# SPATIAL CORRELATION IN RULINGS CONCERNING LAYOFF DISPUTES: AN ANALYSIS OF SPANISH LABOUR COURTS

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## ABSTRACT

The current paper seeks to explain differences in the number of layoff disputes resolved in favour of workers in Spanish labour courts. Although legal decisions should be based solely on an objective analysis of a case, the literature has shown that judges are influenced by socioeconomic conditions. In particular, economic research has revealed disparities in rulings depending on the economic cycle. This paper explores a different issue: namely, whether local and/or regional patterns may impact judicial decisions. For this purpose, we use a General Council of the Judiciary database, which provides court level information on the number of cases resolved in favour of the worker by judges between 2004 and 2010. From a methodological point of view, we use spatial econometrics. Specifically, we suggest different spatial correlation matrices to find local and/or regional patterns. Underlying the current analysis is the notion that judges might be influenced by the decisions taken by their colleagues in neighbouring provincial or even regional courts, given the existence of a High Court in each region which acts as the highest authority before which appeals may be filed.

## HIGHLIGHTS

Are judges' decisions affected by those of their colleagues in neighbouring courts?
There is no global spatial correlation at a geographical level in judges' decisions.
It is found spatial correlation at an administrative level in judges' decisions.
The results show evidence of what we have called "*reversal* and *emulation effects*"

Keywords:
Spatial correlation, labour courts, layoffs, judges' decisions
JEL codes:
K31, K41, C21, R12

## 1. INTRODUCTION

Are judges' decisions affected by those of their colleagues in neighbouring courts? This is the question which the current research seeks to answer. We analyse decisions taken by judges in labour courts, particularly those dealing with layoff disputes. A number of works, which we examine later, have already explored the influence of socioeconomic circumstances on judges' decisions. However, these works focus on whether the economic cycle leads labour court judges to find in favour of workers more or less often. Our purpose is quite different. What we aim to ascertain is whether being "surrounded" by other judges (or courts) who are more likely to find in favour of workers involved in labour disputes, has a positive impact on other judges' (or courts') propensity to do likewise. Put in more technical terms, we aim to determine whether there is a positive spatial correlation in labour court rulings.

As we are aware of the likely spatial correlation generated in our variable of interest by similar economic structures in neighbouring territories, we perform our empirical analysis at two different levels. The first one is quite common in regional economics and makes use of the rather standard spatial contiguity matrices. The second one constitutes the main innovative element of this research. Here we define several alternative correlation matrices with a legal-administrative basis instead a pure geographical one. By comparing and contrasting the results obtained at the two levels we reach our main conclusions. More precisely, what we find is a weak or practically null correlation when we consider the pure geographical level whereas we observe a strong correlation when we look at the legal-administrative scenario. These facts make us think that two effects of a subjective nature could be operating, the "*reversal* or *annulment effect*" and especially the "*emulation effect*". These ones will be explained in greater detail in the next section.

One further point is that, in an effort to pinpoint possible temporal patterns, our analysis covers a period spanning the years leading up to the current economic crisis as well as the years in which the effects of the crisis had made themselves felt. Specifically, we study the period between 2004 and 2010. It should be remembered that most of the layoffs sparked by the crisis starting in 2008 have led to a significant increase in the number of cases brought before the labour courts. Specifically, the number of cases involving layoffs to reach the courts virtually doubled between 2004 and 2010[1].

The rest of the paper is organised as follows: in the following section, we identify three reasons which could cause significant spatial correlation among judges' decisions. In section three, we explain the main characteristics governing the functioning of the labour court system in Spain. In section four, we review prior literature. Section five presents the database used in this paper. Section six is dedicated to discuss our empirical strategy. Section seven details the methodology

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[1] Based on information from the Statistics Department of the Spanish Ministry of Labour and provided by the General Council of the Judiciary, Labour Courts dealt with 62,620 cases of layoffs in 2004, a figure which reached 105,299 in 2010, after having peaked at 125,202 cases in 2009.

applied, while section eight explains the main findings. The paper ends with the conclusions.

## 2. JUDGES' DECISIONS AND TERRITORY

Judges' decisions should be highly objective and should be based on strictly legal considerations. Nevertheless, there are at least two[2] reasons why a positive spatial relation might be expected: one which is more local, and another which is more regional. Firstly, there is an "*emulation effect*" which is basically subjective. This is due to the fact that judges, like all human beings, display social behaviour. Decisions taken by colleagues who work in nearby courts would thus affect judges' own decisions. Following group pattern behaviour is commonplace, and is an issue that has been widely studied in the fields of sociology and psychology. Judges are, ultimately, only human beings. Going too much against the grain established by colleagues who work close by might entail a psychological cost for judges. When taking decisions, judges would thus strive to avert such a situation by minimizing any "distance" with their colleagues. This might generate territorial inertias that could cause a certain positive spatial correlation. This effect would clearly prove more intense were we to consider a more limited geographical scope.

