Employment exclusion in Spain: a territorial approach

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Abstract

Purpose – This paper studies social inequality in the vital field of employment in Spain during the crisis period 2009-2014.

Design/methodology/approach – Factor analysis is used to build a synthetic index of employment exclusion. The starting information matrix collects data from a wide set of employment variables for all 17 Spanish autonomous communities and the autonomous cities of Ceuta and Melilla. Based on this information, four factors are extracted which explain employment exclusion in different situations of vulnerability, such as unemployment, temporality, poverty or low pay.

Findings – In the territorial ranking, Madrid, Basque Country, Aragon and Catalonia show the lowest risk of employment exclusion, whereas Ceuta, Andalusia, Extremadura and Canary Islands show the highest ones.

Originality/value – The main value of this research is that it confirms the need for coordination of public policies in order to foster social and territorial cohesion in Spain.

Keywords Employment exclusion index, Factor analysis, Regional classification, Economic crisis

Paper type Research paper

Introduction

The employment dimension has been proven paramount in social exclusion analysis. This study aims at broadening the knowledge on the factors shaping the risk of exclusion in the employment dimension. To this end, data were collected from a large number of work-related variables so as to define a synthetic indicator of employment exclusion revealing the territorial gap in Spain and the factors accounting for such disparities.

Several structural changes related to the labour market, the complexity and fragmentation of the social structure and the regression in the protection of citizen rights by public administrations are put forward when explaining the increase in social inequalities and vulnerable population groups, referred to by the term social exclusion [Laparra Navarro *et al.* (2007); Ayala Cañón (2008); Hernández Pedreño (2008)]. This process has been exacerbated by the crisis, expanding the risk of social exclusion to new population groups [Fundación FOESSA (2014); Hernández Pedreño (2014); Leahy *et al.* (2015)] and widening the regional gap.

Spain's economic revival is not making up lost ground in terms of economic and social welfare. In fact, Spain has one of the highest percentages of economically vulnerable

JEL classification – I31, I38, J81

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population in the European Union [Ayala Cañón *et al.* (2018), p. 19], which implies great opportunity costs in relation to lost private and public income, deterioration of human capital, increasing unease or the reduction of intergenerational social mobility [OECD (2017)].

It is necessary to underline that social exclusion is a structural, dynamic, multifactorial and multidimensional phenomenon because the exclusion factors are a combination of interconnected circumstances that have an impact on different life spheres [European Commission (2003), Bradshaw *et al.* (2004); Levitas *et al.* (2007)]. Among these, the employment area stands out due to its connection with the other dimensions of social exclusion (income, education, health, housing, social relationships or participation). Unemployment, temporary work, low work intensity or low pay jeopardise the level and stability of household income, which may be exposed to situations of poverty or material deprivation, which in turn may lead to new problems related to health, home maintenance and family relationships; this is an accumulation of disadvantages that are typical of social exclusion processes.

Two decades ago, Atkinson (1998) made two assertions. First, the costs of unemployment for the people who lose their jobs go beyond the lost income, and second, having a job is not equal to social inclusion. In this vein, although the quantity of jobs is still a crucial issue, increasing attention is currently being paid to aspects related to job quality, as it is a determining factor in the welfare of people and their households, having a positive impact on productivity and social cohesion [Cazes *et al.* (2015)].

This shift in perspective is observed in the direction of the European Employment Strategy. Initially aimed at fighting unemployment, the goals of the European Employment Strategy have been addressed to the promotion of the employment rate and quality jobs and the increase in human capital, following the priorities established in the current Europe 2020 Strategy [European Commission (2010)]. The EU's social dimension has been strengthened by the European Pillar of Social Rights and the European Labour Authority [European Commission (2018a)], which foster equal opportunities in the labour market and fair working conditions. This is an explicit attempt to decrease social inequalities broadly derived from the employment sphere.

Consequently, it is crucial to research in depth into the determinants and measurement of social exclusion, and employment exclusion in particular, to design public policies aimed at guaranteeing inclusive growth and equal opportunities.

This paper analyses social inequality in the employment dimension as a multi-attribute decision problem in every Spanish territory with autonomous government, that is, seventeen communities and two autonomous cities, during the crisis (2009-2014) by conducting factor analysis. Four factors related to precarious situations that account for employment exclusion have been extracted. This analysis aims at establishing a statistical criterion to classify autonomous communities and cities and obtain a final ranking.

The next section gives a brief review of the literature on employment exclusion, featuring the socioeconomic context in which its conceptualization is developed and the different approaches taken for measuring it. In the third section, the methodology is presented, together with the transformation carried out to construct the synthetic employment exclusion indicator. The fourth section begins by examining the results and then the factors shaping the risk of employment exclusion in terms of spatial and temporal evolution. The employment exclusion ranking by regions, obtained by the synthetic indicator, is also presented, and the main conclusions are drawn in the last section.

Context and background

The relevance of work as a source of social integration has been widely investigated in social sciences [Castel (1995), Atkinson (1998); Levitas *et al.* (2007)]. In fact, work has been regarded as one of the two axes of exclusion/inclusion in developed societies, together with family and social relationships [Castel (1995); Subirats (2005)]. In keeping with this, Kalleberg (2009, p. 1) noticed that "work is a core activity in society. It is central to individual identity, links individuals to each other, and locates people within the stratification system".

Since the late 1970s, labour flexibility has put an end to stable employment and brought about the increase of precarious work. These key factors in the social dualisation arose from labour segmentation [Gordon *et al.* (1982), Davidsson and Naczyk (2009)]. Therefore, a distinction is usually made between typical or standard employment (full-time, permanent work for a single employer) and atypical or non-standard employment, which is an umbrella term for different employment arrangements, such as temporary employment, part-time work, temporary agency work or subcontracted labour, and dependent self-employment [ILO (2016), pp. 7-9]. Although the institutional elements of the labour market (employment protection legislation, minimum wage or unions, among others) are at the heart of the debate, the vast amount of literature on the subject has not yet drawn clear conclusions on their impact in terms of efficiency and equity [Betcherman (2012)].

The potential of work as an integrating element has been weakened in the last decade due to the economic crisis [Eurofound (2013); Manzanera Román *et al.* (2016)] and technological change and the new forms of employment associated with the digital economy [Broughton *et al.* (2016); European Commission (2018b)].

European countries have responded to increasing unemployment with austerity policies and reforms aimed at making the labour market more flexible, which has extended and diversified precarious employment [Lang *et al.* (2013); Lorente Campos and Guamán Hernández (2018)]. In consequence, the EU as a whole, and Spain in particular, has reached high levels of labour and economic instability and insecurity, inflicting negative effects on citizens (state of health, professional development, social relationships or maintenance of the home], economic growth and social cohesion [Benach *et al.* (2014), Frazer *et al.* (2014); Eurofound (2017), Arundel and Lennartz (2018)]. Despite the recovery of the labour market, these issues continue to exist [European Commission (2018b)].

