
Cantabria	592,25	1.26	411	3.08	1,095	2.97
Castilla y León	2559,515	5.44	921	6.89	2,357	6.39
Cast.-LaMancha	2098,373	4.46	654	4.90	1,890	5.13
Catalonia	7512,381	15.98	1,500	11.23	4,028	10.93
Ceuta	80,579	0.17	110	0.82	388	1.05
Extremadura	1107,22	2.35	522	3.91	1,463	3.97
Galicia	2797,653	5.95	989	7.40	2,774	7.52
La Rioja	322,415	0.69	420	3.14	1,134	3.08
Madrid	6458,684	13.74	1,141	8.54	3,045	8.26
Melilla	76,034	0.16	114	0.85	378	1.03
Murcia	1461,979	3.11	536	4.01	1,657	4.49
Navarre	636,924	1.35	458	3.43	1,246	3.38
Spain	47021,031	100.00	13,360	100.00	36,865	100.00

[a] Source: National Institute of Statistics (INE).