The second effect might be termed a "*reversal effect*" or "*annulment effect*" and would be based on more objective criteria (although it would still contain a subjective element) and would result from the jurisdictional organisation of Spanish courts. Although this matter will be discussed in greater detail later, it is worth noting here that each regional appeal court has the power to accept an appeal concerning a judge's decision in the cities located in this region.

Clearly, judges who issue rulings in courts of the first instance wish to see their decisions remain final and not overturned in a higher court. Having their decisions systematically overturned or overruled by the appeal courts would damage their reputation (subjectively and psychologically) as well as objectively, due to possible sanctions imposed by the judicial control authorities. For these reasons, there are clear incentives for judges who are familiar with layoff cases to incline towards the "interpretative sense" adopted by the appeal court in their region. This would generate a positive spatial correlation within the region. Nevertheless, it should be clarified that the proximity of courts reflects a more abstract concept in the present research, in the sense that courts are deemed to be in proximity with one another if they belong to the same region even though they may be in cities located in non-bordering provinces. This will be dealt with in greater detail in a subsequent section.

Having pointed out this, it is worthwhile mentioning that there would be a third reason to find a significant spatial correlation: the purely geographical explanation. It is very likely that neighbouring territories have a similar economic structure and, due to this, could be exposed to symmetric aggregate demand shocks. If this were true, we would observe, to certain extent, similar cases coming in neighbouring courts at the same time (coming, for instance, from a declining

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[2] Apart from the pure geographical explanation discussed below.

industry) that could cause the same kind of judges' ruling in a particular geographical area and, in the end, a positive spatial correlation. So as to disentangle this geographical effect from the other two discussed in the text, we carried out our empirical analysis at two different levels: the before mentioned geographical and what we call legal-administrative level. We believe that if we found no traces of spatial correlation from a pure geographical standpoint and, at the same time, found a strong spatial correlation in the legal-administrative level, this could be considered as an empirical test in favour of the already cited "*reversal effect*" and "*emulation effect*". Anyhow, in a subsequent section this will be explained in greater detail.

## 3. LEGAL FRAMEWORK FOR LAYOFF DISPUTES

When workers are laid off by a firm, they can request the case be dealt with through the corresponding judicial body. Spanish legislation offers a prior (and voluntary) procedure for settling disputes, which involves both employer and worker going to the Conciliation, Mediation and Arbitration Units. As provided for in international legislation, this allows individual and collective disputes in labour relations to be settled. In Spain, this is an extrajudicial body available to each regional authority for settling labour disputes. If no agreement is reached between the parties through the Conciliation, Mediation and Arbitration Units, workers may pursue the claims procedure by taking the case to a labour court.

The Spanish legal system is structured on a number of different hierarchical levels. Issues regarding the organisation of legal demarcation are established through different laws. Organic Law 6/1985 of the Judiciary governs the extent and limits of the jurisdiction and the organisation of courts. Law 38/1988, governing Judicial Demarcation, addresses this issue in greater depth. These laws set out that the legal power to deal with labour related matters is assigned to labour courts, the High Court of Justice, the National High Court, and the Supreme Court.

The case is first heard in the corresponding labour court, which is located in the city where the worker is employed. It may therefore be said that the court has a local influence.

If the judge's decision is contested by one of the parties, the case may be brought before the Labour Chamber of the High Court of Justice in the region. This is a regional court which exerts its influence over all courts at a regional scale. Article 70 of the Organic Law of the Judiciary states that the High Court of Justice in each region is the highest instance in each region, notwithstanding any ruling which the Supreme Court may issue. As set out under the corresponding law, its Labour Chamber deals with cases concerning disputes involving workers and employers at a level beyond that of the labour court but not beyond the regional level. It also deals with any appeals filed against the rulings issued by the local labour courts in the region, as well as any matters regarding jurisdiction involving the various local labour courts in the region (Article 75 of the Organic Law of the Judiciary). Article 78 also states that whenever the number of cases in a given province may so require it, and in exceptional circumstances, extra labour courts

may be set up whose jurisdiction will be limited to one or more provinces in the same region.