On the other hand, the digital economy promotes new tasks and forms of work on the fringes of labour legislation, such as crowdwork and work on demand via apps. Likewise, automation and technological change raise the question of the disappearance of a good proportion of jobs in the near future, increasing the job polarisation between low- and high-skilled workers and raising spatial inequality caused by the adjustment process [ILO (2017), pp. 24-26].

Therefore, employment exclusion does not only refer to the most traditional aspect (related to unemployment and difficult access to labour market for some groups, such as the young, women, people with disabilities, immigrants or ethnic minorities) in this context, but also to a wide range of situations of socioeconomic precariousness and vulnerability related to employment. According to Standing (2011), this is the precariat, a new social class.

There is a vast amount of literature on employment from both micro- and macro-perspectives. This study takes the latter with two possible approaches in the international and interregional comparative study when tackling the problems derived from participation/exclusion in the labour market.

The first approach analyses the comparative results focusing on either one variable of interest or several variables separately, among which the most frequent are employment, unemployment, income or, more recently, the transitions in labour market status [Ward-

Warmedinger and Macchiarelli (2013), Fulvimari *et al.* (2016)]. The links between employment situation and poverty or social exclusion have been increasingly present in this type of research, which has put forward new analysis perspectives. For instance, alternative ratios have been used to measure other forms of labour underutilisation when the unemployment rate is deemed insufficient [ILO (2018)]; it has also been suggested to adjust employment rate to work intensity [Brandolini and Viviano (2017)], or to implement welfare measures through a household employment deprivation index [Gradín *et al.* (2017)]. On the other hand, Felgueroso *et al.* (2017) built an indicator to account for the most vulnerable population with regard to employment, providing information for every autonomous community in Spain (EVAE rate).

When employment is regarded as one of the dimensions of social exclusion/inclusion, the second approach considers different methods for multidimensional measurement of social exclusion, or alternatively of welfare or quality of life, because "quality of life is the background concern of much of the work on social exclusion" [Levitas *et al.* (2007), p. 24].

The EU's multidimensional social exclusion indicator (AROPE rate) includes the employment dimension through the measurement of the population living in (quasi-)jobless households, reporting on the low or null participation in the labour market[1]. Nevertheless, the risk of poverty or social exclusion does not only affect those with weak links with the labour market but it has also extended to full-time workers [Eurostat (2018), p. 114], the so-called working poverty[2]. Additionally, there are a wide range of indicators available that are part of the portfolio of EU social indicators [European Commission (2015)].

Furthermore, the EU has developed a set of indicators of quality of life that concern the analysis of nine dimensions based on expert recommendations [Eurostat (2017)]. The employment dimension, Productive or main activity, relates to both quantity aspects (employment, unemployment and underemployment) and qualitative ones (income and benefits from employment, health and safety at work, work/life balance, temporary work and assessment of job quality), in the cases of both paid and unpaid work, although the variables available for the latter are scarce.

A few comparative analyses of the quality of life at work across European regions have been conducted, mainly using OECD's measurements (2014a). However, territorial breakdown usually involves fewer indicators available [OECD (2018)]. On the other hand, the analysis of life quality from a regional perspective may vary from the national one, as proposed by Lagas *et al.* (2015) when building their regional quality of living index, where youth and adult unemployment rates are included as indicators of Purchasing power and employment dimension.

In Spain, Fundación FOESSA elaborated the Synthetic Index of Social Exclusion by mining their own survey which includes employment indicators which are not available in official statistics, such as marginal activities (cardboard collecting, leafleting or begging) and irregular employment or employment without contract [Laparra Navarro *et al.* (2014)]. With regard to life quality, the National Statistics Institute [INE] provides a reduced version of Eurostat's European indicators, which especially affects the variables related to employment quality [INE (2018a)]. Additionally, INE has recently started to aggregate the information into a global index of quality of life, displaying results by autonomous communities and dimensions, such us employment, among others. Furthermore, Merino Llorente *et al.* (2012) develop a Synthetic Indicator of Dynamic Work Quality for the Spanish autonomies. This indicator incorporates four dimensions (employment conditions, job conditions, labour relations and social policies), observing the regional convergency/divergency in terms of quality levels in employment between 2000 and 2010.

Our study falls within the scope of the multidimensional measurement trend, and it presents an employment exclusion index that allows both identifying the dimensions or factors of employment exclusion and establishing a ranking of Spanish regions based on results.

Therefore, this paper contributes to the debate on social inequality in Spain [Ruiz-Huerta (2013); Ayala Cañón *et al.* (2018)], offering new results in relation to the observable regional disparities in the Spanish labour market, which have been highlighted in innumerable works, often from a descriptive perspective. In this sense, the four explanatory factors provided in this research complement the findings of other studies, such as the different educational levels [López-Bazo and Motellón (2013)] or the economic and institutional factors accounting for wage differences across regions [Davia Rodríguez (2013)]. Additionally, both the methodology used in the construction of the multidimensional indicator and the analysis perspective, based on the measurement of employment exclusion, are novel aspects with respect to the previously mentioned works carried out in Spain, either by being oriented to the measurement of the quality of employment [Merino Llorente *et al.* (2012); INE (2018b)], or by adopting a microanalysis approach in relation to employment vulnerability [Felgueroso *et al.* (2017); Felgueroso (2018)].

Methodology

The employment dimension is usually included in every system of social indicators, or in the resulting composite index, whose intention is to account for the complexity of social reality. However, the measurement model always starts from a previously stated conceptualization. For instance, the Social Progress Index, an indicator to measure well-being in European regions, does not include employment/unemployment variables because it excludes all economic measurements [Porter and Stern (2015), p. 26]. On the contrary, the Social Justice Index covers a long list of employment-related variables in its dimension Labor market access, which even doubles the weight of other areas of the index [Schraad-Tischler *et al.* (2017)].

We have taken the steps recommended by OECD (2008) to build our social exclusion index to ensure internal coherence and robust results. The method used is factor analysis because it enables us to condense a large number of explanatory variables into a set of latent factors or variables, with the smallest loss of information possible. This is how the relevant factors shaping employment exclusion are revealed. Factor analysis also allows the possibility of extracting the structure of weights with which they are to be aggregated to the global index. Therefore, factor analysis avoids previous judgements on the internal structure of the composite index, as it also includes a statistical criterion to assign weightings in the aggregation[3].

Factor analysis has been conducted to obtain the structure of relevant indicators measuring living standards and material deprivation [Callan *et al.* (1993); Guio (2005)]. It has been recently used to measure the components underlying the multidimensional concept of social exclusion [Bailey *et al.*, 2017], including its relational dimension [Loktieva (2016)]. In Spain, Gallego and Subirat (2011) used factor analysis to identify the determinants of the sociostructural reality of the autonomous communities, and Jurado Málaga and Pérez-Mayo (2012), to construct a multidimensional index of well-being.

