

# SPATIAL ANALYSIS OF THE EUROPEAN SOCIAL FUND IN THE REGION OF THE PRINCIPALITY OF ASTURIAS

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## ABSTRACT

*The aim of this work is the study of the variable "public investment" through the European social fund (ESF) in the region of Asturias, including the factor "space" as determinant, using specific techniques for working with spatial data, since, classical econometric techniques have proved insufficient to model situations with cross-section territorial data, creating the need to use these specific techniques spatial econometrics.*

**Keywords:** European Social Fund, Exploratory Spatial Data Analysis, Spatial Effects.

## INTRODUCTION

In the 2007-2013 programming period, the social and economic cohesion of the EU is carried out through three Funds: the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund which contribute to the achievement of the three priority objectives of the European Regional Policy: convergence, regional competitiveness and employment and European territorial cooperation. The ESF is the main instrument with which Europe supports job creation, helps people to get better jobs and ensures fairer job opportunities for all citizens. An essential and little studied factor of employment is "space", therefore, it is necessary to consider the study of the variable "Public Investment" through the European Social Fund (ESF) including the "space" factor as a fundamental variable. Spatial econometrics is defined as "the set of techniques that have to do with the peculiarities caused by space in the statistical analysis of regional science models" (Anselin, 1988). The study of spatial effects (spatial autocorrelation and spatial heterogeneity) is usually given, when data from very different spatial units are used, to explain the same variable or the same phenomenon. Spatial Econometrics is made up of a set of techniques that can be classified into two large groups: Exploratory Analysis and Confirmatory Analysis. In our case we will focus on exploratory analysis.

## DATA

The main source of data used has been the Asturian Society for Economic and Industrial Studies (SADEI) and the National Institute of Statistics (INE). Another source used for the case of micro-territorial data is the Public Employment Service of the Principality of Asturias (SEPEPA) in Table 1.

<b>Table 1 DATA AND VARIABLES</b>			
Variable	Description	Unit	Source
IPFSE07-13	FSE Public Investment 2007-2013. Source: Public Employment Service of the Principality of Asturias. Ministry of Economy and Employment	Euros	Consejería de Economía y Empleo Government of the Principality of Asturias
CONT13	Contracts made in 2013. Source: SADEI. Unit: Contracts	Contracts	SADEI
EMP13	Employment in 2013. Source: SADEI. Unit: Jobs	Jobs	Consejería de Economía y Empleo Government of the Principality of Asturias
PAR14	Registered unemployment in 2014 Source: Public Employment Services. State (SEPE) and Autonomous (SEPEPA).	Unemployment	Consejería de Economía y Empleo Government of the Principality of Asturias

**Table 1:** Data and Variables.

## METHODOLOGY

The ESDA or Exploratory Spatial Data Analysis can be defined as a “*collection of techniques to describe and visualize spatial distributions, identify atypical spatial locations or spatial outliers, discover patterns of spatial association, clusters or hot spots, and suggest spatial regimes or other forms of spatial heterogeneity*” (Anselin, 1998). The exploratory analysis of spatial autocorrelation is carried out in a first phase globally (through the global indices of spatial autocorrelation) and later locally, for this the local indices of spatial autocorrelation, called LISA (Local Indicator of Spatial Association) are used. Regarding the analysis of global spatial autocorrelation, it tries to carry out a joint examination of all the units that make up the sample to determine if the spatial units are randomly distributed or if, on the contrary, they do so according to a certain pattern. The contrasts used are the Moran’s I (Moran, 1948), the Geary’s C (Geary, & G (d) of Ord & Getis, (1992). For the detection of agglomerations (clusters) it is essential to analyze the local spatial autocorrelation. Anselin (1995) defines a LISA (Local Indicator of Spatial Association) indicator as a statistic that satisfies two requirements: on the one hand, it provides a quantification of the degree of significant grouping of similar values around an observation, and on the other hand, the sum of the LISA's for all observations is proportional to a global indicator of spatial association, so it is useful to measure the contribution of each observation to the value of the global contrast.

## RESULTS

To detect the presence of global spatial autocorrelation, we initially used Moran's test (Moran's scatterplot). After having carried out the randomization process, in some specific cases there are doubts, some variables are not significant at 95%, although they are significant at 90%,

yielding a pseudo p-value very close to 0.05, and the value of the I is greater than its expected value, which indicates spatial autocorrelation and in this case positive, for the variables studied.

From the analysis carried out, it is clear that locations with a higher level of employment or more economically developed areas are more influenced by councils with similar levels of employment and vice versa. Regarding the Local Spatial Autocorrelation, Local indicators of spatial association or LISA maps have been calculated. The local autocorrelation test is significant, observing clusters in the councils with the largest population and most urban character. The results are very similar if we use the G and the corrected G of Getis & Ord (1992).

## CONCLUSION

The observation of clusters that has been detected in the AEDE, can be both a consequence of spatial autocorrelation or even a sample of the presence of spatial heterogeneity. Therefore, it seems appropriate to propose spatial models with spatial econometric techniques in the study and estimation of different models for analyzing the possible influence of the Public Investment ESF-Asturias which provide us with information on priority issues of the ESF such as: promotion of entrepreneurship and innovation and population fixation in the territory.

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