Finally, this latter decision may be contested before the Labour Chamber of the National Court or before the Fourth Chamber of the Supreme Court. These are of a national level. Article 67 of the Organic Law of the Judiciary and Article 59 of the Demarcation and Judicial Organisation Law set out that the Labour Chamber of the Provincial Court shall deal in the first instance with special cases of claims concerning any collective bargaining agreements which reach beyond a regional scale, as well as cases involving collective bargaining conflicts, decisions on which reach beyond a regional scale. Article 59 of the Organic Law of the Judiciary also sets out that the Labour Chamber of the High Court shall deal with appeals and reviews, as well as any extraordinary appeals.

**[Insert Figure 1]**

When a case reaches a labour court, the normal procedure is the one shown in Figure 1. At the start of the procedure, when layoff claim reaches the labour court, the Judicial Secretary of the labour court meets with the parties in an effort to achieve conciliation. Should no agreement be reached, the parties go to trial, and the magistrate will or will not uphold the claim. Other circumstances might also arise. The claimant might (tacitly or expressly) withdraw his/her claim during the course of the procedure. There might also be other causes that prevent the judge from being able to take a decision (for example, formal defects or missing documents, disqualification of one court to which the case has been submitted in favour of another, the court not having the legal authority to deal with the case, or the case being dismissed). When such circumstances do not occur and the parties go to court, judges can rule in favour of the claim or dismiss it.

In addition to layoff disputes, the focus of the present paper, other types of cases are dealt with by labour courts. The General Council of the Judiciary establishes the following classification, and distinguishes between:

- **Cases concerning collective disputes:** these include cases affecting a group of employees considered as a whole. They usually concern the application or interpretation of a law, collective bargaining agreements, a decision, or company practice. Claims against collective bargaining agreements might also be processed through this procedure. Such claims might be filed by trade unions, employer associations, employers and other legal representatives of employers or trade unions in cases involving company or workplace conflicts.
- **Cases concerning payments:** these include disputes concerning salaries, supplements, bonuses, et cetera.
- **Cases concerning Social Security:** these are related to disputes about matters such as affiliation, social security contributions, benefits, compensation for workplace accidents, professional illness, et cetera.
- **Other matters:** for example matters relating to holidays, specific working conditions, as well as cases in which the claimant might be the Labour Inspection Service.

It is important to stress that the claim is always made by the worker in layoff disputes. This allows us to identify layoff cases in which the court finds in favour of the worker, as well as cases ruled as unfavourable to the latter. This is not always the case in other types of matters. For example, in claims related to Social Security issues, the authorities themselves or the Labour Inspection Service may file a claim. In disputes concerning collective bargaining agreements, the claimants may be the trade unions or employers' associations. Other claims may be filed by the State as a result of unpaid social security debts. In collective disputes, trade unions or employers' associations may act as claimants.

## 4. LITERATURE REVIEW

Analysing judges' decision-making behaviour has for some time been the subject of inquiry in the international literature from a psychological, sociological, and purely economic point of view. Examining judges' behaviour and exploring which factors have an effect on their considerations sheds light on one of the most important pillars of any nation: justice. How the justice system works is therefore a key aspect in any society. Yet, it is also important to underpin the fact that in addition to the political and social factors that might affect judges' decisions, no less important is the economic aspect, as has been the focus of certain research into the topic (Macis, 2001; Ichino et al., 2003; Mora, 2006 and Marinescu, 2011).

Some papers analyse judges' behaviour from a general point of view. Since the publication of Tversky and Kahneman's (1974) seminal paper exploring the cognitive rules that apply in decision-making, numerous other papers have focused on judges' behaviour. Muñoz Aranguren (2011) recently addressed this issue in Spain. Bornstein and Miller (2008) summarise the main research carried out into the relation between judges' religion and their judicial decisions, in the sense that religion might contribute towards determining a judge's personal and moral attitude, and thus potentially affect the decisions taken. Yoon (2006) addresses the existence of various institutional and personal factors, such as age, political environment, and the type of retirement benefit that might influence judges' sick leaves, positing the idea that if all these factors affect their professional working environment, then they might also influence their judicial decisions when working.

Behavioural economics has also recently contributed certain ideas. Baum (2007) focuses on the psychological factors which motivate judges as decision-makers. Viscusi (1999) explores in depth the factors related to judges' attitude to risk and uncertainty in the decision-making process. Rachlinski (1996) explores a similar line of research. In Spain, Manzanos (2004) studied the extrajudicial factors that influence judges' decisions, dividing them into different groups: social and professional factors (resulting from their role as public sector workers) ideological, religious, and cultural factors, subjective factors such as age, gender, marital status or educational background, in addition to factors related to media pressure or even the question of who the claimant is.

