The regional distribution of unemployment. What do micro-data tell us?

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Abstract: Regional disparities in unemployment rates are large and persistent. The literature provides evidence of their magnitude and evolution, as well as evidence of the role of certain economic, demographic and environmental factors in explaining the gap between regions of low and high unemployment. Most of these studies, however, adopt an aggregate approach and so do not account for the individual characteristics of the unemployed and employed in each region. This paper, by drawing on micro-data from the Spanish wave of the Labour Force Survey, seeks to remedy this shortcoming by analysing regional differentials in unemployment rates. An appropriate decomposition of the regional gap in the average probability of being unemployed enables us to distinguish between the contribution of differences in the regional distribution of individual characteristics from that attributable to a different impact of these characteristics on the probability of unemployment. Our results suggest that the well-documented disparities in regional unemployment are not just the result of regional heterogeneity in the distribution of individual characteristics. Non-negligible differences in the probability of unemployment remain after controlling for this type of heterogeneity, as a result of differences across regions in the impact of the observed characteristics. Among the factors considered in our analysis, regional differences in the endowment and impact of an individual's education are shown to play a major role.

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1. INTRODUCTION

Disparities in unemployment rates are sizeable and persistent both between and within many countries (OECD, 1989, 1990, 2000, 2005; Blanchard and Katz, 1992; Decressin and Fatas, 1995; López-Bazo et al., 2002; Overman and Puga, 2002; Cracolici et al., 2007; Bande et al., 2008; Filiztekin, 2009). In Spain, for example, data from the Labour Force Survey (LFS) reveal that the unemployment rate in 2010 was 20.2%, the highest among OECD members. This figure contrasts sharply with the lowest rates recorded in OECD economies, namely in Norway and Korea (3.7% and 3.8% respectively). A comparison of the unemployment rates in the various member states of the European Union (EU) - the highest being in Spain and the lowest in the Netherlands, Austria and Luxembourg (4.5%) - shows marked disparities also between countries of an economically integrated area with a common currency. However, the magnitude of disparities is even greater within than it is between countries. Thus, in Spain in 2010 the unemployment rate in Andalusia and the Canary Islands reached 28% and 28.7% respectively, whereas at a distance of a few hundred kilometres and within a similar institutional framework, the rate in the Basque Country was 10.5%.

As such, the regional gap in Spain's unemployment rate is of a similar order of magnitude to that observed between the country considered as a whole and rates recorded in EU and OECD economies. Furthermore, the analysis in OECD (2005) suggests that Spain is no anomaly here, as the degree of regional disparity in unemployment rates within a number of countries (including Germany, Italy, Mexico, and Turkey) is even higher than that observed in Spain. These results also point to the increase in regional inequality within countries as being at the root of the intensification of overall inequality in unemployment rates in Europe.

From a theoretical perspective, in a world characterized by the absence of adjustment costs and rigidities, disparities in unemployment rates across locations would not be expected to persist. Situations of excess labour in one area would quickly disappear as workers moved to areas with higher rates of unemployment. However, the evidence (Lazar, 1997; Evans and McCormick, 1994; Martin, 1997; Martin and Sunley, 1999; Overman and Puga, 1999; López-Bazo et al., 2005) indicates just the opposite: regions with high unemployment in a given decade continue to suffer high unemployment rates in the following decades, while regions with low unemployment continue to enjoy low rates.

The slow wage adjustment rate and the high costs incurred by individuals and firms when migrating probably explain why idiosyncratic shocks, or contrasting regional responses to common shocks, might cause unemployment rates to differ markedly across regions for long periods. Given this explanation, heterogeneity in the spatial distribution of unemployment can be seen as what Marston (1985) defines as a disequilibrium phenomenon. A second explanation as to why certain areas have differing unemployment rates is also provided in Marston (1985), drawing on ideas in Hall (1972) and Rosen (1974). A steady-state relationship in unemployment rates across regions exists as a function of their factor endowment and since this endowment differs from one region to another, the spatial distribution of unemployment is not homogeneous. Moreover, as long as this endowment remains stable, the distribution of unemployment will not change dramatically. This equilibrium hypothesis, therefore, is based on the idea that workers have incentives not to migrate when unemployed because, for one reason or another, they value these endowments. On the other hand, when selecting their optimal location, firms take into account other regional endowments in addition to those of wage and unemployment rates (Partridge and Rickman, 1997). Evidence regarding high wages in areas of high unemployment supports this view, as does the preference for certain facilities and amenities. Martin (1997) and Partridge and Rickman (1997) extend the list of factors that might account for unemployment equilibrium differentials to permanent differences in economic, institutional and labour market characteristics across regions.

Most previous contributions to the empirical literature (Elhorst, 1995; Partridge and Rickman, 1997; Taylor and Bradley, 1997; López-Bazo et al., 2002, 2005; Filiztekin, 2009) have sought to analyse the determinants of regional inequalities in unemployment by means of an aggregate specification in which the unemployment rate in each region, or the deviation from a benchmark (the nationwide average or the region with the lowest rate), is related to regional magnitudes proxying for both the disequilibrium and the equilibrium determinants of unemployment. It should be noted that this aggregate approach imposes the same effect on each variable in all regions, while only partially (and thus imperfectly) accounting for regional heterogeneity in individual and household characteristics, i.e., for the sorting of individuals across regions according to their observed characteristics.

The expected impact of education on unemployment can be used to illustrate our argument. A rising level of education in a region is assumed to have a negative impact on its rate of

unemployment, given that findings at the micro level suggest that education increases the probability of an individual finding and keeping work (e.g., Mincer, 1991; OECD, 2011). Accordingly, the effect of the regional endowment of education on the regional unemployment rate is estimated to be negative and significant in six out of the nine studies reviewed by Elhorst (2003). Yet, contradictory findings are reported in the remaining three studies. Furthermore, the effect is reported as being positive, and in some cases even significant, for the set of Canadian regions in Partridge (2001), while no significance was found for the Spanish regions in López-Bazo et al. (2002, 2005). Likewise, Filiztekin (2009) finds no evidence of a robust negative effect for the Turkish provinces. Thus, there would seem to be some contradiction between the expected effect of education on an individual's probability of unemployment and the findings of empirical studies using micro-data, and (at least part of) those of aggregate studies using regional data.

In this paper, we seek to complement previous evidence of regional unemployment disparities obtained from studies using aggregate data, with results based on the exploitation of micro-data. By drawing on information for individuals in each region, we are able to control for the spatial distribution of the set of characteristics that shape an individual's probability of being unemployed and, by aggregation, the unemployment rate at the regional level. To the best of our knowledge, this represents a novel contribution to the literature that analyses regional disparities in labour market quantities (unemployment, employment. and participation rates).

In fact, the use of information at the individual level within each region enables us to assess the contribution of differences in the endowment, and in the impact of the characteristics that determine an individual's probability of unemployment, to the regional unemployment rate gap. It should be stressed that the decomposition of the gap between two groups of workers (male and female, native and immigrant, etc.) for a magnitude of interest (usually wages) has been standard practice in the labour economics literature since the seminal proposals made by Oaxaca (1973) and Blinder (1973). However, the application of this methodology in the regional economics literature remains scarce and focused primarily on wages (see, for instance, García and Molina, 2002; López-Bazo and Motellón, 2011; and Pereira and Galego, 2011).

The standard detailed decomposition is only suitable for linear models and, thus, cannot be applied in decomposing the gap in the probability of unemployment. Thus, here, as an

alternative, we apply the generalized decomposition method suggested by Yun (2004), which provides a detailed decomposition of the effects of each variable (or groups of variables) under analysis in the case of non-linear models. As far as we are aware, this approach has only previously been applied in a regional context by Motellón (2008) to analyze regional gaps in the probability of being hired under temporary contract in Spain. We should stress that the possibility of obtaining a detailed decomposition of the regional unemployment gap is crucial to our analysis given our interest in isolating the effects attributable to different sets of characteristics (individual vs. household) and, in particular, in assessing the role of an individual's education in accounting for regional unemployment rate differentials.