As this study is a regional analysis of employment exclusion, all the data available are collected in a matrix where the rows represent the regions and the columns represent the variables (X_i). The size of the matrix is nxm, where n is the number of regions and m is the number of variables. Given the usually high number of variables, m, it is required to apply a

factor analysis. The objective is to reveal the latent factors accounting for the correlation among variables. Each observed variable is a linear combination of factors plus a random residual component, without any correlation among residuals. More specifically, the factor analysis model is defined as follows:

$$X_i = c_{i1}f_1 + c_{i2}f_2 + \ldots. + c_{im}f_m + d_i e_i \quad (1)$$

where f_i are the common factors; e_i are the unique factors and c_{ij} is the weight of factor j in variable i, called factor loading.

Variance of variable X_i can be decomposed into two parts:

$$\sigma_i^2 = h_i^2 + w_i^2 \quad (2)$$

h_i^2 being the proportion of each variable's variance that can be explained by the common factors and is called communality (defined as the sum of squared factor loadings for all variables), and w_i^2 being the percentage of variance for the variable that is not explained by the common factors, called uniqueness.

Sometimes, the factor solution has a complex interpretation and a rotation is performed so that the variables are highly correlated with one factor, and less with the others. This facilitates the interpretation of factors based on the meaning of the variables that most correlate with them. Varimax is the most commonly used rotation method to obtain factors that have a strong correlation with a small number of variables, and a weak one with the others, so the variance of factors is redistributed.

Some minimum criteria are needed to conduct factor analysis. These are Bartlett's test of sphericity and the KMO index [Kaiser–Meyer–Olkin]. Bartlett's test of sphericity checks that the correlation matrix is the identity matrix, which would indicate that there is no significant correlation among variables. When the p-value associated to this test is lower than 0.05, is appropriate to conduct factor analysis. When KMO values are close to 1, the sample is proved adequate, which means that the coefficients of partial correlation among original variables are small. On the other hand, the data are unsuitable for factor analysis when KMO value is less than 0.5.

The factors are selected by the Kaiser rule, which calculates the eigenvalues of the correlation matrix of original variables, and selects the factors with a value >1, taking into account the percentage of variance explained by factors, which must attain a satisfactory level (above 60 per cent). Each extracted factor has an average of 0 and a variance of 1, their relevance being determined on the grounds of the variance percentage explained (w_j). These latent variables must have a clear interpretation within the dimension of employment exclusion. When the variables of the extracted factor have a direct relationship with the risk of exclusion, it is called positive factor. And when the factor is inversely related to the risk of exclusion, it is called negative factor[4].

The following criterion has been applied to positive factors so that all factors are dimensionless and have the same variation range:

$$f_{ij}^{+} = \frac{f_{ij} - \min(f_j)}{\max(f_j) - \min(f_j)} \quad (3)$$

whereas for negative factors:

$$f_{ij}^{-} = \frac{\max(f_j) - f_{ij}}{\max(f_j) - \min(f_j)} \tag{4}$$

f_{ij} being the value of factor j in region i; and f_j, the vector made up of all regional values of factor j.

This change allows for a linear transformation so that all values are within the interval [0,1]. Therefore, regions with higher risk of exclusion in one factor will get 1 in such factor, and regions where risk of exclusion is lower will get 0, regardless of whether the factor is positive (direct relationship) or negative (inverse relationship). This permits a comparative analysis across regions and a ranking of results. The region with the smallest value (0) has the lowest level of exclusion and would be the ideal region in that factor. The aim now is to determine the distance between every region, in each one of the factors, and the group of ideal regions for the factors shaping the dimension. To that end, the Euclidean distance of every region i to the ideal region is estimated:

$$d(\text{region}_i, \text{ ideal region}) = \left[\sum_{j=1}^{k} w_j^2 \left(f_{ij}^{\pm} - f_{ij}^{ideal}\right)^2\right]^{1/2}. \tag{5}$$

In conclusion, we obtained a synthetic indicator which classifies regions based on their proximity to the ideal one by considering the cluster of factors found. This methodological choice of selecting the best regional achievement instead of the national average is due to our will to better capture regional disparities.

Results

This section presents the results obtained after applying the methodology, as well as the variables introduced in the model, the resulting explanatory factors, the temporal evolution of their mean values, territorial disparities in each of them, and finally the synthetic indicator that accounts for social inequality in the research field under study.

Set of initial variables

The initial selection of variables related to the risk of social exclusion in the employment dimension took into account the variables used in the already-mentioned international systems of social indexes or indicators of quality of life [OECD (2014a, 2014b); European Commission (2015), Eurostat (2017)], and in the literature on social exclusion in Spain and its regions [Subirats (2005); Gallego and Subirats (2011); Fundación FOESSA (2014)]. When collecting variables, special attention was paid to the indicators accounting for job insecurity, such as temporality, accident rate, work intensity or low pay, as well as some institutional aspects like flexible working arrangements or the coverage of collective bargaining, following Gallego and Subirats (2011).

The data on 25 variables (Table I) were collected from the surveys of the Spanish National Statistics Institute on Labour Force and Living Standards, as well as the surveys of the Ministry of Employment and Social Security on Registered Labour Movement, Employment Regulation and Affiliation of Workers to the Social Security System. A few variables not available at a regional level were constructed from the microdata of the Living Standards Survey, such as the percentage of employees earning less than the minimum wage, and the percentage of full-time and part-time working poor. When possible, variables

Variables	Source
Percentage of employees with fixed-term contracts	Labour Force Survey, Spanish National Statistics Institute
Percentage of employees with open-ended contracts	
Economic activity rate by age, sex and nationality	
Employment rate by age, sex and nationality	
Unemployment rate by sex, gender and nationality	
Percentage of employers with respect to number of self-employed workers	
Percentage of family assistance with respect to number of self-employed workers	
Percentage of independent workers with respect to number of self-employed workers	
Percentage of members of a cooperative with respect to number of self-employed workers	
Percentage of employees with respect to total number of economically active persons	
Percentage of wage-earners in the public sector with respect to total number of employees	
Percentage of part-time workers with respect to total number of economically active persons	
Percentage of households with low work intensity (when the ratio between the total number of months that all working-age household members have worked and the total number of months the same household members theoretically could have worked is below 0.2)	Living Conditions Survey, Spanish National Statistics Institute
Percentage of employees earning less than the minimum interprofessional wage	
Percentage of working poor (income 60% lower than national median wages)	
Percentage of full-time working poor	
Percentage of part-time working poor	
Rate of work accidents (number of work accidents per 1,000 inhabitants)	Registered Labour Movement, Spanish Ministry of Employment and Social Security
Percentage of open-ended contracts over total number of contracts	
Percentage of fixed-term training contracts over total number of contracts	
Percentage of fixed-term contracts turned into open-ended contracts over total number of contracts	
Percentage of contracts to disabled workers over total number of contracts	
Percentage of workers affected by procedures of collective redundancy (ERE) over total number of workers contributing to the Social Security system	
Percentage of workers participating in strikes over total number of workers contributing to the Social Security system	
Percentage of workers affected by collective agreements over total number of workers contributing to the Social Security system	

Table I.
Initial variables

Source: Own elaboration

such as employment and unemployment rates were broken down by sex, age or nationality, with the aim of analysing these axes of social inequality.