Judges' decisions have also been studied from an economic perspective. Delving more deeply into the link between law and economics, mention should be

made of papers addressing the matter from an economic standpoint. Cooter and Rubinfeld (1989) incorporated an economic utility model to study judicial decisions, both during preliminary hearings as well as during final rulings. Burgess *et al.* (2001) analyse the increased number of labour disputes in United States courts and, adopting a cost-benefit analysis, examine which factors affect workers' decisions to pursue a claim. One such factor influencing a worker's decision is how confident they are of winning.

Yet, there is also evidence in the literature concerning economic factors that might influence judges. The recent work of Brennan *et al.* (2009a and 2009b) sheds some light in this regard. In the former paper, judges' behaviour is likened to that of voters in government elections, the authors reporting that this follows a short-term behaviour pattern. Using an econometric model drawing on data from the first half of the 20th century, the authors infer that economic upturns and downturns influence judges in much the same way as they influence voters, who will or will not support a country's government. In the latter paper, the authors focus on the macroeconomic factors that shape judges' decisions in the Supreme Court of the United States in cases in which one of the parts is a public institution.

Finally, mention should also be made of research focusing on the economic analysis of layoff decisions. Based on a previous paper by Macis (2001), Ichino *et al.* (2003) examine this relation for layoffs in an Italian firm. However, they report contrasting findings. Ichino *et al.* (2003) show that a higher rate of unemployment is associated with a greater number of rulings in favour of employees, and conclude that judges tend to favour employees in more adverse economic climates. This finding is also significant and important since the authors evidence that a one percentage point increase in the unemployment rate reduces the likelihood of a firm winning the case by 2.5 percentage points. These findings concur with those of Donohoue and Siegelman (1991), who point out that employees are more inclined to resort to the legal system during an economic downturn when they feel themselves to be in danger of losing their jobs.

By contrast, Marinescu (2011) recently reported that a higher unemployment and bankruptcy rate in Great Britain is associated to judges being less likely to find in favour of employees. Based on the research of Farber and Bazerman (1986), they cite the fact that magistrates are more prone to rule in favour of firms during economic downturns. As a result, they show that economic factors influence judges both directly (since it is something they bear in mind) and indirectly (through both employee and employer behaviour prior to the dispute). They link this idea to the "quality of the case". In the same vein, a previous paper by Marinescu (2003) concluded that unemployment negatively impacts the percentage of employee victories in labour courts in France.

Using information for Spain, Mora (2006) estimated a dynamic panel with data for Spanish regions during the period 1997-2002 and found a positive relation between the unemployment rate and the percentage of cases won by employees. In the same work, he reported significant effects of disputes, such as strikes, and the inclination of the judges to resolve in favour of employees.

## 5. DATABASE

The present paper's empirical analysis uses information provided by the General Council of the Judiciary in Spain. This database allows cases in all labour courts in Spain during 1995 and 2010 to be identified. However, information prior to 2004 is incomplete, since data is not available on the sentence passed (whether the appeal was upheld or rejected), or the type of judge (permanent, temporary replacement, supporting judge, or judge from another court) nor the context of the dispute (layoff, collective conflict, claims for amounts due …).

The variable in this study is the percentage of cases resolved in favour of the worker in Spanish labour courts. As a result, we only use layoff disputes and the classification according to the actual decision made for the years between 2004 and 2010. Specifically, we use information from 299 courts in 2004, 301 in 2005, 314 in 2006, 316 in 2007, 319 in 2008, 326 in 2009, and 332 in 2010.

**[Insert Table 1]**

Table 1 provides a summary of the information used in this paper. For all the years, we have the total number, the mean value, the standard deviation, and the maximum and minimum values of the dependent variable (percentage of layoff cases resolved in favour of the worker in the courts). The first part of the figure shows court level information, with no provincial or regional references, whereas, the second and third parts display aggregate information at the provincial and regional levels.

In general, it can be seen that close to 70% percent of cases are resolved in favour of the worker, although there is a significant dispersion of over 60 percentage points in court level cases in 2008. From a temporal standpoint, certain recurrences are also appreciable regardless of the level of aggregation. The dependent variable is seen to have a higher value during the years of the recession, while during economic upturns the percentage of cases resolved in favour of the worker is four or five points lower.