A detailed decomposition is reported in this study in order to assess the contribution of a broad set of individual and household characteristics that might account for regional gaps in unemployment rates in Spain. Drawing on micro-data for the Spanish regions taken from the LFS, we obtain results that indicate that only part of the regional gap in unemployment rates can be explained by the spatial distribution of observed individual and household characteristics (i.e., spatial sorting linked to observed characteristics). In other words, Spain's regions also differ in the impact that these characteristics can have on the probability of being unemployed in a given region and, in fact, this accounts for a sizable part of the gap. Our results also suggest that education has a substantial impact, but that this impact is far from straightforward. Thus, on the one hand, low levels of education in some regions contribute to higher rates of unemployment; on the other hand, the more marked impact of low levels of schooling on the probability of being unemployed in regions with high unemployment serves to reduce what would otherwise be a wider regional gap in unemployment rates. Studies using aggregate data at the regional level are unable to detect this feature as they assume the same throughout the regions.

The rest of the paper is structured as follows. The next section introduces the dataset used in the analysis and describes the main features of the regional distribution of unemployment rates in Spain. It also defines two groups of regions with markedly contrasting incidences of unemployment, and shows that the distribution of certain individual and household characteristics in these two groups is far from equal. The probabilistic model used to estimate the impact of the observed characteristics on the probability of unemployment in each group of regions is defined in Section 3. This section also outlines the methodology used to obtain the detailed decomposition of the gap observed between regions with high and low

unemployment rates. Section 4 discusses results concerning the regional heterogeneity in the impact of the observed characteristics and those concerning the detailed decomposition, with a particular concern for the effect associated with the number of years of schooling attributable to an individual. Additional results obtained from using an alternative proxy for education, and when distinguishing by gender, are discussed in Section 5. Finally, we offer some concluding comments in Section 6.

2. DATA AND DESCRIPTIVE ANALYSIS

In contrast with previous studies in the literature that draw on statistical information at the aggregate regional level, our study is based on individual data for each of the regions under analysis. The data correspond to the second quarter for each of the years 1999 to 2009 contained in the LFS.[1] The LFS is produced by the Spanish National Institute for Statistics in line with the criteria laid down by EUROSTAT for EU Member States. The survey provides information about the status of individuals in the labor market (non-participant, employed, unemployed) and the characteristics of individuals and households (gender, nationality, age, education, number of household members, etc.). The sample used in our analysis comprises individuals between 16 and 65 years of age in each of the seventeen NUTS 2 regions in Spain, which correspond to historical and administrative regions with considerable political and financial autonomy, including responsibility for drafting and implementing specific labour market policies. Notice that the LFS-sample design ensures that it is representative of each of these Spanish regions.

The unemployment rates in each of the regions and in the country as a whole at the beginning (1999), at the mid-point (2004), and at the end of the period under analysis (2009) are shown in Table 1. The table also includes the average unemployment rate for this period for the whole of Spain and for each region. These figures confirm that unemployment differentials across the Spanish regions are sizeable and persistent. If we use the unemployment rate as a rough measure of the probability of being unemployed, Table 1 indicates that a *representative* (average) individual of the active population in Andalusia, or in Extremadura, is between two to three times more likely to be unemployed than a counterpart in regions at a distance of just a few hundred kilometres (e.g. La Rioja, Navarra, and Aragon).

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[1] The LFS is conducted each quarter. However, given the impact of seasonality on Spain's labour market (being particularly sensitive to tourism and other activities in the service and primary sectors), we present the results using information for the second quarter of each year, as it would seem that this quarter is the one that is least influenced by seasonal variations. Note, nevertheless, that our results are robust to the consideration of data for the other three quarters.

In line with previous studies (e.g. Filiztekin, 2009; Patacchini and Zenou, 2007; López-Bazo et al., 2002), regional unemployment rates in Spain are spatially clustered. Figure 1 maps the regional distribution of the average unemployment rates over the entire period (with a similar picture being obtained for the individual years). Thus, it is apparent that high unemployment rates tend to concentrate in the South-West while the regions with low rates concentrate in the North and East of Spain and in Madrid, the capital city. Unemployment rates in regions such as Andalusia and Extremadura are systematically above the national average, while those in regions such as the Basque Country, Navarra, Aragon, and La Rioja are consistently below the average.[2] Based on the average unemployment rates for the period 1999-2009 we define two groups of regions, which subsequently serve to illustrate the results in the rest of the analysis. The group with high unemployment rates (HUR) comprises the first two regions mentioned above, whereas the latter four regions make up the group with low unemployment rates (LUR).[3] Therefore, the two groups comprise geographically adjacent regions with similar unemployment rates. However, these rates differ markedly from those in the other regions. Table 2 shows that the gap in unemployment rates between the two regional groups is large and persistent, though it decreases somewhat over the period under analysis, from 16 to 12 percentage points.

The unemployment rates of the two groups of regions defined above may be distinct because of differences in the distribution of the individual characteristics that determine the probability of an individual being unemployed. In other words, the regional gap in unemployment rates might be explained by differences in the regional endowments of the aforementioned characteristics, since the sorting of individuals across regions is dependent on their observed characteristics. Thus returning to the example outlined above, the gap between the HUR and LUR groups of regions would be attributable to the lower educational attainment of individuals in the HUR regions. A simple description of the observable characteristics presented by the two groups of regions (see Table 3) shows that, while for some (i.e., gender, nationality and age) there are no significant differences, they do differ markedly in the endowment of other determinants of the probability of unemployment. For

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[2] López-Bazo et al. (2005) showed that the regional ranking of unemployment rates in Spain has been highly stable since the early seventies.

[3] A similar strategy has been adopted by Motellón et al. (2011) in their analysis of regional wage gaps. However, note that the conclusions reported here are robust to alternative definitions of the two groups of regions (for instance, the inclusion of additional regions with similar unemployment rates in each group). Results are available from the authors upon request.

example, the two groups of regions differ in terms of family composition and size and, interestingly, in their respective populations' skills composition. In addition, the average number of years of schooling in the LUR group is consistently one year greater than that in the HUR group over the entire period. This difference reflects the gap between the two groups of regions in terms of the share of their respective populations with post-compulsory education (beyond "first secondary"), that is occupying an interval that is 12 to 15 percentage points higher in the LUR regions.

Thus, it is essential to determine whether the spatial sorting that results in the endowment disparities in the observed characteristics accounts for most of the observed gap in regional unemployment rates. To obtain preliminary evidence of such concerns, we computed the unemployment rate in each region within the categories of the observable characteristics. The results are summarised in Table 4. Were the differences in the aggregate probability of unemployment between regions to be explained by the different distribution of endowments, we would observe far smaller differences in probability within each of the categories. The figures in Table 4 suggest that this is not in fact the case as the probability of unemployment is much higher in the HUR group than it is in the LUR group for all categories of the full set of observed characteristics. The only exception to this general rule is the higher rate of unemployment among immigrants in the LUR group in 1999, at a time when international migration was still scarce in Spain.

Disparities between the two types of region in terms of their respective unemployment rates within levels of schooling are of particular interest. Notice that the absolute magnitude of the gap for some of the schooling categories is even wider than that for the entire population. Thus, for instance, the unemployment rates in the HUR regions in 2009 for those with primary and the first level of secondary education were 33.6% and 30.9% respectively, almost doubling those in the LUR (17.2% and 17.0% respectively). Absolute and relative differences were even more marked in previous years, before, that is, the impact of the worldwide financial crisis was felt in Spain. In 2004, the probability of individuals with only primary schooling being unemployed was almost 19% in the HUR group and only 5.2% in the LUR group. Similar gaps can be observed in the case of secondary schooling and vocational training (unemployment rates between 15% and 20% in the HUR regions and around 5% in the LUR group). Finally, among those with a university degree, the probability of unemployment was above 10% in the HUR regions vis-à-vis 5% in the LUR group.

Interestingly, our results suggest that the impact of the financial crisis has only led to a closing of the gap in unemployment rates for individuals with the lowest skills (no schooling), with almost no effect being recorded in the case of secondary and tertiary education.

