INTERREGIONAL WAGE DIFFERENCES IN SPAIN. A MICRODATA ANALYSIS FOR 1990.

Esteban Sanromá
Raúl Ramos
Department of Econometrics, Statistics and Spanish Economy
University of Barcelona
Avda. Diagonal, 690 - 08034 Barcelona (Spain)
sanroma@eco.ub.es, rrlobo@eco.ub.es

ABSTRACT:. Interregional wage differences in the Spanish economy are of considerable magnitude. More precisely the average wage in Madrid is 69% higher than in Murcia and the figure for Cataluña is 47% higher. The main objective of this paper is to explain these differences. In order to do so, we estimate enlarged Mincer equations and study the quantitative importance of the "territorial effect" on wages. Then we attempt to explain these effects as compensatory differences or as a result of existent disequilibrium in the provincial labour markets.

The evidence obtained allows us to determine the magnitude of the "territorial effect." Once the influence of the individual and job characteristics are controlled for, there still remain positive differences slightly greater than 24% between the provinces of Barcelona and Sevilla and about 13% between Madrid and Sevilla. These wage differences are compensating to some extent for differences in the levels of prices, but they do not correspond to the unequal attraction of the Spanish provinces. The differences are explained, finally, by the unequal level of prices and by the irregular distribution of unemployment between provinces, which is shown to have a negative effect on wages close to the magnitude estimated by Blanchflower/Oswald (1994).

1. Introduction

As in the majority of western countries, geographical wage differences can also be found in the Spanish economy. The little empirical evidence available emphasises the importance of two facts: first, that these differences can only be explained partially by differences in the regional industrial structure and, second, that observed differences do not balance varying non-monetary working conditions. The objective of this study is to investigate the explanatory causes of wage differences between Spanish provinces, attempting to discover whether they correspond to compensatory variations for the unequal attraction in physical, cultural and economical terms of the different areas or if they can be interpreted as a disequilibrium phenomenon, mainly as a result of the limited geographical mobility of the Spanish population.

In this paper we use data from the Encuesta de Presupuestos Familiares (survey about family budgets) 1990/ 91 carried out by the National Institute of Statistics (INE) of Spain. This survey contains information about personal and job characteristics. Using these data, we estimate enlarged Mincer equations with the purpose, in the first place, of studying the quantitative importance of the "territorial effect" on wages and, in the second, of contrasting both explanatory hypotheses: compensatory differences versus disequilibrium in provincial labour markets. The evidence obtained permits to quantify the magnitude of the "territorial effect". So, for example, once personal characteristics (sex, educational level, work experience) and the features of the job (occupation, sector of activity, part-time) are controlled for, there persist positive differences slightly greater than 24% between Barcelona and Sevilla and of about 13% between Madrid and Sevilla, as well as negative differences of almost 18% between Almería and Sevilla. Also, the paper permits the conclusion that geographical differences in nominal wages compensate, to some extent, differences in price levels, although nominal wages neither respond to the unequal climatic attraction, nor to the unequal provision of cultural, educational, health and leisure services in the Spanish provinces. Interprovincial wage differences are explained, more than by uneven price levels, by the irregular distribution

of unemployment across the Spanish geographical area, and this should be related to the low degree of geographical mobility of labour.

This paper is structured as follows. In the second section, a brief review is made of the literature on geographical wage differences. In the third section, the geographical structure of wages in Spain is described using some recent statistical sources and a summary of the available work for the Spanish case is presented. In the fourth section the methodology and the data used are explained, as well as the estimates obtained. The paper concludes with some comparative conclusions from the results obtained and some future lines of improvement.

2. Geographical wage differences: theoretical considerations and empirical evidence

From a simple neoclassical perspective, perfect competition in markets, perfect mobility of the labour force and complete information guarantee that market forces equalize wages in different regions or that, in the event that certain differences exist between jobs or regions, they make the net advantage of working in different labour markets equal. As a result, we would expect that observed wages are equal, unless there exist differences that make some regions or jobs more attractive than others. These differences can be of various types. In the first place, heterogeneity among workers in relative terms is due, mainly, to their varying productivity, an aspect that could be summarised by their human capital (Mincer, 1974). The same is true of jobs: in less satisfactory jobs or in jobs that imply greater risks, workers earn higher wages in compensation, a fact that should be kept in mind as a possible explanation of wage behaviour. A third factor in which regions could differ is their attraction with respect to geographical and climatic conditions, cultural, leisure or public services. The interregional equilibrium will be obtained when the utility derived from residing in different zones is equal (Rosen, 1974). Essential features that differentiate regions are their price levels, so that observed differences could reflect a situation of equilibrium upon correcting to balance the varying costs of goods and services, including housing.

To break with the basic assumptions previously mentioned offers variations of considerable interest. If labour markets are not perfectly competitive, we could find different unemployment rates in the regions being considered. In this case, the neoclassical theory, still along the lines of compensatory differences, points out that wages will reach higher levels in the areas of higher unemployment, thereby balancing the risk of becoming unemployed, or in a similar way, equalling the flow of income from labour in the different regions (Harris/Todaro, 1970). Nevertheless, modern theories of the determination of wages postulate a negative relationship between wages and unemployment, including at the regional level (efficiency wages: Stiglitz, 1986; Weiss, 1990; insiders-outsiders: Lindbeck/Snower, 1988). These approaches do not necessarily invalidate the model of Harris/Todaro, but they allow to work with the hypothesis that, in the short term- while the migratory flows do not equalize the net advantage in regions-, the observable relationship between wages and unemployment is negative.