In conclusion, the information matrix is made up of this series of variables for each autonomous community and city in every year of the period under study (2009-2014).

Calculation of exclusion factors

First, the minimum requirements to run the factor analysis were checked: the KMO value was equal to 0.775, and Bartlett's sphericity test was significant (p-value = 0.000). The communalities, which represent the coefficient of multiple linear correlation of each variable[5] with the factors, are high (Table II), implying that all variables are very well represented in the factor space.

V1: Foreign-born unemployment rate	0.824
V2: Unemployment rate in people aged under 25	0.913
V3: Employment rate in people aged 25-54	0.922
V4: Employment rate in people aged under 25	0.886
V5: Unemployment rate in people aged 25-54	0.930
V6: Percentage of households with low work intensity	0.779
V7: Percentage of employees earning less than minimum wage	0.862
V8: Percentage of working poor	0.778
V9: Unemployment rate in people aged over 54	0.821
V10: Percentage of contracts to disabled people over total contracts	0.671
V11: Rate of work accidents	0.706
V12: Percentage of employees with fixed-term contracts	0.797
V13: Percentage of employees with open-ended contracts	0.867
V14: Employment rate in people aged over 54	0.814

Source: Own elaboration

Table II. Communalities

The optimum number of factors was given by the Kaiser rule, which determined the extraction of four factors, using Varimax rotation to facilitate the interpretation. Table III shows the variables that correlated with all four factors that account for nearly 83 per cent of data variability; w_j being the percentage of variance explained by factor j divided by the overall explained variance.

	Factors			
Factors and variables	1	2	3	4
Unemployment factor				
Foreign-born unemployment rate	0.895	−0.105	0.015	−0.109
Unemployment rate in people aged under 25	0.852	0.355	−0.243	0.044
Employment rate in people aged 25-54	−0.851	−0.388	−0.207	0.070
Employment rate in people aged under 25	−0.821	−0.080	0.325	0.155
Unemployment rate in people aged 25-54	0.788	0.355	−0.028	0.000
Percentage of households with low work intensity	0.783	0.399	−0.035	−0.070
Income insecurity factor				
Percentage of employees earning less than minimum wage	0.074	0.901	−0.028	−0.212
Percentage of working poor	0.290	0.794	0.113	−0.223
Unemployment rate in people aged over 54	0.260	0.763	−0.133	−0.097
Job insecurity factor				
Percentage of contracts to disabled people over total contracts	−0.033	0.066	−0.800	0.161
Rate of work accidents	−0.310	0.004	0.780	0.051
Percentage of employees with fixed-term contracts	0.202	0.297	0.573	−0.225
Standard employment factor				
Percentage of employees with open-ended contracts	−0.279	−0.085	−0.164	0.869
Employment rate in people aged over 54	0.142	−0.356	−0.016	0.817
% of explained variance	33.56	22.69	13.72	12.73
Weights (w_j)	0.4061	0.2740	0.1658	0.1541

Source: Own elaboration

Table III. Rotated component matrix

The first factor, named Unemployment, reveals the impact that the general conditions of the labour market, in terms of unemployment and employment (the latter with negative values in the matrix coefficients, which indicates an inverse influence of unemployment on the risk of exclusion) have on employment exclusion. By referring only to unemployment, we seek to avoid possible misunderstandings regarding the positive relationship of this factor as a whole with exclusion in the employment dimension; that is, the direct relationship between this factor and exclusion (the higher the factor value, the higher the risk). This factor clusters employment and unemployment rates in the youth (people under the age of 25) and in people aged between 25 and 54, coupled with the foreign-born unemployment rate and the percentage of households with low work intensity.

The differentiation of employment and unemployment by sex and foreign origin (from the EU or non-community origin) has become irrelevant in the first factor because these variables are all associated with that factor. Only age differentiation in the over 54-year-old group has linked unemployment and employment rates to factors other than the first one.

The second factor is Income Insecurity, which involves low wages in general and unemployment in people aged over 54. Therefore, the vulnerability of older unemployed people, who have suffered the cutbacks in the duration and amounts of unemployment benefits during the crisis, is associated with the economic insecurity arising from income poverty and very low wages.

The third factor was called Job Insecurity, which gathers variables such as work accident rate, temporary work and the access of disabled people to the labour market. The latter has a negative coefficient in the matrix of rotated components (the higher the hiring of disabled people, the lower the risk of employment exclusion), whereas the other two variables have a positive relationship with employment exclusion (increased rates of temporary work and work accidents lead to higher risk of exclusion).

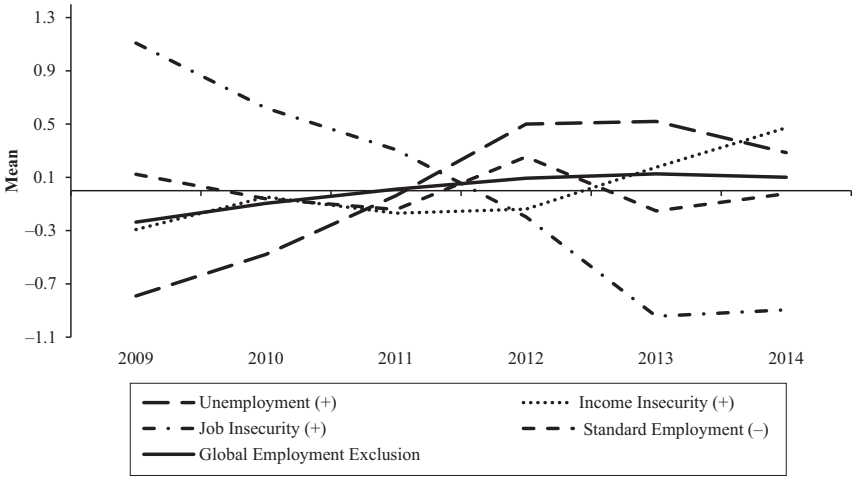
And finally, the fourth factor is Standard Employment according to the term used by the International Labour Organization to refer to the traditional functions of the employment relationship (stability, predictable and reliable incomes, safe workplaces, social protection, etc.) that enable work to satisfy a person's fundamental needs [ILO (2016), pp. 10-15]. This last factor involves a better inclusion in the labour dimension and it is defined by the percentage of employees with indefinite contracts and the employment rate in people aged over 54. The over-54 group at large exhibits employment and unemployment rates under the average of the overall working-age population. This is due to the lower participation of women in this age bracket and the proximity to retirement. Higher job security rates, less temporary work, and a wide percentage of wage-earners in the public sector, especially women, are found in this age group [CES (2014), pp. 39-42; SEPE (2015), p. 37].

Thus, the first three factors apprehend precariousness in the labour market, describing the increasing insecurity and vulnerability of workers [Koukiadaki and Katsaroumpas (2017), p. 19]. In contrast, employment and income security, linked to an indefinite employment relationship, are represented in the fourth factor.