In short, our preliminary findings suggest that differences in the impact of the observed characteristics (i.e., in their return or behavioural responses) may play a role in explaining the regional gap in unemployment rates. In the remaining sections we estimate these effects in each group of regions and decompose the gap in unemployment rates in terms of the contribution of differences in the endowment of characteristics and in terms of that of their impact.

3. METHODOLOGY

The empirical setting for the assessment of the impact of the observed characteristics assumes that the probability of an individual in a group of regions G (=HUR, LUR) being unemployed depends on that individual's set of endowments (including gender, nationality, age and education), and on his or her household characteristics (including the size of the household, having children, and whether another household member is employed):

$$\text{prob}(U=1)_G = \Phi\left(X_G \beta_G\right) \tag{1}$$

where prob(U=1) denotes the probability of unemployment, Φ the cumulative normal distribution function, X includes the aforementioned characteristics, and β is the corresponding vector of coefficients.[4]

The average probability of unemployment in G is:

$$\overline{\text{prob}\left(U=1\right)}_G = \overline{\Phi\left(X_G \beta_G\right)} \tag{2}$$

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[4] Notice that given the focus of this study, we deliberately exclude all determinants of the individual probability of being unemployed (such as those considered in studies using aggregate regional data) other than those operating at the micro level. We assume that regional differences in the macro determinants will affect the impact of the individual characteristics in each region and, thus, that their effect will be captured by the term accounting for regional differences in the impact of the observed characteristics in the decomposition described below.

where "over bar" denotes the average over the sample of individuals. Such an average is an estimate of the unemployment rate in G (the percentage of unemployed among the entire set of individuals participating in the labour market). Counterfactual average probabilities of unemployment in G (i.e., counterfactual unemployment rates) can be computed by imposing either the vector of average values of X or the vector of coefficients β, in the other group of regions. In the case of this study:

$$\overline{prob(U=1)}_{HUR}^{LUR} = \overline{\Phi(X_{HUR}\beta_{LUR})} \tag{3}$$

$$\overline{prob(U=1)}_{LUR}^{HUR} = \overline{\Phi(X_{LUR}\beta_{HUR})} \tag{4}$$

If the impact of the observed characteristics was the same as that on the LUR group, the unemployment rate in the HUR group would be derived from equation (3). Likewise, the counterfactual unemployment rate in equation (4) corresponds to that of the HUR group if they had the same endowment of observed characteristics as the LUR group.

From the probabilistic specification in (1), and the aforementioned counterfactual probabilities, the difference in prob(U=1) at the first moment of the distribution- i.e., the mean difference of prob(U=1) - between groups HUR and LUR can be decomposed as:

$$\overline{prob(U=1)}_{HUR} - \overline{prob(U=1)}_{LUR} = \left[\overline{\Phi(X_{HUR}\beta_{HUR})} - \overline{\Phi(X_{LUR}\beta_{HUR})}\right] + \left[\overline{\Phi(X_{LUR}\beta_{HUR})} - \overline{\Phi(X_{LUR}\beta_{LUR})}\right] \tag{5}$$

The first term in the RHS of (5), $\left[\overline{\Phi(X_{HUR}\beta_{HUR})} - \overline{\Phi(X_{LUR}\beta_{HUR})}\right]$, corresponds to differences in the characteristics of individuals in the two groups of regions, i.e., the differences in the unemployment rate caused by the spatial sorting of individuals. It can be seen as the gap in the unemployment rate that would be observed if the impact of the observed characteristics were homogeneous across regions.

The contribution of differences in coefficients, the behavioural responses to the observed characteristics, is captured by the second term in the RHS of equation (5),

$\left[\overline{\Phi(X_{LUR}\beta_{HUR})} - \overline{\Phi(X_{LUR}\beta_{LUR})}\right]$. This can be seen as the gap in the unemployment rate that would be observed in the absence of spatial sorting, i.e., if the regions had not differed in their endowment of individual and household characteristics.

Both terms in the RHS of equation (5) can be either positive or negative. A positive contribution will be obtained when regional differences in the endowment, or in the impact, of the characteristics widen the gap in unemployment rates. That is, when it causes higher unemployment in the HUR group. By contrast, a negative contribution indicates that the difference in the endowment, or in the impact, favours the group of HUR regions, i.e., results in a lower unemployment rate in these regions than in their LUR counterparts.

Thus, the overall decomposition in (5) presents the same form as that of the traditional Blinder (1973) and Oaxaca (1973) decomposition. But the non-linearity in $\Phi(.)$ prevents us from computing the particular contribution of each of the characteristics following the traditional decomposition. This is a major drawback if, as in this study, we are concerned with assessing the particular contribution of a characteristic or set of characteristics. In our case, we are particularly interested in, on the one hand, disentangling the contribution of the individual and the household characteristics and, on the other, in assessing the role of regional differences in education (both in its endowment and its impact). For this reason we adopt the approach suggested by Yun (2004) for obtaining a detailed decomposition of the gap in the probability between the two groups of regions. In the case of our probabilistic specification, the detailed decomposition can be obtained from:

$$\overline{prob(U=1)}_{HUR} - \overline{prob(U=1)}_{LUR} = \sum_{i=1}^{k} W_{\Delta X}^{i} \left[\overline{\Phi(X_{HUR}\beta_{HUR})} - \overline{\Phi(X_{LUR}\beta_{HUR})}\right] + \sum_{i=1}^{k} W_{\Delta\beta}^{i} \left[\overline{\Phi(X_{LUR}\beta_{HUR})} - \overline{\Phi(X_{LUR}\beta_{LUR})}\right] \tag{6}$$

where:

$$W_{\Delta X}^{i} = \frac{\left(\overline{X}_{HUR}^{i} - \overline{X}_{LUR}^{i}\right)\beta_{HUR}^{i}}{\left(\overline{X}_{HUR} - \overline{X}_{LUR}\right)\beta_{HUR}}, \qquad W_{\Delta\beta}^{i} = \frac{\overline{X}_{LUR}^{i}\left(\beta_{HUR}^{i} - \beta_{LUR}^{i}\right)}{\overline{X}_{LUR}\left(\beta_{HUR} - \beta_{LUR}\right)}$$

$$\sum_{i=1}^{k} W_{\Delta X}^{i} = \sum_{i=1}^{k} W_{\Delta\beta}^{i} = 1$$

Therefore, $W_{\Delta X}^i$ and $W_{\Delta \beta}^i$ enable us to weight properly the contribution of each variable to the effects of the characteristics and of the coefficients. They can be computed by using the sample average of the characteristic of the LUR and HUR groups of regions, and the estimate of β for the two groups from the probit model in (1).

The contribution of the endowment of a characteristic, or of that of its impact, can be either positive or negative. The interpretation is similar to that discussed above in the case of the global decomposition, but now attributable just to the specific characteristic under analysis.

4. RESULTS

4.1. Regional differences in the impact of individual and household characteristics

The first step in our assessment of the role played by differences in endowment and in the impact (or behavioural response) is to estimate the effect of the observed characteristics on the probability of unemployment in each group of regions. The estimate of the coefficients β in the probit models for the HUR and the LUR groups is used to compute the decomposition in (5) and (6). However, before discussing the results of the decomposition, we show that the estimated effects of the observed characteristics differ markedly between the two groups of regions for all the years under analysis.

We base our comparison of the impact of the characteristics on their corresponding marginal effects (in line with the usual method for interpreting the magnitude of the effects in probabilistic models). Marginal effects are computed based on an estimation of the coefficients in the probabilistic model in (1).[5] The variables included in this model are those of individual characteristics: gender, nationality, age, number of years of schooling as the proxy for education,[6] marital status; and those accounting for the characteristics of the household: number of members, dummy for the head of the household, number of children, dummy for children under 9, and dummy for another employee.