Moreover, other restrictions can transform a transitory situation of disequilibrium into a permanent one. According to the neoclassical mechanism, a local recessive shock would decrease wages making the region less advantageous for workers in that market. This fact would generate an emigratory flow towards other markets with a better combination of real wages and attractions, until the new equilibrium point was reached. The existence of restrictions on wage adjustments or on the mobility of the labour force would decelerate the process towards equilibrium and the disequilibrium situation would tend to continue or, at least, to last larger than optimally or necessary. Some institutional mechanisms in the fixing of wages, such as national agreements, or the presence over the entire territory of the public sector or such as multiplant companies of interregional scope, isolate wages from the conditions of the local labour markets. In a similar way, obstacles to migration decelerate the process of adjustment. In whichever of either situations, territorial wage differences will tend to persist at higher levels than the strictly compensatory.

The empirical evidence on these approaches is considerably broad, especially in the United States, where a debate has been produced lasting almost three decades about the existence of a wage differential between the industrialized north and the less developed south. One group of studies attributes it to the price differential between each zone (Coelho/Ghali, 1971; Bellante, 1979; Gerking/Weirick, 1983; Dickie/Gerking, 1987), while other authors find that, once the variables related to the human capital of the workers are controlled for, the differential in terms of real wages turns out to be favourable to the south (Sahling/Smith, 1983; Farber/Newman, 1987). Finally, some other work conclude that, including control variables for human capital, for the industrial composition of employment and keeping in mind the differences in the cost of living, there are still significant wage differences attributable to the "territorial effect," an effect that in general is favourable to the metropolitan areas of the south and south-east of the United States (Hanushek, 1981; Johnson, 1983; Montgomery, 1992).

The studies that analyze the British case using individual data also find that, once the variables related to human capital and other personal characteristics are controlled for, the presence of "territorial effects" on wages is significant (Hughes/McCormik, 1987). But the most outstanding feature of the British literature is the inclusion of variables of demand -usually the regional unemployment- in the explanation of interregional wage differences. The detected effect is statistically significant and of a negative value, indicating that the level of a wages in a territory is inversely related to its unemployment rate (Blackaby/Manning, 1990). In this context, Blanchflower (1991) and especially Blanchflower/Oswald (1994), working with several samples from different countries and years, have found as an empirical regularity a coefficient of approximately -0.1 of the regional unemployment rate on the wage level in the same area.

In conclusion, the main ideas that can be deduced from the theoretical and empirical literature for applied studies can be summarised in four points. Firstly, it is absolutely necessary to work with individual data sets containing information about the characteristics of the wage earner and on his/her job. Secondly, it is also necessary to have information about price levels at a

regional level. Thirdly, it is necessary to incorporate as explanative variables information about the unequal attraction of the areas. And fourthly, the existence of unemployment suggests -particularly in the Spanish case - contrasting the sign of the coefficient of the unemployment rate in order to test alternative explanations: compensatory differences as opposed to institutional rigidities.

3. The territorial structure of wages in Spain

The National Institute of Statistics (INE) has recently published the results of the Encuesta de Estructura Salarial (survey on wage structure) 1995, carried out in 1996. According to this survey, that offers information for Autonomous Communities (NUTS II), the region with the highest average wage is Madrid (22.8% above the Spanish average), followed by the País Vasco (14.3% above) and by Cataluña (6.5%). The regions of lower wage levels are Murcia (27.5% below the average), Castilla-La Mancha (23.0%) and the Canarias Islands (20.5%). This means that the differences between regions are very considerable: The average wage in the Community of Madrid is 69.5% higher than in Murcia, the País Vasco 57.7% higher than in Murcia and Cataluña 46.9% higher than in Murcia.

The Encuesta de Salarios en la Industria y los Servicios (survey on wages in manufacturing and services) is a quarterly survey carried out by the INE on firms of five or more workers of the same industries as the source mentioned above. This survey provides different results to the previous one, but they both draw a wage map that is quite similar. In 1996 the Autonomous Communities where the observed wages were above the Spanish average consisted of the País Vasco (28.5%), Madrid (13.8%), Asturias (9.1%), Navarra (7.1%), Aragón (3.6%), Cantabria (3.3%) and Cataluña (2.2%), while the rest of the Spanish regions are below the average.

MAP 1

The Autonomous Communities with higher wage levels are situated geographically in the northeast quadrant of the peninsula, except Madrid which is in the centre, and they represent 24% of the Spanish territory (see Map 1). At the beginning of the 20th century, these regions were the most industrialised in Spain and had the highest levels of income. They continued their industrialisation process with great dynamism, especially in the fifties and sixties, producing more than 52% of the Spanish GDP from 1973 onwards. Some of these regions -specifically Asturias and the País Vasco- suffered from the crisis of the seventies and the decline of their basic industries, mainly mining and the iron and steel industry, with special acuteness as they lost their positions in the income per capita ranking to regions characterized by an industrial composition based on small sized but highly efficient firms (Community of Valencia) or a competitive service industry (Baleares Islands).

The empirical literature on wage differences in Spain, although not very abundant, provides some interesting results that deserve to be remarked upon. Applying the methodology proposed by Wonnacott/Wonnacott (1967), Rodríguez (1988) finds that differences among nominal wages could not be explained more than partially by the industrial composition of the productive activity[1]. A similar result was obtained by Lorente (1992)[2]. These studies show that there are significant wage differences within the same industry depending on its geographical location. Therefore, the estimations done by Rodríguez (1988) of different wage equations at a provincial level for 1975 and 1981 reveal the importance of labour demand when only

[1] " It is possible to affirm that in Spain provinces of lower wages for similar kinds of jobs do not seem to be very specialized in low wage industries." (Rodríguez 1988:15).