Temporal and spatial evolution of exclusion factors

Figure 1 shows the trend of the mean values of the exclusion factors obtained in the employment dimension between 2009 and 2014. Factors 3 and 4, Job Insecurity and Standard Employment, underwent a decrease in their mean values, more sharply in the former and very slightly in the latter.

The reduction of the mean value of Job Insecurity, which promotes lower employment exclusion, is due to a slight improvement in its three components between 2009 and 2014: decreased rates of temporary work and work accidents coupled with increased rates of



Notes: (+) Direct relationship with employment exclusion (the higher the factor value, the higher the exclusion); (–) Inverse relationship with employment exclusion (the higher the factor value, the lower the exclusion)
Source: Own elaboration

Figure 1.
Temporal evolution of mean values by factors

labour market inclusion for individuals with a disability. The evolution of these three variables is visible in the national territory as a whole and in most regions. Nevertheless, there is an upturn in the mean value of this factor in 2014[6] leading to a change in trend.

On the other hand, the slight decrease in the mean value of the Standard Employment factor shows a more erratic course, with ups and downs throughout the period under analysis. On the contrary, there is a rise in the mean values of factors 1 and 2, Unemployment and Income Insecurity, in the same period, which worsens the conditions of the employment dimension. As a result, the rising trend of the global mean value of all factors implies the worsening of employment exclusion in the period under analysis[7].

Regional differences are shown in Figure 2, the most noticeable ones being found in Income Insecurity and Standard Employment. Likewise, Ceuta and Melilla show the most differing mean values of Unemployment with respect to the other regions. The graphical analysis gives an account for the positions of the autonomous communities and cities regarding their performance in every employment exclusion factor. It also provides the number of regions located in each factor according to whether they are pro or against exclusion. Most regions lean towards exclusion in the negative factor Standard Employment, as 12 regions have values below 0 (mean value of the factor). This implies that the fourth factor increases employment exclusion in most of the Spanish territory. There are fewer regions with values over zero in the remaining factors, which are all positive: Unemployment (6) and Income Insecurity (7). Job Insecurity (9) displays a more even distribution.

Consequently, the group of regions that could worsen the risk of employment exclusion is smaller than the number of regions that could diminish it by reducing or improving the positive factors. However, the fact that Andalusia is in the small group of regions with a positive impact on the risk of employment exclusion counteracts this situation, given its demographic weight.

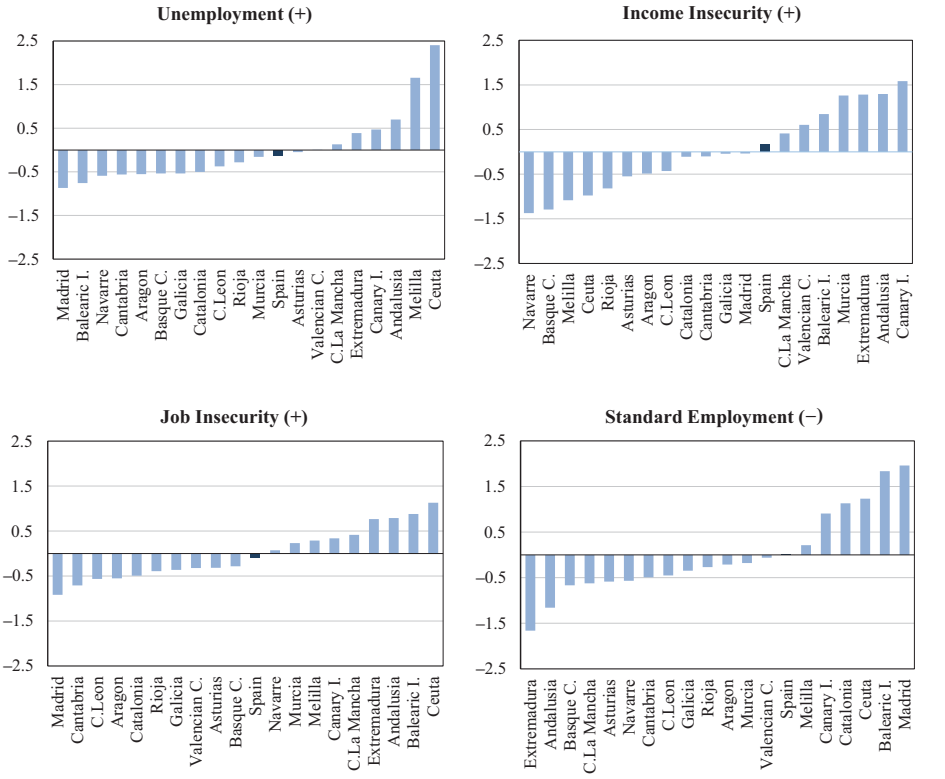


Figure 2.
Mean value of factors across regions

Notes: (+) Direct relationship with employment exclusion (the higher the factor value, the higher the exclusion); (–) Inverse relationship with employment exclusion (the higher the factor value, the lower the exclusion)
Source: Own elaboration

In any case, it seems obvious that the Spanish policies against employment exclusion must be implemented by the majority of autonomous communities and cities, so that the indicators related to the employment factors obtained are strengthened; the positive factors should be reduced and the negative factor should be increased.

Employment exclusion index

The nature of each factor must be taken into account to achieve a global indicator of employment exclusion. As previously said, the first three factors contribute to employment exclusion (positive factors) whereas the fourth one (negative) behaves inversely (the higher the value, the lower the exclusion). The transformations necessary for all four factors to be interpreted in the same way were performed by expressions (3) and (4) (Table IV).

Madrid gets the lowest value in three factors (Unemployment, Job Insecurity and Standard Employment), whereas Navarre has the lowest value in Income Insecurity. The highest values in Unemployment and Job Insecurity are found in Ceuta; and the maximum values in Income Insecurity and Standard Employment are registered in the Canary Islands

Region	Unemployment	Income insecurity	Job insecurity	Standard employment
Andalusia	0.4792	0.9024	0.8332	0.8610
Aragon	0.0969	0.2997	0.1791	0.6001
Asturias	0.2510	0.2789	0.2931	0.7030
Balearic Islands	0.0340	0.7503	0.8781	0.0346
Basque Country	0.1010	0.0278	0.3094	0.7257
Canary Islands	0.4092	1.0000	0.6133	0.2909
Cantabria	0.0939	0.4301	0.1017	0.6773
Castile and Leon	0.1507	0.3187	0.1728	0.6656
Castilla-La Mancha	0.3056	0.6039	0.6503	0.7139
Catalonia	0.1120	0.4270	0.2072	0.2288
Ceuta	1.0000	0.1337	1.0000	0.2012
Extremadura	0.3843	0.8975	0.8218	1.0000
Galicia	0.1016	0.4500	0.2705	0.6371
Madrid	0.0000	0.4520	0.0000	0.0000
Melilla	0.7720	0.0977	0.5895	0.4827
Murcia (Region of)	0.2177	0.8905	0.5614	0.5906
Navarre	0.0848	0.0000	0.4836	0.6980
Rioja (La)	0.1798	0.1869	0.2565	0.6151
Valencian C	0.2668	0.6684	0.2905	0.5580
Spain	0.2285	0.5187	0.3953	0.5390

Source: Own elaboration

Table IV. Transformed employment exclusion factors

and Extremadura, respectively. Therefore, the region with the lowest score is the ideal region for each factor: Navarre for Income Insecurity and Madrid for the other three factors. The highest values for Spain as a whole are found in Standard Employment and Income Insecurity.