Table 5 shows the estimated marginal effects (valued in the sample average for each group of regions) from the estimates of the probit model in the three years under analysis. It can be

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[5] Note that the decompositions in (5) and (6) can be re-written as a function of marginal effects and sample averages of the observed characteristics. This is an additional reason for showing and discussing here the estimate of the marginal effects as opposed to the estimated coefficients in the probit models. However, the estimates of the coefficients of the probit models are available from the authors upon request.

[6] Results obtained when using a set of dummies accounting for different levels of educational attainment are discussed in Section 5.

observed that most of the marginal effects for the categories of the individual characteristics are statistically significant and display the expected sign. Being male reduces the probability of unemployment in both types of region, although the effect decreases substantially over the period. Yet, the impact of gender is not homogeneous as this fall in probability for males with respect to females is much higher in the HUR group of regions. Holding Spanish nationality also reduces the probability of being unemployed in both types of region, with a more marked effect at the beginning and the end of the period. Here, also, the impact of nationality differs considerably in the two groups of region: after controlling for a broad set of individual and household characteristics, native workers present a much lower probability of being unemployed than immigrants in the LUR regions. Interestingly, estimates for 1999 and 2004 suggest that during the last economic boom nationality per se did not exert any influence in the high unemployment regions, which would, in part, account for the foreign immigration observed to those regions during that period. However, the financial crisis changed this situation, so that even in the HUR regions immigrants faced greater probabilities of unemployment than natives (although the marginal effect associated with Spanish nationality was still higher in the LUR group in 2009).

Our results in Table 5 also confirm that age is inversely related to the probability of unemployment. They also indicate that most of its effect appears to be concentrated in the lowest categories (youth unemployment). In other words, there would seem to be a marked distinction in the probability of unemployment between the youngest groups (under 30 years old), on the one hand, and the mature active population, on the other. In this case also the magnitude of the effect of age evolves over time with that of the unemployment rate (falling from 1999 to 2004 before rising again in 2009). Additionally, it differs markedly between the two types of region, with the effects for most of the categories in the HUR group doubling those in the LUR regions.

Regional differences in the behavioural response associated with an individual's education are, as mentioned above, of particular interest in the present analysis. As expected, schooling reduces the probability of unemployment. Each additional year of education reduces the probability of unemployment in the HUR regions by around 1.5 percentage points in 1999 and in 2004, and by 2.4 points in 2009. This means that, on average in these regions, ten years of schooling (approximately primary vs. tertiary education) represents a decrease in the probability of unemployment of between 15 and 24 percentage points, according to the year

under consideration. This result has major implications for the HUR regions as it suggests that increasing the educational attainment of their (active) population would reduce the number of people affected by episodes of unemployment (and probably their duration), and thus contribute to a decrease in their unemployment rates.[7] But, based on the estimated marginal effect of schooling, it can also be inferred that, during the period under analysis, individuals with low educational attainment in the HUR regions faced very high *net* unemployment rates.

The effect of schooling is also negative in the LUR group, though much more moderate in its magnitude. In fact, in these regions it is only statistically significant at the 1% level in 2009, with a magnitude that is less than half that presented by the HUR group. Thus, it would seem that particularly in periods of economic boom with low rates of unemployment, schooling in itself (i.e., after controlling for all other individual and household characteristics) has a negligible effect on the probability of being unemployed in the LUR regions. In sum, these results confirm that the two groups of regions not only differ in their educational endowment, but that they also differ markedly in terms of the impact that schooling has on the probability of being unemployed in the respective regions.

Our results regarding marital status, the last of the individual characteristics to be considered, indicate that being single increases the probability of being unemployed with respect to the other statuses in all years. In 2009, positive and significant (at the 5% level) coefficients are also found for being a widow and being divorced. However, overall, there does not seem to be a substantial difference across the two groups of regions in the marginal effect of this characteristic.

The final group of rows in Table 5 corresponds to our estimates of the marginal effects of household characteristics. In general, there is greater heterogeneity in the significance and magnitude of these estimated effects, as they differ sharply from one year to another and between the two groups of regions. However, their impact seems to be greatest in the HUR group. For instance, household size, proxied by both the number of members and the number of children, had a significant effect only in the HUR regions (though the impact was not

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[7] It might be argued that educational attainment also increases participation in the labour market and, hence, the denominator of the unemployment rate. However, our evidence points to a positive effect of schooling on the employment rate, which means that the increase achieved in participation is mostly absorbed by employment and that the net impact of education on the unemployment rate is negative (see for instance OECD, 2011, Indicator A7).

significant in those regions in 2004).[8] Being the head of the household and the presence of another household member with employment reduced the chances of unemployment in both types of region, albeit that the impact was greater in the HUR group.

All in all, the results in Table 5 confirm the existence of sizeable regional differences in the marginal effects of the observed characteristics. This suggests that unemployment rates vary from region to region because, as stressed in the previous section, there are regional differences in the distribution of individual characteristics (i.e., spatial sorting associated with observed characteristics), but also because of the existence of regional heterogeneity in their impact on the probability of unemployment (i.e., differences in behavioural responses). In the case of education, the regional unemployment gap can be explained therefore by the fact that individuals in the HUR have lower levels of educational attainment, and by the fact that individuals with low levels of schooling in these regions face a higher probability of being unemployed vis-à-vis individuals endowed with higher levels of education.

4.2. Decomposition of the regional gap in the probability of unemployment

The estimate of the coefficients of the probit models for the two groups of regions in the years under analysis, and the sample averages of the observable characteristics in each group are used to compute the overall and the detailed decompositions in (5) and (6), respectively. Notice that the probit models were estimated by including the normalization in Yun (2005, 2008) so as to guarantee the robustness of the decomposition to the omitted category for the discrete variables. The results of the decomposition are summarised in Table 6. The first row of results in the table shows the magnitude of the gap between the two groups in each of the years. This is simply the difference in the average probability of unemployment from the sample of individuals in each macro-region (as shown in Table 2). The next row of data displays the results of the overall decomposition, i.e., the part of the gap attributable to differences in the endowment of the whole set of characteristics (which we assimilate with the spatial sorting of individuals) and to differences in the impact of all of them.

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[8] Any interpretation of the estimated impact of these two characteristics needs to take into account the fact that there is a degree of colinearity owing to the way in which the number of household members has been constructed – i.e., it includes the number of children. In line with a number of previous studies we have preferred to include children in the computation of total household size to allow for a joint effect of both characteristics. Yet, notice that this does not affect the decomposition analysis if we are solely interested in the joint effect attributable to regional differences in household characteristics, rather than that of each of its components. In this regard, excluding the number of children from the size of the household does not affect the main results of the decomposition.

The remaining rows correspond to the results of the detailed decomposition, i.e., the part of the gap attributable to each characteristic, or set of characteristics, distinguishing between the part corresponding to differences in the endowment and the part corresponding to differences in the impact. More specifically, Table 6 reports the contribution of regional differences in schooling and in the set of other individual characteristics. Their sum corresponds to the contribution of the overall set of individual characteristics. Next, the table reports results associated with the set of household characteristics and to the intercept.[9] In all cases, a regular font denotes significance at the 1% level, while italics are used to denote that the contribution is not significantly different from zero at standard levels.