[2] We would like to point to our disagreement with this author. The application of the national average industrial composition in terms of labour to every region generates very limited changes. Andalucía, 21% below the Madrid average wage, increases its average wage only by 2 points due to the industrial homogenization; Aragón and Castilla-Leon decrease by 2 points on 15% and 17%; Cantabria 1 point on 27%; Cataluña 1 point over 12%; Galicia, Navarra and the País Vasco are not affected. Castilla-La Mancha, Valencia and Rioja increase 3 points on 32%, 26% and 28% respectively and Murcia reduces its difference of 32% to 28%. In fact only two high-specialisation regions have quantitatively important effects: the Canary Island, which increases 5 points -being 22% below Madrid-, and Asturias, which decreases 7 points. Faced with this evidence, Lorente (1992:17) affirms that "this fact demonstrates that wages geographical dispersion is due mainly to sectorial and occupational dispersion", a conclusion, at least, debateable.

considering a 3 digit-industry classification and the positive effect on wages of residing in the northern regions of Spain. García Ferrer (1979) also estimates provincial wage equations for 1960 and 1970, where wages depend on the provincial structure of population by age, levels of education, occupations and urban or rural location. According to his conclusions, most wage differences can be explained by educational variables and by different kinds of occupations, while territorial dummy variables have a positive effect on provincial wages in locations in the North and East.

Bentolila/Dolado (1991) estimate regional wage equations where the endogenous variable is the growth of the average real wage of a region relative to the national average real wage. Their results show the importance of the Autonomous Community dummy variables, in Madrid, Asturias, Cantabria and the País Vasco above the average growth and, below the average, Andalucía, Castilla-La Mancha, Extremadura and Murcia. Also, they find a positive effect, although very small, of the regional unemployment rate (defined as the difference with respect to the national rate) on regional wages, which shows the compensating role of unemployment.

On the other hand, Lorences/Fernández/Rodríguez (1995) studied 300 provincial wage fixing collective agreements for 1978, 1985 and 1991. Their results indicate the existence of significant interprovincial wage differences, consolidated in the course of the time. They also point out that non-monetary labour conditions (like security regulations and labour hygiene, restrictions to dismissal or social subsidies, among others) do not compensate for the differences in the negotiated wages, but tend more to be directly related to the wage level. This latter prediction runs against the theory of compensatory differences.

Finally, Albert/Malo (1995) use individual data from 1,892 workers from a sample of the Encuesta de Estructura, Conciencia y Biografía de Clase (survey on structure, conscience and class biography) carried out in 1991. Although their objective is to evaluate the effect of risk at work on wages, they estimate equations for individual wages including, among others,

dummy variables corresponding to the Autonomous Community where workers reside. Once the effects of other variables are controlled for, wage differences among a certain number of Spanish regions remain significant. Specifically, Extremadura, Galicia, Castilla-León, Andalucia and Castilla-La Mancha make up a geographical area of low "residual wages" while Madrid, the País Vasco, Cataluña and Valencia show a positive "territorial effect" on wages.

To summarize, the previous studies on the topic carried out in Spain are not conclusive, indicating the need to study territorial wage differences with a rigorous methodology similar to that used in other western countries. Nevertheless, these studies point towards the importance of a group of variables regarding territory, such as the industrial composition of employment and the unemployment rate, as well as the need to keep in mind a wide group of personal and job characteristics in order to control for their possible effect on wages. This is the challenge of this paper as well as its main objective.

4. Empirical Analysis

4.1. Statistical sources and definition of variables

The estimations presented in this paper are based on individual data from a sample of the Encuesta de Presupuestos Familiares carried out by the INE with reference to the years 1990-1991. The basic purpose of this survey was the study of the expenditure made on goods and services by Spanish families. Nevertheless, the span of the statistical operation was used to collect information about Spanish families. In this additional information we found information about the characteristics and equipment of houses, information about personal and job characteristics and wages, etc.. The availability of this broad individualised information, and the fact that it has not yet been used for a similar study suggested its use in this paper. We have worked with data on 16,949 individuals who declared positive incomes from paid employment in non-agricultural industries.

The information about the level of prices in 1990 in the various regions was taken from Lorente (1992). In fulfilment of an agreement with EUROSTAT, the INE carried out the Encuesta Regional de Precios (survey on regional prices) for 1989. In the work mentioned, Lorente projected prices for 1988-1991 by applying the regional growth rates of prices for every year to the 1989 levels. The limitations of this statistical source for the analysis under consideration are important. Data on levels of prices are considered at NUTS-II level, while the wage study is carried out on a provincial scale (NUTS-III), which has obliged us to assign the same level of prices to every province of the same Autonomous Community. With the exception of the seven uniprovincial Autonomous Communities[3], this fact implies a generalisation that limits the explanatory capacity of the price variable. Moreover, the fact that the INE only attributes the data obtained in the most important city of the region, usually the political capital, to all the Autonomous Community, introduces an unequal bias[4]. In spite of these limitations, we have used this indicator of prices as it is the only indicator available on a territorial scale.

Data related to the attraction of the territories have been taken from the Anuario Estadístico de España (Spain statistical yearbook) published by the INE. The coast kilometres variable has been defined for provinces as the sea peninsular boundaries -excluding the perimeter of small islands- and the sea island boundaries in the case of the Baleares and Canarias Islands. The temperature variable has been calculated as the difference between the absolute maximum and the absolute minimum, both in monthly averages over the period 1931-1980 and is intended to express the inconvenience of residing in zones with extreme temperatures of both above and

[3] Asturias, Baleares Islands, Cantabria, La Rioja, Madrid, Murcia and Navarra.

[4] It is important because, for example, the observed prices in Sevilla are attributed by the INE to the Autonomous Community of Andalusia and unequal because the specific weight of the sample city in the whole region is different for every region. For example, while the city of Madrid represents 60.8% of the population in the Autonomous Community of Madrid, Albacete only represents 7.8% of Castilla-La Mancha.

below zero[5]. The variable on educational services has been defined as the number of university faculties in 1990 in each province, excluding the university centres in the same province where the same degrees can be studied and which belong to the same university. The health services of a territory have been proxied by the operative number of beds in health centres in relation to the population of each province. Concerning the provision of cultural services, the number of libraries in relation to the population has been used. The possibilities of leisure and entertainment has been approached through the number of new films projected in 1990[6] and by the number of restaurants, these being the only available information, expressing both variables in terms of the number of inhabitants. Finally, data about the unemployment rate in the fourth quarter of 1990 has been taken from Encuesta de Población Activa (active population survey) which was carried out by the INE.