Figure 3 shows the distance between every region and the ideal one in all four factors. The regions with the best positions are at the extreme points, in the outer part of the figure. The closer to the core of the graphic, the higher the risk of exclusion associated with each employment factor, compared to its ideal region. The Community of Madrid is the reference to calculate the distances of the rest of regions in three factors, and Navarre in the fourth one.

The employment exclusion index (Table V) was calculated by expression (5), from the transformed factors and once the ideal region was determined. This provides a ranking of regions.

The most advantageous positions are held by Madrid and the Basque Country; whereas the worst scores are found in Ceuta, Andalusia and Extremadura (Figure 4). The employment exclusion index for Spain is at an intermediate position with seven autonomous communities and the two autonomous cities with higher values.

These results suggest that regions group according to their ratings in the employment dimension. Madrid, Basque Country, Aragon, Catalonia, La Rioja and Navarre form the first group, with the lowest values (between 0.12 and 0.14). The second group includes Castile and Leon, Cantabria, Galicia and Asturias, which are close to the former group, their values being 20-40 per cent higher than the lowest value (Madrid). The remaining regions show values far too high compared to these two groups, especially Andalusia and Extremadura, whose indicators practically triple the index of the best placed region, and Ceuta, where there is a 256 per cent increase.

These findings are consistent with previous research, although they refer to different time periods and adopt a different analytical perspective. Merino Llorente *et al.* (2012)

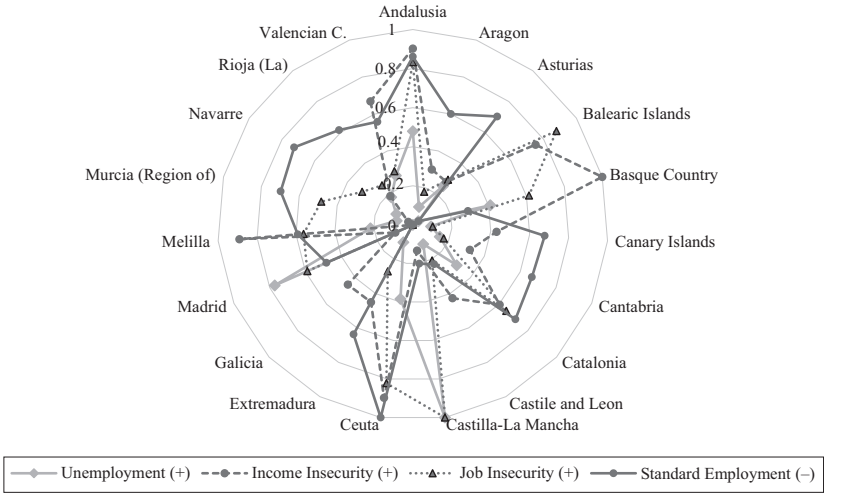


Figure 3.
Exclusion factors

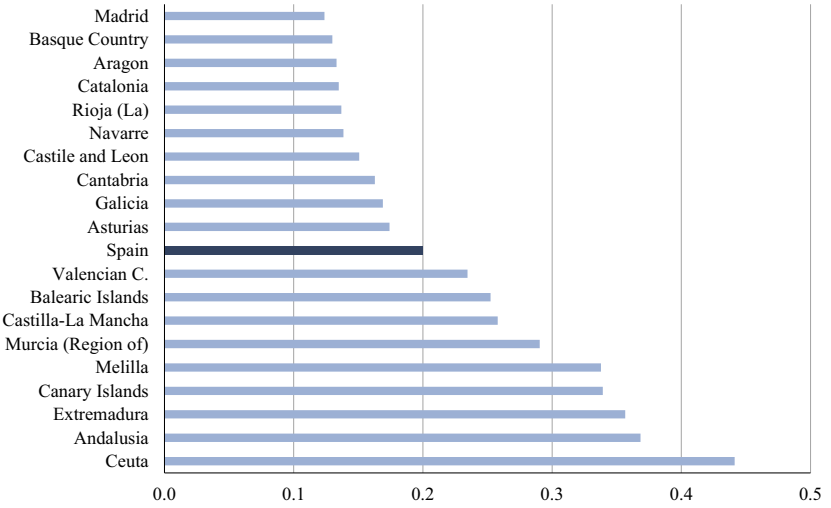
Source: Own elaboration

Andalusia	0.3684
Aragon	0.1331
Asturias	0.1741
Balearic Islands	0.2524
Basque Country	0.1299
Canary Islands	0.3392
Cantabria	0.1628
Castile and Leon	0.1507
Castilla-La Mancha	0.2579
Catalonia	0.1348
Ceuta	0.4412
Extremadura	0.3566
Galicia	0.1690
Madrid	0.1239
Melilla	0.3378
Murcia (Region of)	0.2904
Navarre	0.1385
Rioja (La)	0.1369
Valencian C	0.2345
Spain	0.2000

Table V.
Employment exclusion index

Source: Own elaboration

highlight the weakening in the levels of employment quality in the autonomous communities between 2007 and 2010, which diverge because of the increased regional disparities due to the crisis. More recently, in Felgueroso (2018), the most vulnerable population with regard to employment for the year 2017 is distributed across the Spanish territory in a very similar manner as our employment exclusion index for the period of crisis.

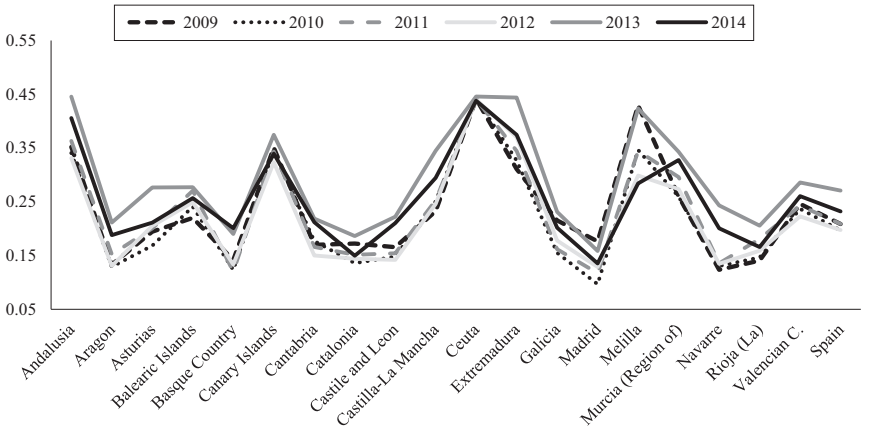


Source: Own elaboration

Figure 4. Employment exclusion index ranking

Likewise, the regions with higher quality of life at work according to INE (2018b) for 2017 are the regions with lower employment exclusion rates revealed by this study. Therefore, the positions of autonomous communities in relation with employment exclusion remain despite the recent economic revival.