Results of the overall decomposition confirm that the regional gap in unemployment rates cannot be explained only by spatial sorting, as the contribution of this component ranges between 20% and 30% of the total gap over the period under analysis. In other words, had the observed characteristics in the HUR regions been the same as those in the LUR group (absence of spatial sorting), the regional gap in unemployment rates would have still been as high as 12, 9, and 8 percentage points in 1999, 2004, and 2009, respectively. Therefore, most of the gap seems to be attributable to differences across regions in the impact of the characteristics, although the contribution of this component fell slightly over the period under analysis. However, mention should be made of the effect attributable to differences in the intercept estimated for each group of regions, which in the literature is typically included (perhaps unreasonably) as part of the impact component. When the effect of the intercept is subtracted from that of the difference in impacts, its net contribution is actually negative in 2004 and 2009. In other words, differences in the impact of individual and household characteristics favoured the HUR regions in the sense that they prevented the regional gap in unemployment rates from growing even wider.[10]

As for the results of the detailed decomposition, the contribution of differences in the endowment of individual characteristics is higher than that of household characteristics. For example, in 2009, differences in the endowment of individual characteristics accounted for 2.74 percentage points while the contribution of differences in the endowment of household characteristic was just 1.05 percentage points (72% and 28% of the total effect attributable to

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[9] Results for the separate contribution of schooling are provided given our interest in assessing the impact of regional disparities in this magnitude. Detailed results for all categories of observed characteristics are not reported here for reasons of space. They are, however, available from the authors upon request.
[10] Notice that the sum of the contribution of differences in the impact of individual and household characteristics gives a negative value in 2004 and 2009.

the endowment of the overall characteristics). Furthermore, education was the characteristic that contributed most to the effect of differences in endowments, accounting for more than 80% of the effect of the endowment of individual characteristics, and 60% of that of the overall characteristics in 2009. Differences in the endowment of the other individual characteristics played a very minor role (slightly above 15% of the total contribution of individual characteristics). Similar contributions are obtained for the other two years under analysis.

Yet, it is worth stressing that the lower educational attainment in the HUR regions only accounts for a small part of the total gap (around 2.3 of the 12 percentage points making up the gap in 2009). In other words, the gap in the unemployment rate between the HUR and the LUR regions in the absence of any kind of spatial sorting of individuals endowed with different levels of schooling would only have been slightly lower than that actually observed.

Interestingly, the size of the contribution of differences in the impact of education is substantially greater, although the sign of this component is negative. In interpreting this negative contribution, recall that the estimated coefficient for the number of years of schooling is negative in the two groups of regions, being higher in magnitude in the HUR group. Therefore, in regions with high unemployment, an additional year of schooling reduced unemployment more markedly than it did in regions with low unemployment. This means that if the impact of education in the HUR regions were similar to that observed in the LUR group, the probability of unemployment among individuals with high levels of education in the HUR regions would increase, thereby widening the regional gap in unemployment rates. Specifically, under a scenario of a regionally homogeneous impact of schooling, the gap in unemployment rates have been around 25, 20, and 16 percentage points in 1999, 2004, and 2009, respectively.

The negative contribution of differences between the two groups of regions in the impact of education is counterbalanced (fully in 1999 and partially in 2004 and 2009) by that of the other individual characteristics. The net contribution of the impact of the full set of household characteristics is positive as well in 1999 and 2009, thereby adding its positive effect to that of the individual characteristics other than the number of years of schooling. Yet, as mentioned above, what makes the overall contribution of the impact component positive is the addition of the effect attributable to differences in the estimated intercept for the two

groups of regions. As the constant term incorporates the effect of factors that do not vary across individuals within each group of regions, it seems that its contribution to the unemployment rate gap can be explained in terms of differences in the macroeconomic or aggregate features within each region. This in turn points to the need to combine the results obtained from using both micro- (as in this study) and macro-data.

In short, the results of the decomposition confirm the role played by regional differences in the impact of the observable characteristics. Its contribution is even more intense than that attributable to differences in endowments. Our results also support the hypothesis that regional differences in an individual's education are an essential element in accounting for regional disparities in unemployment rates. In addition, it would also seem that its effect is far from straightforward since as well as the effect associated with regional differences in endowments, there is a sophisticated contribution linked to regional heterogeneity in its impact on the probability of unemployment.

5. ADDITIONAL RESULTS

In this section, we first discuss the results of the detailed decomposition of the regional gap in unemployment rates when a set of dummies for the different levels of educational attainment is used as a proxy for education, instead of the number of years of schooling. Although interpreting the contribution of education in this case is not as straightforward, it enables us to assess the effect attributable to the different types and levels of formal education.[11] Secondly, given the well-documented gender differences in characteristics and in the behavioural responses to unemployment, we decompose the gaps in male and female regional unemployment rates. The results of the decomposition are found to vary when there are significant regional differences between the distribution of male and female characteristics and in their impact.

5.1. Decomposition using levels of educational attainment

Decomposition results when using dummies for the levels of educational attainment are reported in Table 7. Note that the overall findings from the decomposition remain unaltered,

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[11] Note that the normalization in the probit equation suggested by Yun (2008) avoids the so-called identification problem of the contribution of the differences in the coefficients associated with the dummy variables. Yet, any interpretation of the contribution of the coefficients in each of the categories needs to be treated with caution since the parametric constraints imposed by normalisation on the coefficients prevents all of them in one group from being higher or lower than those in the other group (see Gardeazabal and Ugidos, 2004; page 1035).

as the contribution of endowments and impacts, and the detailed contribution of the individual and household characteristics, are similar to those discussed in the previous section when using the number of years of schooling as the proxy for education. However, there is a marked distinction in the effect attributable to the overall difference in the impact of education. As indicated in the previous section, the higher negative impact of education in the probit model for the HUR group means this effect is negative when we use the years of schooling as the proxy for education. Here, however, the aggregate effect attributable to differences in impacts associated with the dummies for levels of educational attainment is positive in 1999 and in 2009. Indeed, the effect is only negative in 2004 and then at a much lower magnitude than that obtained when using the number of years of schooling.

A detailed analysis of the contribution of each of the categories of education reveals that the positive effect is associated with the lowest levels of education, while a negative effect is observed in association with both high school and tertiary education. Thus, it would appear that the highest levels of education had a favourable impact on the HUR group, reducing the gap in the rate of unemployment. Yet, the contribution of these levels of education was counterbalanced by that of primary and lower secondary education and vocational training. The impact of these levels of schooling on the probability of unemployment in the HUR group was negative but of a lower magnitude than that observed in the LUR group. As a result, they served to increase the regional gap in the unemployment rate.

Thus, it is the greater response recorded by the probability of unemployment to the higher levels of education in the HUR regions that account for the negative contribution of education reported in the previous section. In fact, the reduction in the contribution of this component in 2009 can also be attributed to the reduction in the effect of these categories of education. Finally, one side-effect of this analysis that specifically considers levels of educational attainment is the declining role assigned to the difference in the intercepts of the two groups of regions. Our results suggest that the negative effect assigned to the impact of education in the previous section was offset by an increase in the positive effect corresponding to the intercept (perhaps as a reaction to the homogenous effect that was imposed on the number of years of schooling regardless of the level of education).

5.2. Decomposition by gender

The results of the decomposition by gender are summarised in Tables 8 and 9 for males and females, respectively. Here, the tables include an additional top row showing the unemployment rate in the HUR and in the LUR groups of regions for the three years under analysis. These figures show i) a higher female unemployment rate regardless of region, ii) that a regional gap exists for both males and females, although it is wider in absolute terms in the latter case (and wider also in relative terms in 2004 and 2009), and iii) a somewhat different evolution over time in the respective gaps by gender, increasing in the case of males following the impact of the financial crisis (2009), while it continued to decrease in the case of females over the entire period under analysis. These disparities in the size of the gap and in its evolution, together with gender differences in behavioural responses,[12] point to the need for a separate analysis of the gap decomposition, which is what we discuss in this subsection.[13]

Our results from the decomposition of the regional gap by gender reveal a general picture that is quite similar to the one obtained above for the entire population. The overall contribution of endowments and of impacts is qualitatively analogous to that reported previously when not accounting for gender differences: the part attributable to regional heterogeneity in the impact of the observed characteristics is greater than that attributable to endowments for both males and females. It should be stressed, however, that the contribution of endowments in the case of males is slightly less than that for females, and thus for the entire population. In fact, in absolute terms, the contribution of endowments accounts for a sizeable part of the gender difference in the regional gap. For instance, in the first year under analysis, the gap observed for males was 14.31 percentage points while that corresponding to females was 20.82. If we eliminate the contribution of regional differences in endowments then we obtain a gap of 11.87 percentage points for males and 14.05 for females, and thus a narrower gap between the genders. The same effect is recorded in the other two years under analysis.