4.2. Methodology and calculation of results

We have estimated enlarged Mincer equations that also incorporate a certain number of variables related to the above mentioned factors. A semi-logarithmic function was used, this being the most adequate functional form for this type of estimation with individual data (Mincer, 1974). The logarithm of the annual wage depends on a vector of individual and regional characteristics that proxy the workers qualification levels, the job characteristics, the possibilities of discrimination at work or on the grounds of sex and the presence of "territorial effects". In a second stage, the 49 provincial dummy variables are substituted by territorial attraction and other variables, to finally include the logarithm of the unemployment rate in order to express the influence of the demand for labour on wages.

The estimates have been carried out by ordinary least squares (OLS) and the results were found to be satisfactory. The various models explain around 40% of the variation of wages, a

[5] For example, Teruel, with a difference of 70 centigrade degrees between a maximum temperature of 40 degrees and a minimum of 30 below zero.

[6] We have, alternatively, included the number of cinemas, obtaining very similar results.

similar percentage to that of other studies on the topic which use individual data. It is also important to remark that we are using data of annual salaries. The survey used does not provide information about hourly or weekly wages and the variable on part-time jobs only provides information about people who work less than a third of the usual working hours.

Heteroscedasticity can be found in these kinds of models as a consequence of differences between variations in wages received by different groups of workers. A previous analysis of data using contrasts of variance equality between sub-samples has shown that the most important source of heteroscedasticity is related to the variable of experience. However, upon considering the existence of a non-linear relationship between wages and experience (following the current literature), the value of the statistic of White's Test (1959.31) does not permit rejection of the null hypothesis of homoscedasticity at a signification level of 0.05[7] and for this reason, validates the use of OLS.

As shown in Table 1, the educational level and the years of potential experience[8] are significant and show the expected signs. Concerning the individual of reference -who has obtained the EGB qualification (basic educational level)-, workers with primary education, or without education or illiterate, if the remaining factors are equal, get significantly lower wages, especially illiterates (31.4% or less). On the other hand, workers with educational levels above EGB receive higher wages: Professional Training (FP) of the first grade allows an individual to receive a wage 22.1% higher than those at EGB level; the Bachillerato (BUP) (upper secondary education), 33.6% more than EGB, while a university student with short studies receives a wage higher by about 89.8%. Obtaining a long course university degree allows an individual to earn more than twice the salary of workers with the EGB (114.9%). In

[7] The auxiliary regression of White's Test contains a constant, the 87 exogenous variables in the model, the 1763 non-zero cross-products regressors and the square of the squared-experience (as squares of the dummy variables are identical to the original dummy, they are not included as additional regressors), so the distribution of the statistic can be approximated by a normal distribution with average 1851 and standard deviation 60.84 giving a critical value at 0.05 signification level of 1970.26.

[8] Defined, in the usual way, as age minus years of schooling minus six.

terms of wages, it is important to point out that the Spanish labour market seems to value more the BUP (secondary education) than the first level FP (professional training), and similarly COU (university entrance course) than the second level FP. This result helps to explain the great demand for university education and the high scholarization rate up to the age of 24 years.

TABLE 1

The accumulation of professional experience also has a positive effect on wages, although the concavity of the relationship- revealed by the negative value of the coefficient of the variable square of the experience- indicates decreasing returns for investment in specific human capital and even the existence of a starting age from which additional experience has a negative influence on wages. According to the model, this limit is situated at 39.6 years of experience. This implies that, for example, a person with BUP studies should expect his/her wage begins when he/she reaches 57 years of age.

People working part-time, defined as a third of the usual working hours, only receive a wage of about 60% less than those working full-time. The results also indicate that the wages of women are substantially lower than those of men. This can be attributed to female labour discrimination. However, the variable experience is probably inadequately reflecting the true work experience of females, as periods of inactivity or unemployment are more frequent among women[9].

The dummy variables related to the occupations express the effect of job characteristics for example, fatigue or risk, but also the associated attraction and advantages, as well as the additional required qualification. We have taken low qualified work in the service sectors

[9] Moreover, it is possible that the coefficient value will be collecting the contribution of women in part-time work between one third of full-time and full-time that is not captured by this specific variable, which is supposed to be more significant for women than for men.

(such as waiters, cleaning staff, hairdressing or security guards) as the base category. The estimation results show that, when the other factors are controlled for, only labourers earn less than the base occupation (-7.4%) while the remaining occupations receive higher wages, although these are not significantly different in the cases of the artistic occupations[10] and construction workers. The biggest difference with respect to the base occupation concerns sales executives (67.9% above) and office, transport and communications services managers (44.1% above), followed by shop managers, foremen and persons in charge (40.4%), professionals and higher technicians (38.4%) and managers of companies, commercial establishments and in hotels and catering (37.9%).

The information related to sectors of activity permits, on the one hand, to control for the effect of the various productive and employment structures in the various provinces and, on the other, more information to be offered about job characteristics not previously considered[11]. Unfortunately, the low level of segregation of sectors of activity limits the efficiency of this variable in covering the defined objectives. We have taken as the base category the sector of commerce, restaurants, hotels and catering and repairs (sector 6). The results indicate that together with other manufacturing industries, it is the sector with lowest wages if the rest of factors are equal. The industry with the highest wage differential is energy and water (25.4% more than the base industry), followed by the chemical industry and the extraction and elaboration of minerals (20.3% higher) and the transport and communications sector (14.3%). It seems clear that when the rest of factors are equal, activities characterized by firms of greater size offer better opportunities in terms of wages.