## 6. EMPIRICAL STRATEGY

As stated in the introduction section, the aim of this paper is to determine if there is some evidence of labour judges' ruling being affected by their neighbouring counterparts' decisions. If so, we are also interesting in ascertaining whether it is a consequence of some sort of "psychological inertia" (what we call the "*emulation effect*") or it is due to the hierarchical administrative organisation of Spanish courts (our "*reversal or annulment effect*"). So as to test those effects, we follow a multistage procedure that we describe below:

- **Stage 1:** We define two purely geographical spatial correlation matrices. These ones have a quite conventional geographical basis and they are simply the contiguity matrices both at a regional and at a provincial level for the Spanish case. These kinds of matrices are rather common in standard

geographical analysis and, in brief, take as a neighbouring territory those areas that share a border. Anyhow, this will be explained in greater detail in the next section. These matrices are going to be used as a reference framework. With them, we try to capture some kind of spatial correlation of a purely geographical nature (see section 2). If we detected a significant spatial correlation at this level, it could be reflecting similar economic structures in neighbouring areas, exposed to symmetric aggregate demand shocks.

- **Stage 2:** We build an administrative spatial correlation matrix at a regional level. Nevertheless, it has to be mentioned that, despite the apparent similarities with previous stage analysis, it does not have a strictly geographical basis, and significant differences between this regional matrix and the ones defined in stage 1 have to be noted. First of all, the observational unit in stage 2 is the court, not the province or the region. Secondly, in this second stage there will be some neighbouring courts located in provinces without a common border. This could happen in multi-province regions[3]. Finally, those courts sited in adjacent provinces but belonging to different regions will not be taken as neighbouring courts. Following the above mentioned line of reasoning, all the courts located in the same region are going to be considered as spatially dependant and, if we detected a significant spatial correlation at this level, we think this might be taken as an evidence of the "*reversal or annulment effect*" (we will elaborate more on this argument later).

- **Stage 3:** We define two additional administrative spatial correlation matrices, the first one at a provincial level and the second one at city level. In the same vein as in the regional matrix of stage 2, but now taking the local level as the relevant one, we consider only neighbouring courts those belonging to the same province in the first case and those belonging to the same city in the second one. Due to the fact that we do not contemplate regional relations among courts, the likely effect of the Labour Chamber of the High Court of Justice in each of the regions would be discarded, and so the "*reversal or annulment effect*". As a result of the previous discussion, if we detected a significant spatial correlation at this level, we would interpret it as a test in favour of the "*emulation effect*", as it will be clarified below.

- **Stage 4:** We put together the results obtained in the previous three stages, make an interpretation of them, and extract the conclusions.

Regarding the results from the econometric work, several cases are possible. The list of them and their corresponding interpretation are summarized below:

- **Case 1. No spatial correlation found at any stage.** If this were the case, we would conclude that there is no evidence of neither the "*reversal or*

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[3] Some non-exhaustive examples are Castile and Leon (Soria and Leon), Catalonia (Gerona and Tarragona), Andalusia (Huelva and Almeria), Galicia (Corunna and Orense), Aragon (Huesca and Teruel), Valencia (Castellon and Alicante) or Castile La Mancha (Guadalajara and Albacete) among many others.

*annulment effect*" nor the "*emulation effect*" or of the spatial dependence caused by the location of similar industries in neighbouring territories.

- **Case 2. Significant spatial correlation found at stage 1.** From our point of view, this outcome would be reflecting that adjacent territories share a similar economic structure exposed to symmetric aggregate demand shocks. So, when a certain industry declines and dismisses workers, then court cases with the same characteristics could be entering the neighbouring courts (independently of the administrative region or province they belong to) at the same time, what, in the end, provokes spatial dependence in judges' decisions.

- **Case 3. Significant spatial correlation found at stage 2.** Due to the definition of the spatial correlation matrix in stage 2, which has not geographical grounds but an administrative basis, we consider that this result is a proof in favour of the "*reversal or annulment effect*". It is the "threat" of obtaining a reversal of the sentence by the Labour Chamber of the High Court of Justice what might generate that judges working in courts located in the same region tend to give rulings in the same sense, although their courts belonged to provinces not sharing a geographical border. The proof would be stronger if we found a higher correlation through the regional matrix defined in stage 2 than that obtained by means of the geographical matrices of stage 1 because, in the end, administrative regions have a geographical configuration to some extent.

- **Case 4. Significant spatial correlation found at stage 3.** This would be a central piece of evidence supporting the "*emulation effect*". This is so because the matrices used in stage 3 only consider neighbouring courts those placed in the same province (provincial matrix) or in the same city (city-based matrix). As in the previous case, if we found a weak or low spatial correlation at a local level in stage 1 and a strong or high correlation in stage 3, the evidence would even clearer. The rationale behind this is that no geographical local pattern would be evident meanwhile a clear administrative local regularity would emerge.