The detailed decomposition shows that the lower absolute contribution of endowments in the case of males is attributable to the smaller effect of their individual and household characteristics. In other words, regional disparities in the endowment of individual and

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[12] The full set of estimates of behavioural responses (marginal effects from the probit models) for males and females are not included here for reasons of space, but are available from the authors upon request.
[13] An example of separate estimates of responses involving labour market magnitudes by gender can be found in Elhorst and Zeilstra (2007).

household characteristics exert a stronger effect for females than it does for males. Interestingly, this is particularly evident in the case of education, as the contribution of differences across regions in the number of years of schooling for females is twice that for males in absolute terms. As for the effects associated with impacts, a number of differences are recorded between females and males which, moreover, vary depending on the characteristic and over the years. For instance, in 1999 the contribution of the impact of individual characteristics other than education is as high as 16.82 percentage points for females and just 2.38 percentage points for males. But in 2004 and in 2009 the contribution of this component is largely similar for both genders. As for the effect of the response to education, we find that it is somewhat more marked (larger in absolute terms) for females in 1999 and in 2004, and for males in 2009. Finally, the magnitude of the effect attributable to regional differences in the estimate of the intercept for both genders and the difference between females and males as regards that component confirm the need to combine the evidence obtained from studies that use micro-data and those that adopt an aggregate approach.

6. CONCLUDING COMMENTS

In this paper we have shown that by using micro-data we can provide additional insights into the understanding of regional disparities in unemployment to those previously obtained from studies based on aggregate regional data. A micro-data approach allows us to implement a more detailed control over regional differences in the distribution of individual and household characteristics, without their having the same impact across regions. Furthermore, the decomposition of the regional gap in unemployment rates enables us to assess regional differences in terms of both the endowment of the observed characteristics and their impact. This has proved particularly useful when analyzing the impact of education on regional unemployment disparities.

Results for Spain confirm that regional disparities in unemployment rates are large and persistent. They also indicate that differences across regions in terms of their respective endowments of individual and household (observed) characteristics only account in part for the gap between the regions with the highest and lowest rates. In fact, the regional heterogeneity in their impact on the probability of unemployment accounts for as much as the spatial sorting associated with the observable characteristics. Among the characteristics considered in this analysis, our results confirm the importance of differences across regions in

education, both in terms of endowment and its impact. Indeed, the homogenisation of levels of education and of its impact would have an effect on the gap in the regional unemployment rate which, nonetheless, is more complex than was expected a priori. Thus, while it seems that the homogenisation of the endowment of education across regions reduces disparities in unemployment rates, the equalization of the behavioural response associated with education is likely to increase the gap. The reason for what is, a priori, a counterintuitive result seems to be related to the greater reduction in the chances of unemployment for those with the highest levels of education in the regions experiencing the highest unemployment rates. Therefore, a reduction in the magnitude of this effect to a similar level to that found in regions with the lowest rates of unemployment will tend to increase unemployment rates in the first group of regions.

In addition to the effect attributable to differences in the impact of the observed characteristics, the sizeable contribution assigned to the intercept of the probabilistic model suggests that analyses exploiting micro-data should be combined with studies using aggregate data (for instance, see the results on the role played by capital accumulation for the Spanish regions in Bande and Karanassou, 2009). Therefore, it is our belief that neither the earlier aggregate studies nor studies based solely on micro-data provide a complete explanation of the reasons underpinning regional disparities in unemployment rates. To obtain a better understanding as to why unemployment rates are much higher in some regions than in others, the findings and conclusions from both approaches should be jointly considered. An integrated analysis for a larger sample of regions is, therefore, on our future research agenda.

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Table 1. Unemployment rates in the Spanish regions.

	1999	2004	2009	Average
Spain	15.40%	11.08%	17.92%	11.52%
Andalusia	25.58%	17.43%	25.41%	18.46%
Aragon	9.69%	5.47%	13.01%	6.79%
Asturias	17.63%	10.42%	14.04%	11.12%
Balearic Islands	7.02%	9.14%	18.15%	8.64%
Canary Islands	13.70%	12.79%	25.74%	13.54%
Cantabria	14.96%	10.20%	11.70%	9.63%
Castilla Leon	15.14%	10.93%	14.14%	10.63%
Castilla La Mancha	15.09%	8.86%	19.52%	10.93%
Catalonia	10.54%	9.74%	15.87%	9.21%
Valencia	13.73%	10.18%	21.22%	11.29%
Extremadura	24.89%	17.94%	20.09%	17.60%
Galicia	16.28%	14.19%	12.93%	11.53%
Madrid	12.76%	6.81%	13.60%	8.47%
Murcia	14.04%	10.82%	20.16%	11.29%
Navarra	8.24%	5.38%	12.22%	6.19%
Basque Country	13.92%	9.50%	10.51%	9.17%
La Rioja	6.65%	4.86%	12.74%	6.97%

Note: Figures in the last column correspond to the average unemployment rates computed using data for all years over the period 1999 to 2009.

Table 2. Unemployment rates in the two macro-regions

	1999	2004	2009	Average
Spain	15.40%	11.08%	17.92%	11.52%
HUR regions	25.77%	17.66%	25.04%	18.36%
LUR regions	9.00%	5.41%	12.82%	6.65%
Gap in unemployment rate	16.77%	12.25%	12.22%	11.71%

Note: Figures in the last column correspond to the average unemployment rates computed using data for all years over the period 1999 to 2009.

Table 3. Description of some characteristics in the two macro-regions

	1999 HUR Mean	S.E.	1999 LUR Mean	S.E.	2004 HUR Mean	S.E.	2004 LUR Mean	S.E.	2009 HUR Mean	S.E.	2009 LUR Mean	S.E.
INDIVIDUAL CHARACTERISTICS												
Gender												
Male	0.62	(0.49)	0.62	(0.49)	0.60	(0.49)	0.58	(0.49)	0.56	(0.50)	0.55	(0.50)
Female	0.38	(0.49)	0.38	(0.49)	0.40	(0.49)	0.42	(0.49)	0.44	(0.50)	0.45	(0.50)
Nationality												
Native	1.00	(0.07)	0.99	(0.08)	0.98	(0.12)	0.96	(0.20)	0.96	(0.20)	0.91	(0.29)
Immigrant	0.00	(0.07)	0.01	(0.08)	0.02	(0.12)	0.04	(0.20)	0.04	(0.20)	0.09	(0.29)
Age												
16-19	0.04	(0.21)	0.03	(0.16)	0.03	(0.18)	0.02	(0.13)	0.03	(0.17)	0.02	(0.14)
20-24	0.13	(0.34)	0.10	(0.30)	0.11	(0.31)	0.09	(0.28)	0.09	(0.29)	0.07	(0.25)
25-29	0.15	(0.36)	0.14	(0.34)	0.14	(0.35)	0.12	(0.32)	0.12	(0.33)	0.10	(0.30)
30-34	0.14	(0.35)	0.13	(0.34)	0.13	(0.34)	0.14	(0.35)	0.13	(0.33)	0.13	(0.33)
35-39	0.14	(0.35)	0.14	(0.35)	0.14	(0.35)	0.14	(0.34)	0.14	(0.34)	0.14	(0.35)
40-44	0.12	(0.33)	0.13	(0.34)	0.14	(0.34)	0.15	(0.36)	0.14	(0.35)	0.15	(0.36)
45-49	0.10	(0.29)	0.12	(0.32)	0.11	(0.32)	0.13	(0.34)	0.14	(0.34)	0.14	(0.35)
50-54	0.08	(0.28)	0.11	(0.31)	0.09	(0.28)	0.10	(0.30)	0.11	(0.31)	0.12	(0.32)
55-59	0.06	(0.23)	0.07	(0.26)	0.06	(0.25)	0.08	(0.27)	0.07	(0.26)	0.09	(0.29)
60-64	0.03	(0.17)	0.03	(0.17)	0.04	(0.19)	0.04	(0.19)	0.04	(0.20)	0.05	(0.21)
Education												
Years of Schooling	8.71	(4.24)	9.77	(4.14)	9.44	(4.19)	10.55	(4.03)	9.90	(3.95)	10.97	(3.88)
Educational Attainment												
Compulsory	0.64	(0.48)	0.52	(0.50)	0.57	(0.50)	0.43	(0.50)	0.53	(0.50)	0.38	(0.49)
No Schooling	0.11	(0.31)	0.02	(0.12)	0.06	(0.24)	0.01	(0.10)	0.04	(0.21)	0.01	(0.10)
Primary	0.24	(0.43)	0.27	(0.44)	0.20	(0.40)	0.18	(0.39)	0.13	(0.33)	0.12	(0.32)
First Secondary	0.29	(0.46)	0.24	(0.43)	0.30	(0.46)	0.24	(0.43)	0.36	(0.48)	0.25	(0.43)
Post-compulsory	0.36	(0.48)	0.48	(0.50)	0.43	(0.50)	0.57	(0.50)	0.47	(0.50)	0.62	(0.49)
High School	0.09	(0.28)	0.10	(0.30)	0.10	(0.30)	0.11	(0.32)	0.11	(0.31)	0.14	(0.35)
Voc Training 1st level	0.05	(0.23)	0.08	(0.27)	0.08	(0.26)	0.10	(0.30)	0.09	(0.28)	0.11	(0.31)
Voc Training 2nd level	0.07	(0.26)	0.10	(0.30)	0.06	(0.24)	0.11	(0.32)	0.08	(0.28)	0.12	(0.32)
University 1st level	0.08	(0.27)	0.11	(0.31)	0.09	(0.29)	0.12	(0.33)	0.10	(0.30)	0.12	(0.33)
University 2nd level	0.07	(0.26)	0.09	(0.29)	0.09	(0.29)	0.12	(0.32)	0.09	(0.29)	0.13	(0.33)