TABLE 2

[10] This category includes writers, journalists, sculptors, decorators, photographers, musicians, sportsmen and others not classified. The result -wages not different to low qualified workers- can be explained by the fact that in this kind of occupation wages are complemented by incomes proceeding from freelance work which are not classified as wages.

[11] It should be obvious, for example, that the occupation 'accounting technician' can be defined variously as being in finance, in commerce or in other manufacturing industries.

Finally, the provincial dummy factors show the existence of a quantitatively significant "territorial effect". One can observe, for example, that the effect on wages of residing in Barcelona instead of Sevilla (24.1% of difference) is greater than the effect generated by the first level of professional training (22.1% of increase in relation to the EGB) and almost as important as working in the energy industry instead of commerce (25.4% of improvement). The conclusion is, then, clear: after controlling for a wide group of variables related to individuals and job characteristics, the presence of an important territorial effect on wages is detected. It is true that the provincial dummy coefficients should express the effect of variables not present in the equation due, for example, to the insufficient level of segregation in the case of industries[12]. In spite of this, the magnitude of the statistically significant coefficients allows to state that the effect of the territory on wages is quantitatively significant. As is shown in Table 2, the rest of the factors being equal, wages in Barcelona are 24.2% higher than in Sevilla; in Guadalajara 22.7% higher, in Gerona 19.4% higher and in Alava 17.9% higher. On the other hand, in Almería the wages are 17.6% lower than in Sevilla, in Zamora 16.5% lower, in Granada 13.5% and in Cáceres 12.7%. Map 2 presents another excellent overview of the subject. The 14 provinces that pay a higher wage form -with the exception of Huelva- a geographically continuous area from Madrid toward the east to Cataluña and the Baleares Islands and from Madrid towards the north to Navarra and the País Vasco. This area is not an homogeneous one and bears some characteristics that should be remarked upon. On the one hand, this area includes ten provinces with higher *per capita* incomes with respect to the Spanish average and among these ten are the first nine[13]. Moreover, nearly every province in the area presents a higher manufacturing specialisation index relative to the national total. It also contains three of the biggest cities in Spain: Madrid (1st), Barcelona (2nd) and Zaragoza (5th) and some of the provinces with the highest

[12] On the other hand, this problem does not seem to appear in occupations. Although in the results provided there are 19 different occupations, we have checked that considering 83 different occupations does not affect the provincial dummy coefficients more than marginally.

[13] To be specific, in ascending order, Baleares Islands, Gerona, Madrid, Tarragona, Alava, Barcelona, Navarra, Guadalajara and Zaragoza.

population densities in Spain[14]. In the third place, this area is dominated by three manufacturing areas of great dynamism -Madrid, Barcelona and Zaragoza- which seem to have large areas of influence[15]. Finally, some of the Spanish provinces that pay higher wages are located in one of the two geographical axes of great dynamism over the last ten years and especially during the second half of the eighties[16]. First, the Mediterranean Arc, an economic region that -in Spanish territory- includes Cataluña, the Community of Valencia and the Baleares Islands contains four provinces with higher wages: Barcelona, Gerona, Tarragona and the Baleares Islands. Second, the so-called axis of the Ebro covers half the valley of the River Ebro and continues towards the north to Navarra[17] with three of the provinces with positive wages effects- Zaragoza, Teruel and Navarra-. Alava and Guipuzcoa (in the País Vasco) are the natural continuation of the same area. These considerations seem to question the explanation of the differences based on territorial attractions, and at the same time propose two hypotheses already advanced by the economic theory and not necessarily exclusive. In the first place, the role of prices and their territorial differences as important explanative variables, as it is supposed that prices will be higher in these urban zones of greater dynamism and higher incomes; in the second place, the relevance of the demand for labour, since the provinces described will have more tight labour markets.

MAP 2

The models shown in Tables 3 and 4 allow these hypotheses to be contrasted. In the models numbered from 1 to 3 the territorial dummy variables have been substituted by a group of variables that attempt to approach the attraction of the different areas. The results are not very satisfactory, since only the variable coastal kilometres has the expected negative value and is

[14] Such as Madrid (619 inhab. per Km^2), Barcelona (602 inhab. per Km^2) and Guipuzcoa (339 inhab. per Km^2).

[15] Gerona and Tarragona in the proximities of Barcelona, Teruel and Navarra near Zaragoza and Guadalajara, Segovia and Soria to the north of Madrid.

[16] It is worth remembering that the data used is for 1990-1991.

[17] See, for example, Velarde/García Delgado/Pedreño (1992), especially Chapters 1, 7, 10 and 13.

statistically significant. The rest of the variables are not significant or have contrary signs to those expected by the theoretical approach of compensatory differences. Actually, educational services are related positively to wages.

TABLE 3

The inclusion of prices in Model 2 allows the global adjustment of the estimated equation to be partially improved and its coefficient has the expected positive value with an elevated value but below unit. We should conclude then that differences in wages partly balance the territorial inequalities of prices. When adding the unemployment rate -Model 3-, we obtain a coefficient with a negative value, indicating the short term prevalence of forces of the Curve of Phillips type opposed to those acting to the contrary. As models in table 3 are nested, F-tests can be carried out to test if the improvement achieved when adding new variables is statistically significant. The values of these tests[18] show that the more general model (model 3) cannot be rejected in favour of the restricted models 1 or 2. The evidence obtained does not allow it to be held that the territorial wage differences can be explained completely in terms of the theory of compensatory differences.