To ensure consistency in the results, the calculation of employment exclusion is reproduced for each year between 2009 and 2014, analysing their annual evolution (Figure 5). It can be seen that the territorial positions remain stable every year of the period under analysis, with a significant Spearman's correlation coefficient over 0.9 in all the cases. This



Source: Own elaboration

Figure 5. Temporal evolution of the Employment exclusion index

corroborates the validity of the method used to build an employment exclusion index that allows analysing the evolution of multiple variables in the years of economic crisis, synthesised in a single figure.

Finally, the explanatory power of our employment exclusion index is corroborated by its strong links to the regional risk of poverty or social exclusion measured by the AROPE rate (Figure 6). However, it should be considered that employment exclusion is integrated in the AROPE rate through the indicator population living in (quasi-)jobless households, and it may also influence its most important component, being at risk of poverty, through working poverty.

As it could be expected, increased regional values of the employment exclusion index are associated with increased levels of poverty or social exclusion. The case of Navarre is noticeable because its employment exclusion index is higher than other regions, but it also has the lowest risk of poverty or social exclusion, due to the fact that this community has the best results in social policies. As for Ceuta and Melilla, they are far from the trend because of their specificity.

Conclusions

This paper contributes to the discussion on regional disparities regarding employment exclusion under an approach of multidimensional analysis, more commonly used in national comparative studies. The factors shaping risk of employment exclusion are Unemployment, Income Insecurity, Job Insecurity and Standard Employment, identified by a factor analysis conducted on a wide set of indicators taken from different sources of information. The first three are positive (the higher the factor value, the higher the risk), whereas the latter is negative (the higher the value, the lower the risk).

Unemployment is the factor that accounts for the variability of regional data to a greater extent. The most noticeable differentiation shaping this factor is observed in the age groups of employment and unemployment rates in the young and adults aged up to 55. While the first factor explains regional disparities with regard to quantity of employment available, the other three factors account for aspects related to quality of employment. Therefore, the results point out the need for considering some aspects of the labour market that are more

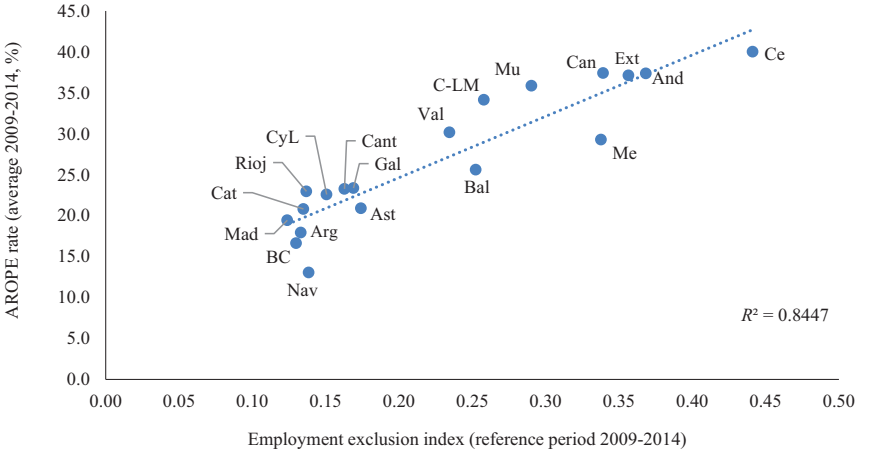


Figure 6.
Link between Employment exclusion index and AROPE rate

Source: Own elaboration

associated with working conditions such as income, stability or security, in addition to the problems in the access to the labour market, usually represented by the unemployment rate.

Furthermore, the remarkable increase in the risk of social exclusion in the employment dimension between 2009 and 2014 has been confirmed. This trend is due mainly to the bad performance of the variables associated with two explanatory factors for this dimension (Unemployment and Income Insecurity), which keep growing throughout the period under analysis.

A synthetic employment exclusion index was constructed to rank the Spanish regions. The interpretation is simple: the lower the value, the more reduced the risk of exclusion. Ceuta, Andalusia, Extremadura, the Canary Islands, Melilla and the Region of Murcia are the lowest ranked regions, whereas Madrid, Basque Country, Aragon, Catalonia, La Rioja and Navarre hold the best positions.

This classification is to be regarded in relative terms, as it takes the best results of one region, the ideal one, as a reference, but it does not mean that such region has an optimal problem-free social framework. Instead, the methodology applied in the construction of the employment exclusion index underlines the measurement of territorial disparities. This facilitates an approach to research on the causes for the observed distances, especially on the possible differences regarding the regional policy measures implemented.

The territorial disparities in employment exclusion remain despite the recovery of the labour market, which is in line with other recent studies [Felgueroso (2018); INE (2018b)]. The persistent employment vulnerability has a negative effect not only on the people concerned but also on potential growth and social cohesion [Eurostat (2018); Eurofound (2018)]. Therefore, more accurate knowledge on the territorial disparities in Spain is crucial to raise awareness and tackle the problem without further delay.

Ultimately, results highlight the need for closing distances between regions, reducing the high risk of employment exclusion in many of them. Therefore, it is necessary to implement some measures by social and economic policies aiming at a more inclusive growth and reinforcing the social cohesion levels that were so badly damaged by the crisis. Therefore, reduced unemployment rates, which are expected to continue falling if the economic recovery goes on, are not enough to diminish the risk of employment exclusion, but instead it is income conditions and stability in labour relations that need to be improved. To that end, it seems necessary not only to enhance government coordination at national, regional and local levels but also to take alternative approaches, as suggested by Iammarino *et al.* (2017), who recommend the implementation of place-sensitive distributed development policies that consider the structural potentials and limitations of every territory.

Notes

1. This indicator has met with criticism due to some methodological weaknesses and the appropriateness of the measurements. See Ponthieux (2017) for further information.
2. Working poverty does not only rely on low pay per hour but also on the household's low work intensity, size and composition [Eurofound (2017)].
3. Aggregation in composite indicators is a controversial issue. A common choice is equal weighting, where the same weight is given to the different dimensions and variables, previously normalised, within each dimension. This could result in an unbalanced structure of the composite index because the dimensions grouping the larger number of variables will have higher weight [OECD (2008), p. 31].

4. Meaning that an increase in the factor leads to a rise in the risk of exclusion (positive factor), or otherwise, an increase in the factor reduces or contributes negatively to the risk of exclusion (negative factor).
5. The variables showing a very low communality and a correlation with factors below 0.3 were dropped. The Appendix includes the mean values and standard deviation of the variables selected for the model by region in the period 2009-2014. V8 and V10 show the highest territorial dispersion, measured through the coefficient of variation, whereas the opposite occurs in V3 and V14.
6. For instance, according to the Labour Force Survey, the temporary work variable, which is included in the third factor, increased again in Spain as a whole and in almost every region between 2014 and 2016, together with the employment growth registered in this period (www.ine.es/jaxiT3/Datos.htm?t=4961).
7. After a non-parametric Kruskal–Wallis test, it is determined that changes in mean values are statistically significant in Unemployment and Job Insecurity, whereas they are not in Income Insecurity and Standard Employment.