Table 3. Description of some characteristics in the two macro-regions (cont'd)

Marital Status											
Single	0.38	(0.48)	0.36	(0.48)	0.37	(0.48)	0.34	(0.47)	0.35	(0.48)	0.33	(0.47)
Married	0.59	(0.49)	0.60	(0.49)	0.59	(0.49)	0.62	(0.49)	0.59	(0.49)	0.61	(0.49)
Widowed	0.01	(0.11)	0.01	(0.11)	0.01	(0.10)	0.01	(0.10)	0.01	(0.11)	0.01	(0.11)
Divorced	0.02	(0.16)	0.02	(0.15)	0.03	(0.18)	0.03	(0.18)	0.05	(0.22)	0.05	(0.21)
HOUSEHOLD CHARACTERISTICS											
N of Members	4.07	(1.41)	3.63	(1.28)	3.76	(1.31)	3.37	(1.20)	3.51	(1.25)	3.24	(1.17)
Head of Household	0.43	(0.49)	0.46	(0.50)	0.44	(0.50)	0.46	(0.50)	0.43	(0.50)	0.46	(0.50)
N of Children	0.70	(0.91)	0.53	(0.80)	0.62	(0.86)	0.51	(0.81)	0.60	(0.83)	0.57	(0.84)
Children under 9	0.27	(0.45)	0.22	(0.42)	0.25	(0.44)	0.23	(0.42)	0.26	(0.44)	0.24	(0.43)
Another Employee	0.83	(0.87)	0.96	(0.85)	0.91	(0.90)	0.99	(0.84)	0.82	(0.79)	0.93	(0.77)
N Obs.	17092		6233		16284		6113		16057		6837	

Table 4. Unemployment rates within some categories of characteristics

	1999		2004		2009	
	HUR	LUR	HUR	LUR	HUR	LUR
INDIVIDUAL CHARACTERISTICS						
Gender						
Male	19.40%	5.08%	12.67%	4.05%	23.42%	12.91%
Female	36.55%	15.68%	25.53%	7.46%	27.30%	12.78%
Nationality						
Native	25.85%	8.65%	17.75%	4.81%	24.32%	10.00%
Immigrant	21.04%	29.00%	16.15%	11.56%	31.58%	27.35%
Age						
16-19	48.35%	21.15%	36.80%	21.05%	62.35%	51.74%
20-24	39.06%	14.59%	26.99%	11.32%	40.64%	30.18%
25-29	31.22%	13.57%	20.48%	8.33%	29.61%	14.49%
30-34	23.87%	7.32%	16.63%	5.53%	23.03%	12.11%
35-39	21.77%	6.57%	14.27%	4.67%	22.12%	13.46%
40-44	19.42%	7.37%	14.20%	4.05%	20.90%	10.74%
45-49	17.30%	7.52%	14.55%	2.64%	19.78%	9.93%
50-54	16.47%	5.43%	13.80%	2.95%	19.42%	7.47%
55-59	22.95%	7.39%	14.63%	1.96%	20.65%	7.00%
60-64	19.19%	3.33%	12.52%	2.77%	16.32%	4.59%
Educational Attainment						
No Schooling	32.56%	14.64%	24.84%	8.32%	36.84%	35.70%
Primary	26.46%	7.41%	18.91%	5.23%	33.57%	17.16%
First Second	27.51%	9.12%	20.64%	5.31%	30.90%	16.97%
High School	25.42%	13.02%	13.99%	5.23%	18.87%	13.25%
Voc Training 1st level	29.51%	9.41%	19.99%	3.63%	24.12%	13.84%
Voc Training 2nd level	24.53%	7.01%	14.64%	7.00%	18.72%	9.49%
University 1st level	17.71%	8.47%	10.39%	6.25%	13.36%	5.81%
University 2nd level	14.33%	10.20%	11.73%	4.94%	10.76%	6.46%
Marital Status						
Single	35.52%	12.75%	23.25%	8.32%	32.55%	18.65%
Married	19.77%	6.68%	14.20%	3.85%	20.65%	9.47%
Widowed	20.54%	10.05%	15.18%	2.70%	24.91%	14.31%
Divorced	28.24%	10.30%	17.85%	4.67%	23.96%	14.03%
HOUSEHOLD CHARACTERISTICS						
Head of Household (=Y)	13.89%	4.50%	10.14%	3.18%	20.69%	10.66%
Head of Household (=N)	34.98%	12.76%	23.58%	7.40%	28.50%	14.71%
Children under 9 (=Y)	22.72%	8.23%	15.82%	5.38%	23.99%	13.17%
Children under 9 (=N)	28.37%	9.44%	18.98%	5.43%	25.85%	12.67%
Another Employee (=Y)	26.16%	9.82%	17.55%	5.60%	23.56%	11.84%
Another Employee (=N)	25.24%	7.12%	17.89%	4.94%	27.65%	15.27%

Table 5. Marginal effects from the probit model.