Model 4 in Table 4 shows the results of an estimation where the compensatory difference variables have been taken away and only the unemployment rate is considered as representative of existent disequilibriums in the labour markets. The unemployment rate appears as highly significant with a coefficient of -0.08, close to that estimated by Blanchflower/Oswald (1994) for various developed countries (-0.10). The possibility that rigidities existing in the markets can be reflected in different levels of prices at a territorial level suggests the introduction of prices -in logarithms- in Model 5. We obtain a negative effect for the unemployment rate and positive and very close to the unit value for the prices. As the wage elasticity to prices is almost unitary, a practically total equivalence should be

[18] The value of the test to select between models 3 and 1 is 341.04; between 3 and 2, 341.14 and between 1 and 2, 334.17 with critical values at 0.05 significance level of 3.00, 3.84 and 3.84 respectively.

expected between this estimation and another taking the real wages as the dependent variable. Model 6 show the results of this last approach where only the intercept value is modified.

TABLE 4

In conclusion, the "territorial effects" on wages are quantitatively significant and the evidence obtained indicates that one could not interpret them as compensatory differences for the unequal attraction of the territories. In fact, from the point of view of compensatory differences the only variable that explains partially the "territorial effects" on wages is different prices. The inclusion of the unemployment rate allows checking for the existence of a negative effect on the provincial wages. Its magnitude (-0.069 in Models 5 and 6) approaches reasonably the estimates of Blanchflower/Oswald for countries with lower values of the coefficient. Otherwise, the fact that the model that best fits is the one that includes the dummy provincial variables seems to indicate that the considered explanative variables in Models 1 to 6 have just not gathered together all the effects of the territory on wages. Therefore, although prices and unemployment explain, in an adequate way, most of the impact of the territory on wages, there probably remain some additional territorial wage effects that should be studied in the future.

5. Conclusions

The present work has tried to study the principal explanatory causes of wage differences among the Spanish provinces. The review of the theoretical literature has allowed the detection of two alternative hypotheses. The more genuinely neoclassical approach, underlines the existence of differences in the composition of the labour force as main explanatory factors-particularly in its human capital-, as well as in the composition of employment and in job characteristics. Once the influence of these factors is eliminated, territorial wages should coincide, at least in real terms, if differences in levels of prices exist. In the event of remaining wage differences, these should correspond to the unequal attraction of the territories. A second

line of reasoning -closest to approaches that highlight the importance of the institutional frame- postulates that, confronted with the limited geographical mobility of the labour force, the variables of demand will explain the observed wage differences, at least, real terms differences. The available empirical evidence for the United States points out the important explanatory role of prices, while the evidence obtained for the United Kingdom puts the explanatory capacity of the variables related to rigidities in the labour market, mainly the unemployment rate, in first place.

The empirical work has used individual data from the Encuesta de Presupuestos Familiares 1990-91. We have used a sample of this survey containing information about those people who have declared that they receive incomes from paid employment (16,949 individuals). We have estimated enlarged Mincer equations containing variables related mainly to the occupation and sector and with diverse specifications of the territorial effect. The principal conclusions could be stated explicitly in the following form.

First, the "territorial effect" is quantitatively important and of positive value in the case of fourteen provinces that -except Huelva- are located in a continuous geographical area running between Madrid and Cataluña-Baleaes Islands to the east, and between Madrid and Navarra-País Vasco towards the north. This area is not homogeneous, but it is mainly placed under the influence of the two most dynamic axes of the Spanish economy -the Mediterranean Arc and the axis of the Ebro- and includes the nine richest provinces of Spain, as well as some of the most populated ones.

Second, the wage differences could not be explained by the unequal attraction, neither climatic nor cultural, educational, in health, nor in entertainment of the provinces. Only the prices seem to influence wages in order to balance the differences in its level, trying to avoid the inequalities that otherwise would be generated in purchasing power.

Third, the unequal territorial distribution of unemployment causes, at least in the short term, an appreciable negative influence on wages. This fact reveals the existence of a Wage Curve, with a value of the coefficient reasonably close to the ones obtained by Blanchflower/Oswald (1994) for countries with lower values of the coefficient. This negative relationship seems to confirm that the mobility of the labour force is low finding serious resistance in acting quickly and efficiently and causing permanent disequilibriums in regional labour markets. This is a result that is common to the group of European countries, since similar estimations have found practically the same effect of the unemployment rate on wages.

In future research, the continuation and improvement of the studies should consist in the quantification and explanation of the territorial effects on wages not explained in the present study, that is to say those neither explained by the price differential nor by unemployment. A reasonable hypothesis is that, with more segregated data, the detected differences at provincial levels would correspond only to differences between some towns and not the whole provinces. For this reason, the next step in this line of research should consist of studying the possible effect of territories on wages as a result of the presence of external economies. These external economies may be generated by the size of the labour market or by an accumulation of the same kind of qualified productive employment (Rauch, 1993), or generated by the concentration of diverse productive activities in the territory or by specialization in a dominant activity (Glaeser/Maré, 1994). This type of study, complementary to the one presented here, should necessarily be carried out at a local level, a level which requires more detailed statistical information that is more precise than that used in the elaboration of this paper.