## 7. ECONOMETRIC METHODOLOGY

Because of empirical strategy adopted in the current work, spatial analysis of the information received from courts is essential. In this kind of analysis, two typical issues emerge (Moreno and Vaya, 2002): spatial heterogeneity and spatial correlation. The former is the result of using different spatial units, and leads to problems of structural instability and heteroscedasticity. The latter is caused by a functional relation between what happens at two different points in the space.

In the present research, information is taken from national courts, such that the spatial units are not so different. However, we have given some reasons to assume there might be some relation between what happens in certain courts and in others. This spatial correlation is similar to that observed from a temporal point of view, except that it displays multidirectionality since the influence might come

from any of the neighbouring areas. In such cases, conventional econometrics proves insufficient, and different spatial econometrics techniques that enable us to compare and estimate are required.

In order to observe how the territory influences our dependent variable, we use exploratory analysis with spatial data. This type of analysis is defined as a group of techniques that describe and visualise spatial distributions, identify uncommon situations and spatial outliers, reveal spatial association patterns, clusters or hot spots, and suggest spatial structures and other forms of spatial heterogeneity (Anselin, 1999). The methods used in this analysis are the result of global and local spatial autocorrelation statistics, and the use of visualisation techniques for the existence of spatial effects.

The global spatial correlation statistics applied are *Moran's I* (Moran, 1948) and *Geary's C* (Geary, 1954)[4]. *Moran's I* usually takes values from -1 to 1 (although it can surpass both limits). It indicates positive (negative) autocorrelation when its values are near to 1 (-1), which means that areas with high levels of the variable are surrounded by areas with high (low) values of the same. Finally, *Moran's I* taking the value zero indicates a lack of spatial correlation.

*Geary's C* varies from 0 to 3, and there is positive autocorrelation for values below 1, negative correlation for values above 1, and lack of correlation for values near to 1. These statistics allow us to compare the existence or lack of correlation at a global scale, but do not allow us to evaluate the local structure of spatial correlation. In order to correct this drawback, we perform two local spatial association comparisons: the local statistic of Moran's $I_i$ (Anselín, 1995) and the New-$G_i$* tests (Ord and Getis, 1995)[5].

For all of these statistics, it is necessary to design a matrix with spatial weights that identifies which areas we consider to be those of influence. The most widely used matrices are the contiguity matrix and the distance matrix. In the present paper, we basically use the first from two perspectives. Firstly, we consider contiguity from a purely geographical perspective at a provincial and regional scale. We identify whether there is a correlation between the total number of cases resolved in favour of the worker in each province (region) and in adjacent ones. Secondly, we adopt a legal and administrative perspective, using three different matrices where we consider courts in the same city, province, or region to be adjacent courts. In addition to calculating spatial correlation statistics, exploratory analysis of spatial data also draws on various graphical tools to identify spatial correlation visually. The most representative of these tools is Moran's scatter plot, which shows the normalised object variable in the X axis and its spatial lag in the Y axis. A concentration of points in the first and third

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[4] Moran's I index is a correlation coefficient of the sample while Geary's C is based on the notion that the variance of the difference between two random variables depends on their covariance (Dutilleul, 1998). Cliff and Ord (1981) pointed out that Moran's I seems to be less affected by the distribution of the data than C, and consider this to be a statistical advantage. However, Legendre and Fortin (1989) found that Moran's I index seems to be more sensitive to atypical values than the C index.

[5] A comprehensive description of all these statistics appears in Moreno and Vaya (2002) and a brief summary is offered in the appendix A of this paper.

quadrants (second and fourth) thus indicates positive (negative) spatial correlation.

## 8. RESULTS

As mentioned previously, spatial correlation analysis is performed from a two-fold perspective: geographical and legal-administrative.

### Geographical perspective (stage 1)

For this first section, we use the geographical contiguity matrices as the spatial weight matrices. We thus consider provinces (regions) which share border to be neighbouring. Court level information is not used in this case to calculate the dependent variable. We simply aggregate all the courts belonging to the same province (region). The percentage of layoff cases resolved in favour of the worker is thus the ratio between the number of cases favourable to workers and the number of cases dealt with in the court each year in a given province (region). Results show that the percentage of cases resolved in favour of the worker in each province (region) is not strongly influenced by its bordering regions. The Moran scatter plots included in the figures B1 and B2 of appendix B and the global correlation index depicted in Table 2 show no significant and homogeneous spatial correlation.

### [Insert Table 2]

In the case of disputes resolved in favour of the worker at a provincial level, the values obtained by Moran's I are near to zero, have no constant sign, and are not significant for any year in the sample. It can also be seen that the points of the scatter plot are spread widely across all four quadrants. The values of Geary's C do, however, display some positive correlation in 2006, 2009, and 2010, although these values are generally well above 0.5 and are therefore closer to displaying a lack of correlation.