	1999				2004				2009			
	HUR		LUR		HUR		LUR		HUR		LUR	
INDIVIDUAL CHARACT.												
Gender (excl. Female)												
Male	-0.1459	***	-0.0821	***	-0.1149	***	-0.0280	***	-0.0680	***	-0.0161	**
Nationality (excl. Immigrant)												
Native	-0.0354		-0.1401	***	0.0022		-0.0491	***	-0.0617	***	-0.1104	***
Age (excl. 16-19)												
20-24	-0.0533	***	-0.0253	*	-0.0363	**	-0.0196	*	-0.0952	***	-0.0428	**
25-29	-0.0854	***	-0.0257	*	-0.0520	***	-0.0321	***	-0.1351	***	-0.0840	***
30-34	-0.1111	***	-0.0468	***	-0.0720	***	-0.0427	***	-0.1635	***	-0.0907	***
35-39	-0.1273	***	-0.0568	***	-0.0955	***	-0.0413	***	-0.1778	***	-0.0905	***
40-44	-0.1535	***	-0.0512	***	-0.0972	***	-0.0430	***	-0.1906	***	-0.1023	***
45-49	-0.1646	***	-0.0556	***	-0.0944	***	-0.0464	***	-0.2007	***	-0.1034	***
50-54	-0.1649	***	-0.0530	***	-0.0923	***	-0.0404	***	-0.1999	***	-0.1062	***
55-59	-0.1139	***	-0.0364	**	-0.0810	***	-0.0413	***	-0.1913	***	-0.1025	***
60-64	-0.1572	***	-0.0506	***	-0.1057	***	-0.0376	***	-0.2080	***	-0.1014	***
Years of Schooling	-0.0166	***	-0.0021	**	-0.0140	***	-0.0009		-0.0243	***	-0.0099	***
Marital Status (excl. Married)												
Single	0.0450	***	0.0326	***	0.0418	***	0.0169	**	0.0483	***	0.0350	***
Widowed	-0.0386		0.0473		-0.0075		0.0024		0.0443		0.0747	**
Divorced	0.0312		0.0479	**	0.0163		0.0171		0.0333	**	0.0371	**
HOUSEHOLD CHARACT.												
N of Members	0.0236	***	0.0042		0.0037		0.0004		0.0210	***	0.0078	*
Head of Household	-0.1028	***	-0.0217	**	-0.0715	***	-0.0161	**	-0.0159	**	-0.0059	
N of Children	-0.0147	**	0.0086		0.0032		0.0079		-0.0270	***	-0.0011	
Children under 9	-0.0055		-0.0117		0.0004		-0.0038		0.0302	**	0.0011	
Another Employee	-0.0614	***	-0.0071		-0.0349	***	-0.0042		-0.0534	***	-0.0160	***
N Obs.	17092		6233		16284		6113		16057		6837	
LR χ²(20)	1951.91		316.66		1300.18		176.31		1610.19		520.76	
Prob > χ²	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	

Notes: Marginal effects computed in the corresponding sample average of each group of regions.
***, **, and* denote statistically significant at 1%, 5%, and 10% respectively.

Table 6. Unemployment rate gap decomposition (with years of schooling)

	1999		2004		2009	
GAP	16.77		12.25		12.22	
	Endowment	**Impact**	**Endowment**	**Impact**	**Endowment**	**Impact**
OVERALL	4.16	12.61	2.46	9.79	3.79	8.43
INDIVIDUAL CHARACT.	2.27	0.67	1.78	-4.47	2.74	-1.56
Years of Schooling	1.58	-7.71	1.48	-7.75	2.28	-4.08
Other Individual Charact.	0.69	8.38	0.30	3.28	0.46	2.52
HOUSEHOLD CHARACT.	1.89	2.27	0.68	-2.52	1.05	0.67
Intercept		9.67		16.78		9.32

Notes: Figures in the table are percentage points. All contributions are significantly different from zero at 1% level of significance.

Table 7. Unemployment rate gap decomposition (levels of educational attainment)

	1999		2004		2009	
GAP	16.77		12.25		12.22	
	Endowment	**Impact**	**Endowment**	**Impact**	**Endowment**	**Impact**
OVERALL	4.36	12.41	2.56	9.69	3.87	8.36
INDIVIDUAL CHARACT.	2.46	8.93	1.88	2.82	2.82	3.04
Educational Attainment	1.67	0.83	1.60	-0.30	2.43	0.59
No Schooling	1.40	0.01	0.60	0.06	0.54	-0.04
Primary	-0.19	1.02	0.15	0.14	0.10	0.44
First Secondary	0.01	0.39	0.23	0.66	0.75	0.56
Vocational Training 1st level	-0.05	0.24	-0.02	0.51	0.01	-0.07
Vocational Training 2nd level	0.08	0.25	0.14	-0.41	0.12	0.05
High School	-0.00	-0.26	0.06	-0.02	0.20	*-0.03*
University 1st level	0.24	-0.18	0.29	-0.86	0.23	0.03
University 2nd level	0.18	-0.64	0.14	-0.38	0.48	-0.37
Other Individual Charact.	0.78	8.10	0.28	3.12	0.39	2.45
HOUSEHOLD CHARACT.	1.90	1.93	0.68	-2.17	1.05	0.90
Intercept		1.56		9.04		4.42

Notes: Figures in the table are percentage points. Contributions no significantly different from zero at 10% in italics. All the others are significantly different from zero at 1% level of significance.

Table 8. Unemployment rate gap decomposition for males (years of schooling)

|	1999		2004		2009	
UNEMPLOYMENT RATE	**HUR:** 19.39	**LUR:** 5.08	**HUR:** 12.67	**LUR:** 4.07	**HUR:** 23.38	**LUR:** 12.85
GAP	14.31		8.60		10.53	
	Endowment	**Impact**	**Endowment**	**Impact**	**Endowment**	**Impact**
OVERALL	2.44	11.87	1.49	7.11	2.78	7.75
INDIVIDUAL CHARACT.	1.39	-4.77	1.02	-2.87	1.97	-2.61
Years of Schooling	1.21	-7.15	1.02	-5.78	2.07	-5.50
Other Individual Charact.	0.18	2.38	*-0.00*	2.91	-0.10	2.89
HOUSEHOLD CHARACT.	1.05	1.54	0.47	2.68	0.81	-1.51
Intercept		15.10		7.30		11.87

Notes: Figures in the table are percentage points. Contributions no significantly different from zero at 10% in italics. All the others are significantly different from zero at 1% level of significance.

Table 9. Unemployment rate gap decomposition for females (years of schooling)

	1999		2004		2009	
UNEMPLOYMENT RATE GAP	**HUR:** 36.48 **LUR:** 15.66		**HUR:** 25.52 **LUR:** 7.46		**HUR:** 27.28 **LUR:** 12.76	
	20.82		18.06		14.51	
	Endowment	**Impact**	**Endowment**	**Impact**	**Endowment**	**Impact**
OVERALL	6.76	14.05	4.11	13.95	4.69	9.82
INDIVIDUAL CHARACT.	3.70	7.64	3.27	-5.80	3.60	-0.49
Years of Schooling	2.27	-9.18	2.13	-9.28	2.37	-2.80
Other Individual Charact.	1.43	16.82	1.14	3.48	1.23	2.31
HOUSEHOLD CHARACT.	3.06	1.87	0.84	-5.67	1.09	1.04
Intercept		4.54		25.42		9.27

Notes: Figures in the table are percentage points. All contributions are significantly different from zero at 1% level of significance.

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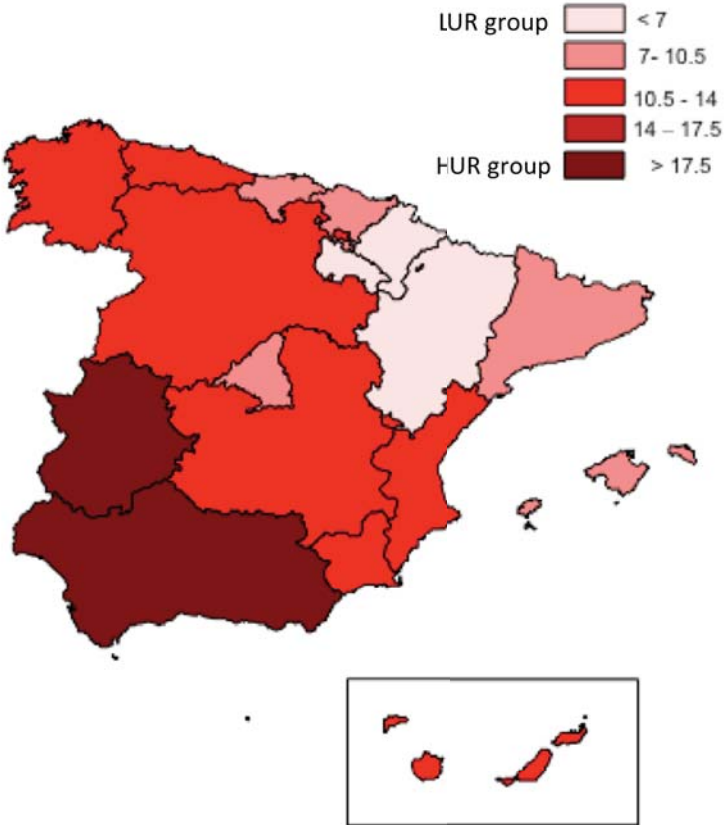
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