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Table 1

OLS ESTIMATION					
Dependent variable: natural logarithm of wages					
intercept	12.784 (381.760)	ocu19	-0.071 (-2.350)	pr22	0.007 (0.184)
gender	-0.378 (-33.066)	Industrial *dummies*		pr23	0.022 (0.528)
Schooling years *dummies*		se10	0.226 (6.248)	pr24	-0.034 (-0.824)
est01	-0.377 (-16.413)	se20	0.185 (5.991)	pr25	0.035 (0.755)
est2	-0.143 (-10.208)	se30	0.128 (5.511)	pr26	0.038 (0.928)
est4	0.291 (14.272)	se40	0.038 (1.728)	pr27	-0.041 (-0.871)
est5	0.349 (14.870)	se50	0.087 (3.306)	pr28	0.122 (3.730)
est6	0.200 (9.174)	se70	0.134 (5.653)	pr29	0.058 (1.494)
est7	0.361 (16.199)	se80	0.078 (3.136)	pr30	-0.062 (-1.640)
est8	0.641 (28.830)	se90	0.041 (2.409)	pr31	0.145 (-3.641)
est9	0.765 (30.415)	Provincial *dummies*		pr32	-0.065 (-1.315)
exp	0.057 (42.666)	pr1	0.164 (4.015)	pr33	-0.023 (-0.558)
exp2	-0.001 (-28.457)	pr2	0.026 (0.591)	pr34	-0.094 (-2.124)
part-time	-0.467 (-14.687)	pr3	-0.014 (-0.418)	pr35	0.072 (1.759)
Occupational *dummies*		pr4	-0.194 (-4.130)	pr 36	-0.037 (-0.965)
ocu1	0.325 (14.496)	pr5	0.049 (0.991)	pr37	0.001 (0.028)
ocu2	0.010 (0.229)	pr6	-0.026 (-0.593)	pr38	-0.009 (-0.239)
ocu3	0.252 (2.315)	pr7	0.112 (2.976)	pr39	0.075 (1.739)
ocu4	0.365 (9.320)	pr8	0.216 (6.202)	pr40	0.101 (2.144)
ocu5	0.237 (13.003)	pr9	0.021 (0.481)	pr42	0.142 (3.075)
ocu6	0.321 (6.581)	pr10	-0.136 (-3.114)	pr43	0.144 (3.523)
ocu7	0.518 (6.094)	pr11	-0.048 (-1.286)	pr44	0.133 (2.863)
ocu8	0.153 (7.082)	pr12	0.046 (1.027)	pr45	0.060 (1.284)
ocu10	0.339 (7.427)	pr13	-0.011 (-0.261)	pr46	-0.044 (-1.294)
ocu11	0.301 (4.543)	pr14	-0.094 (-2.196)	pr47	0.039 (0.912)
ocu12	0.116 (2.399)	pr15	0.010 (0.273)	pr48	0.032 (0.897)
ocu13	0.169 (2.558)	pr16	0.043 (0.844)	pr49	-0.180 (-3.583)
ocu14	0.069 (2.686)	pr17	0.177 (4.386)	pr50	0.134 (3.386)
ocu15	0.166 (7.430)	pr18	-0.145 (-3.368)	N	16,949
ocu16	0.263 (5.716)	pr19	0.204 (4.452)	R^2	0.4067

ocu17	0.033 (1.140)	pr20	0.088 (2.315)	Adj. R^2	0.4036
ocu18	0.135 (5.511)	pr21	0.152 (2.982)	F	132.849

For a description of the variables, see text and tables 4, 5, 6, 7 and 8.
t-statistic values are between parenthesis.

Table 2

Interprovincial wage differences from Sevilla **Results obtained from the OLS estimations of the coefficients associated to the provincial *dummies*[1]**									
PR8	24.17 %*	PR28	12.99%*	PR16	4.43%	PR37	0.15%	PR11	-4.68%
PR19	22.69%*	PR7	11.91%*	PR47	4.06%	PR38	-0.93%	PR30	-6.03%
PR17	19.37%*	PR40	10.67%*	PR26	3.91%	PR13	-1.12%	PR32	-6.29%
PR1	17.84%*	PR20	9.23 %*	PR25	3.58%	PR3	-1.47%	PR14	-8.98%*
PR21	16.53%*	PR39	7.79%	PR48	3.27%	PR33	-2.30%	PR34	-0.03%*
PR31	15.65%*	PR35	7.50%	PR2	2.59%	PR6	-2.59%	PR10	-12.73%*
PR43	15.51%*	PR45	6.20%	PR23	2.29%	PR24	-3.35%	PR18	-13.51%*
PR42	15.32%*	PR29	6.02%	PR9	2.13%	PR36	-3.69%	PR49	-16.52%*
PR50	14.34%*	PR5	5.10%	PR15	1.02%	PR27	-4.09%	PR4	-17.63%*
PR44	14.29%*	PR12	4.68%	PR22	0.79%	PR46	-4.31%		

1. Calculated as: exp(coefficient)-1

* the associated *dummy* is significant at a 5% level

Table 3

OLS ESTIMATION **Dependent variable: natural logarithm of wages**						
	Model 1		*Model 2*		*Model 3*	
intercept	12.559	(207.177)	9.459	(12.078)	9.576	(12.106)
coast	$-8.515*10^{-5}$	(-2.298)	$-6.695*10^{-5}$	(-1.794)	$-4.39*10^{-5}$	(-1.156)
temperature	0.001	(1.533)	0.001	(1.014)	0.001	(0.788)
university degrees	0.002	(4.077)	0.002	(2.363)	0.001	(2.209)
hospital beds	0.002	(4.825)	0.002	(4.041)	0.002	(4.242)
libraries	0.007	(0.648)	0.019	(1.701)	0.013	(1.152)
restaurants	0.005	(7.055)	0.004	(4.161)	0.003	(2.830)
films	-0.001	(-0.484)	-0.001	(-0.538)	-0.002	(-1.048)
log of prices			0.690	(3.971)	0.649	(3.723)
log of unemployment.					-0.046	(-3.144)
N	16,949		16,949		16,949	
R^2	0.3972		0.3977		0.3981	
Adjusted R^2	0.3955		0.3961		0.3964	
F	247.457		242.632		237.804	

Every model also includes the following exogenous variables: gender, schooling years dummies, experience and its square, part-time, occupational and industrial *dummies*.

For a description of the variables, see text.

t-statistic values are between parenthesis.

Table 4

OLS ESTIMATION **Dependent variables: natural logarithm of nominal (Models 4 and 5) and real wages (Model 6)**						
	Model 4		*Model 5*		*Model 6*	
intercept	12.791	(294.220)	8.272	(14.088)	12.802	(294.982)
log of prices			0.983	(7.717)		
log of unemployment	-0.079	(-7.063)	-0.069	(-6.116)	-0.069	(-6.144)
N	16,949		16,949		16,949	
R^2	0.3946		0.3967		0.3944	
Adjusted R^2	0.3932		0.3953		0.3930	
F	282.557		277.936		282.376	

Every model also includes the following exogenous variables: gender, schooling years dummies, experience and its square, part-time, occupational and industrial *dummies*.
For a description of the variables, see text.
t-statistic values are between parenthesis.