In the analysis by regions, the conclusions are very similar to those for the early years in the sample. The values of Moran's I and Geary's C continue to show little significance and are near to displaying a lack of correlation. The scatter plots also continue to evidence random points distribution. Only in 2009 and 2010 can any positive correlation in both indicators be seen, although in no case does this reach 1%.

Having confirmed the lack of spatial correlation at a global level, Moran's I as well as Gettis and Ord's G local correlation tests were also carried out to pinpoint clusters[6]. In the case of the provinces, no cluster was found to be repeated each year. Only some different regions with similar values were found to exist for certain years around the four provinces of Galicia and certain provinces in Castile and Leon (Burgos, Valladolid and Zamora). There are also clusters of dissimilar

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[6] Detailed correlation test results are available upon request from the authors.

values in certain years around Barcelona, Caceres, Lerida, Murcia, and Valencia. In the case of the regions, the only generalised cluster was found in the region of Murcia, although this also changes its value over the period. In the early years, it is a cluster surrounded by different values vis-à-vis the percentage of cases resolved in favour of the worker, whereas in 2009 and 2010 it emerges as a region surrounded by others which display similar dependent variable values.

## Legal-administrative perspective (stages 2 and 3)

The observational unit here is the court. As previously mentioned, we now use three different matrices with an eminently administrative reference. The first one considers the city as the area of influence and deems neighbouring courts to be those located in the same city. The second one considers courts belonging to the same province as neighbouring courts. The third matrix considers the region as the area of influence and with it we want to capture the likely sway of a higher judicial body at a regional level.

## [Insert Table 3]

Table 3 shows the values of the global correlation statistics of the percentage of layoff cases resolved in favour of the worker in each labour court in Spain for the period 2004-2010. Both Moran's I and Geary's C show values between 0 and 1 and are highly significant for the three different matrices used and for each year in the period. This result points to a positive correlation, such that courts with a higher (lower) percentage of cases resolved in favour of the worker are surrounded by courts which also evidence high (low) levels in this variable. Another important result to emerge from Table 3 is that the level of autocorrelation decreases as we expand the administrative area of influence. We thus see that Moran's I (Geary's C) values are greater (smaller) when the spatial weight matrix used considers courts located in the same city to be neighbouring courts. However, these values decrease (increase) substantially when we take the provincial matrix. Although only slightly, this trend is maintained when we take the regional matrix.

The same conclusions emerge if we observe the Moran scatter plots shown in the figures B3, B4 and B5 of appendix B of this paper. A positive slope in the distribution of the points, coupled with a higher concentration in the first and third quadrants can be seen for all matrices and years. This also indicates the positive spatial autocorrelation between the percentages of cases resolved in favour of the worker in each court. It can also be seen that the value of the slope of the trend and the concentration of points in quadrants 1 and 3 is greater if we use the city matrix and that it gradually decreases when we use the provincial and regional matrix.

As in the previous case, Moran's I and Gettis and Ord's G local correlation tests have been used to pinpoint clusters[7]. When we consider courts located in the same city to be neighbouring, a number of cities emerge in which courts are

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[7] Detailed correlation test results are available upon request from the authors.

surrounded by others that display a similar level of cases resolved in favour of the worker over the whole period. Specifically, these are Las Palmas, Tenerife, Alicante, Valencia and Madrid. In addition, other cities show clusters in certain years; namely Saragossa, Oviedo, Barcelona, Burgos, Leon, Palencia, Toledo, Vigo, Vitoria, and Bilbao. If we consider courts which are in the same province to be neighbouring, certain clusters are repeated each year and in some instances coincide with the previous case, particularly Las Palmas, Tenerife, Alicante, Valencia, and Madrid. Finally, if we use the region as the area of influence, clusters appear in Asturias, the Canaries, the Region of Valencia, Madrid, and Murcia, again in line with results obtained in the previous matrix.

<div align="center">

### Results interpretation (stage 4)

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As we look at the overall picture, what we see is strong evidence against the case 1 of our empirical strategy (*no spatial correlation found at any stage*). At the same time, we also observe a rather weak spatial correlation at stage 1, if any; what make us discard case 2 too. Nonetheless, it can be noticed a high and significant spatial correlation at stages 2 and 3. The combination of the practically lack of correlation found at stage 1 and the solid spatial correlation detected at stages 2 and 3 is a robustness check of the relevance of the "*reversal effect*" and the "*emulation effect*", as it was explained in a previous section.