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Appendix

Table AI. Mean and standard deviations of variables selected for factor analysis, 2009-2014

	V1		V2		V3		V4		V5		V6		V7	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Andalusia	37.12	3.17	56.40	7.36	58.85	2.33	19.45	4.57	29.30	3.95	19.87	5.53	30.07	4.02
Aragon	33.96	5.26	41.27	7.83	73.57	1.74	25.15	4.60	16.56	2.65	8.03	3.18	20.02	1.93
Asturias	33.66	7.97	44.97	6.90	66.62	2.63	19.85	4.76	18.73	4.34	14.55	5.00	16.30	4.33
Balearic Islands	28.38	2.60	42.67	5.17	71.05	1.20	28.68	4.69	19.44	1.63	9.05	2.75	26.33	4.16
Basque Country	31.46	6.97	38.43	6.50	76.53	1.80	23.05	4.98	13.03	2.60	10.02	2.46	14.12	2.93
Canary Islands	33.65	1.29	55.92	6.30	60.04	1.73	19.48	3.42	28.97	2.70	19.80	5.30	28.40	2.79
Cantabria	29.77	3.89	41.66	7.55	71.32	2.18	20.64	5.61	15.65	3.25	11.77	3.64	25.06	3.44
Castile-Leon	34.41	3.87	42.14	7.56	70.96	1.59	23.14	5.28	17.12	2.83	11.13	3.31	19.27	3.02
Castilla-Mancha	38.03	4.05	50.71	9.34	65.27	2.47	22.90	6.11	22.88	3.99	13.67	4.23	23.27	4.23
Catalonia	34.40	4.07	44.58	5.18	72.99	1.60	28.01	4.07	18.13	2.38	10.07	2.21	19.30	1.48
Ceuta	51.96	8.62	62.17	12.41	55.42	3.84	14.80	5.07	27.08	7.07	23.03	2.97	16.21	3.74
Extremadura	41.16	10.48	52.82	7.62	61.44	3.15	20.11	3.98	25.21	5.07	16.23	3.60	33.24	5.27
Galicia	31.36	6.68	41.17	7.16	70.09	2.46	22.87	4.72	17.54	3.62	12.57	2.39	22.68	3.14
Madrid	26.54	3.79	42.99	5.95	75.85	1.47	25.35	4.66	15.49	1.93	7.62	1.71	16.41	1.43
Melilla	48.16	6.74	54.26	8.10	57.75	2.04	14.48	3.91	24.44	3.70	14.95	4.05	14.80	4.05
Murcia (Region of)	34.82	1.86	46.25	7.23	64.56	1.54	24.07	4.91	23.92	2.63	14.78	4.58	30.68	6.16
Navarre	31.13	7.05	37.32	7.60	76.68	2.15	25.49	5.91	13.32	2.71	6.22	1.64	15.09	2.25
Rioja (La)	34.22	3.67	43.39	5.91	74.02	2.04	23.37	4.64	15.75	2.92	10.57	2.79	16.93	2.58
Valencian C	35.46	1.99	49.80	6.65	65.90	1.56	23.45	5.42	23.25	2.47	14.30	3.27	24.52	3.01
Spain	33.04	3.14	47.82	6.55	68.32	1.82	23.29	4.63	20.85	2.89	13.12	3.15	22.08	2.24

Sources: The denomination of variables V1-V14 is shown in Table II. Own elaboration. Financing: a part of this work was financed by the 20th Award of Research on "Inequality, poverty and social exclusion: coordination and evolution of public policies in Spain" (Spanish Economic and Social Council)

(*continued*)

Table AI.

	V8		V9		V10		V11		V12		V13		V14	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Andalusia	18.41	2.23	24.95	4.26	0.08	0.01	38.08	5.27	33.78	1.55	66.22	1.55	15.05	0.43
Aragon	10.05	2.66	10.60	3.16	0.13	0.03	30.33	3.61	22.77	1.00	77.23	1.00	19.34	0.67
Asturias	9.62	1.52	10.70	2.24	0.17	0.05	41.95	6.67	23.77	0.86	76.23	0.86	16.24	0.76
Balearic Islands	11.69	1.39	15.26	3.20	0.12	0.03	45.55	4.99	25.52	0.88	74.48	0.88	23.69	0.62
Basque Country	6.19	1.05	8.30	1.53	0.13	0.02	37.33	5.03	22.05	0.80	77.95	0.80	18.98	0.71
Canary Islands	17.32	2.51	22.10	2.99	0.13	0.03	39.32	5.06	29.58	1.07	70.42	1.07	18.84	0.56
Cantabria	12.74	1.99	10.50	2.82	0.12	0.03	31.06	4.49	21.27	1.17	78.73	1.17	18.43	1.15
Castile-Leon	10.49	1.99	12.51	2.52	0.13	0.02	33.72	5.91	21.35	0.59	78.65	0.59	17.50	0.63
Castilla-Mancha	15.97	2.14	19.15	5.35	0.10	0.03	41.04	6.04	25.23	1.73	74.77	1.73	15.92	0.31
Catalonia	8.64	0.60	14.32	2.74	0.15	0.03	34.73	5.05	18.65	0.71	81.35	0.71	21.04	0.54
Ceuta	12.96	7.81	12.99	5.35	0.08	0.05	38.11	8.86	23.57	8.18	76.43	8.18	24.56	1.28
Extremadura	22.10	3.51	22.21	4.62	0.07	0.01	35.70	5.07	34.52	1.30	65.48	1.30	14.10	0.87
Galicia	10.45	1.57	11.64	2.97	0.14	0.03	36.63	6.96	24.20	1.30	75.80	1.30	17.34	0.45
Madrid	8.33	0.89	13.17	2.55	0.15	0.05	30.35	4.60	17.85	1.33	82.15	1.33	22.75	0.66
Melilla	8.70	3.56	15.06	6.72	0.13	0.06	34.00	5.18	27.57	4.48	72.43	4.48	21.88	2.23
Murcia (Region of)	18.93	3.61	17.09	4.03	0.13	0.02	33.81	4.43	32.43	0.66	67.57	0.66	18.60	0.82
Navarre	5.91	1.67	7.91	1.38	0.09	0.01	34.09	5.17	23.03	1.83	76.97	1.83	20.53	1.41
Rioja (La)	9.96	1.90	11.34	3.53	0.13	0.03	35.20	5.65	20.40	0.68	79.60	0.68	20.15	0.61
Valencian C	14.14	1.97	17.67	2.88	0.13	0.04	30.79	4.20	27.05	0.48	72.95	0.48	17.79	0.64
Spain	12.09	0.94	15.90	2.95	0.12	0.02	34.94	5.08	24.25	0.81	75.75	0.81	18.59	0.20