Going into greater detail, our results seem to show the prevalence of the "*emulation effect*" over the "*reversal effect*". The rationale for reaching such a conclusion rests on the stronger spatial correlation found as we define a "narrower" spatial matrix in stages 2 and 3. In line with what was mentioned in section 2, the highest correlation detected at the city level would be indicating, according to our view of the facts, that judges' decisions are strongly affected by those of their nearest colleagues. It is as if they were influenced by the atmosphere (both for and against the workers) of their closest "juridical environment". It might be psychologically hard to be a pro-worker labour judge if you are surrounded by colleagues ruling more frequently than you in favour of the employers, in a systematic way. The identification and measuring of this "psychological inertia" is our main contribution in this paper.

## 9. CONCLUSIONS

In Spain there are over 300 labour courts dealing with disputes between employers and employees. The present paper seeks to provide insights into the percentage of cases resolved in favour of the worker and whether this percentage may be influenced by the decisions taken in nearby courts and by the prevailing economic climate.

A purely descriptive approach to the data reveals differences in the percentage of cases resolved in favour of the worker at both a temporal and a spatial level. Results show that, on average, approximately a difference of five percentage points in the number of cases resolved in favour of the worker during a recession is found than during an upturn in the economy. Results also show

substantial differences of up to sixty percentage points between courts which most often uphold workers' claims and those which uphold them the least.

Due to this important spatial differences, an in an effort to ascertain whether a decision taken in one court may be influenced by what happens in another, we perform an exploratory analysis using spatial data from a geographical perspective as well as from a judicial and administrative standpoint. Results show the lack of global spatial correlation at a geographical level, indicating that the percentage of workers' claims upheld in a given province or region is not influenced by what occurs in adjacent provinces or regions. From the same viewpoint, no clusters were found that remained throughout the whole period or which pointed to any areas surrounded by others displaying a similar percentage of workers' claims that were upheld.

However, when the analysis is conducted from a judicial and administrative perspective, global spatial correlation does emerge. The percentage of layoff cases resolved in favour of the worker in each court is strongly influenced by what happens in courts in the same city, and is slightly affected by what occurs in courts in the same province or region. From a local perspective, we also observe clusters with similar percentages of cases resolved in favour of the worker for all the years and for different areas of influence (local, provincial, and regional levels). These clusters are particularly located in the Mediterranean area, in Madrid, and in the Canaries.

Finally, it may be concluded that there is a positive and significant spatial correlation which shows the importance of what we have called "*reversal* and *emulation effects*". Moreover, given the greater correlation observed at a local level, and the decrease seen at a regional and provincial scale, we might assume the latter effect to be more important when analysing what impacts the percentage of cases resolved in favour of the worker in each court.

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**Appendix A**

Global spatial association statistics:

-Moran's I:

$$I = \frac{N}{S_o} \cdot \frac{\sum_{i,j}^{N} w_{i,j}(x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^{N}(x_i - \bar{x})^2}$$

where $x_i$ is the value of the variable $x$ in region $i$, $\bar{x}$ is the sample mean of the variable $x$, $w_{i,j}$ are the components of the spatial weight matrix, $N$ is the sample size and $S_0 = \sum_i \sum_j w_{i,j}$.

-Geary's C:

$$c = \frac{(N-1)}{2 \cdot \left(\sum_{i=1}^{N} \sum_{j=1}^{N} w_{ij}\right)} \cdot \frac{\sum_{i=1}^{N} \sum_{j=1}^{N} w_{ij}(x_i - x_j)^2}{\sum_{i=1}^{N}(x_i - \bar{x})^2}$$

Local spatial association statistics:

-Moran's local:

$$I_i = \frac{z_i}{\sum_i z_i^2/N} \sum_{j \in J_i} w_{i,j} z_j$$

where $z_i$ is the value taken in region $i$ by the normalised variable, and $J_i$ is the set of areas deemed to be neighbouring $i$.

-New Getis and Ord's G:

$$New - G_i^* = \frac{\sum_{i=1}^{N} w_{i,j} x_j - W_i^* \bar{x}}{s\{(NS_{1i}^* - W_i^{*2})/(N-1)\}^{1/2}}$$

with $W_i^* = W_i + w_{ii\prime}$, $S_{1i}^* = \sum_j w_{ij}^2$ and $s^2 = \sum_j (x_j - \bar{x})^2$

**Appendix B**

[Insert Figure B1]

[Insert Figure B2]

[Insert Figure B3]

[Insert Figure B4]

[Insert Figure B5]

**Vitae:**

[Insert Passport-type photographs]


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