Table 5

CODE	SCHOOLING YEARS	DESCRIPTION
EST01	0 years	Illiterate - without studies
EST2	6 years	Primary education
EST3	9 years	EGB or equivalent
EST4	12 years	BUP or equivalents
EST5	13 years	COU
EST6	11 years	Technical studies, first degree (FP-1)
EST7	14 years	Technical studies, second degree (FP-2)
EST8	16 years	Medium university titulation or equivalent
EST9	18 years	High university titulation or quivalent

Table 6

OCCUPATIONS DESCRIPTION	
OC1	Law and science professionals and technicians,teachers
OC2	Artistic and sports professionals and technicians
OC3	Public sector managers and officers
OC4	Office, transport and communications services managers
OC5	Administrative services workers
OC6	Managers of companies, commercial establishments and in hotels and catering
OC7	Sales executives
OC8	Traders
OC9	Non-sale services workers
OC10	Shop managers, foremen and persons in charge
OC11	Extraction of minerals industry workers
OC12	Elaboration of minerals industry workers
OC13	Chemical industry workers
OC14	Food, wood, clothes, shoes, furnitures, etc. industry workers

OC15	Electricists and electronic technicians
OC16	Graphic arts, paper and plastic industry workers
OC17	Construction workers
OC18	Drivers
OC19	Labourers

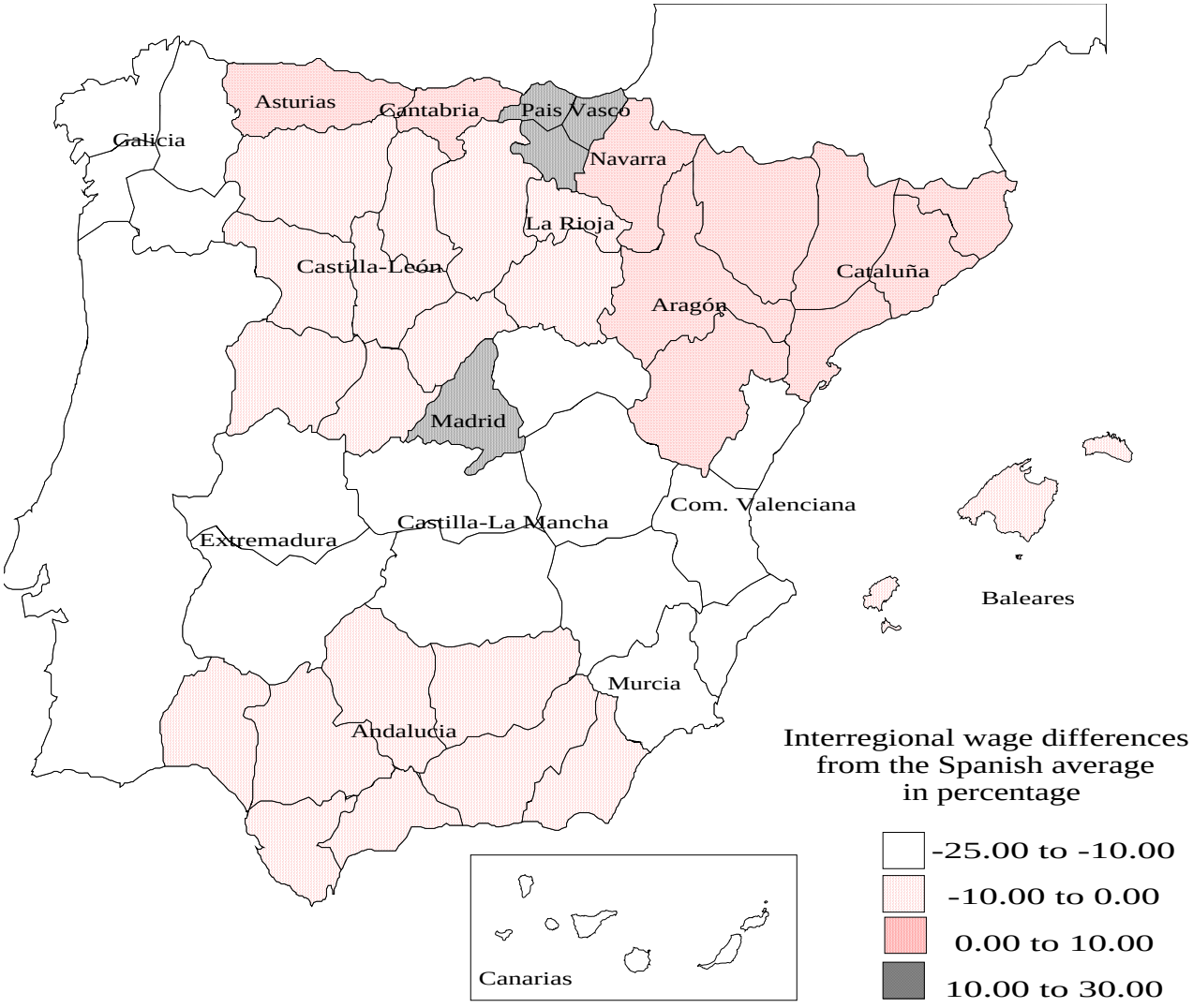
Table 7

INDUSTRIES DESCRIPTION	
se10	Energy and water
se20	Extraction and non-energetic minerals rransformation, chemistry industry
se30	Metalic elaboration industrys, precision mechanics
se40	Other manufacturing industries
se50	Construction
se60	Commerce, restaurants and hotels, repairs
se70	Transport and communications
se80	Financial institutions, insurances, services to firms and rents
se90	Other services

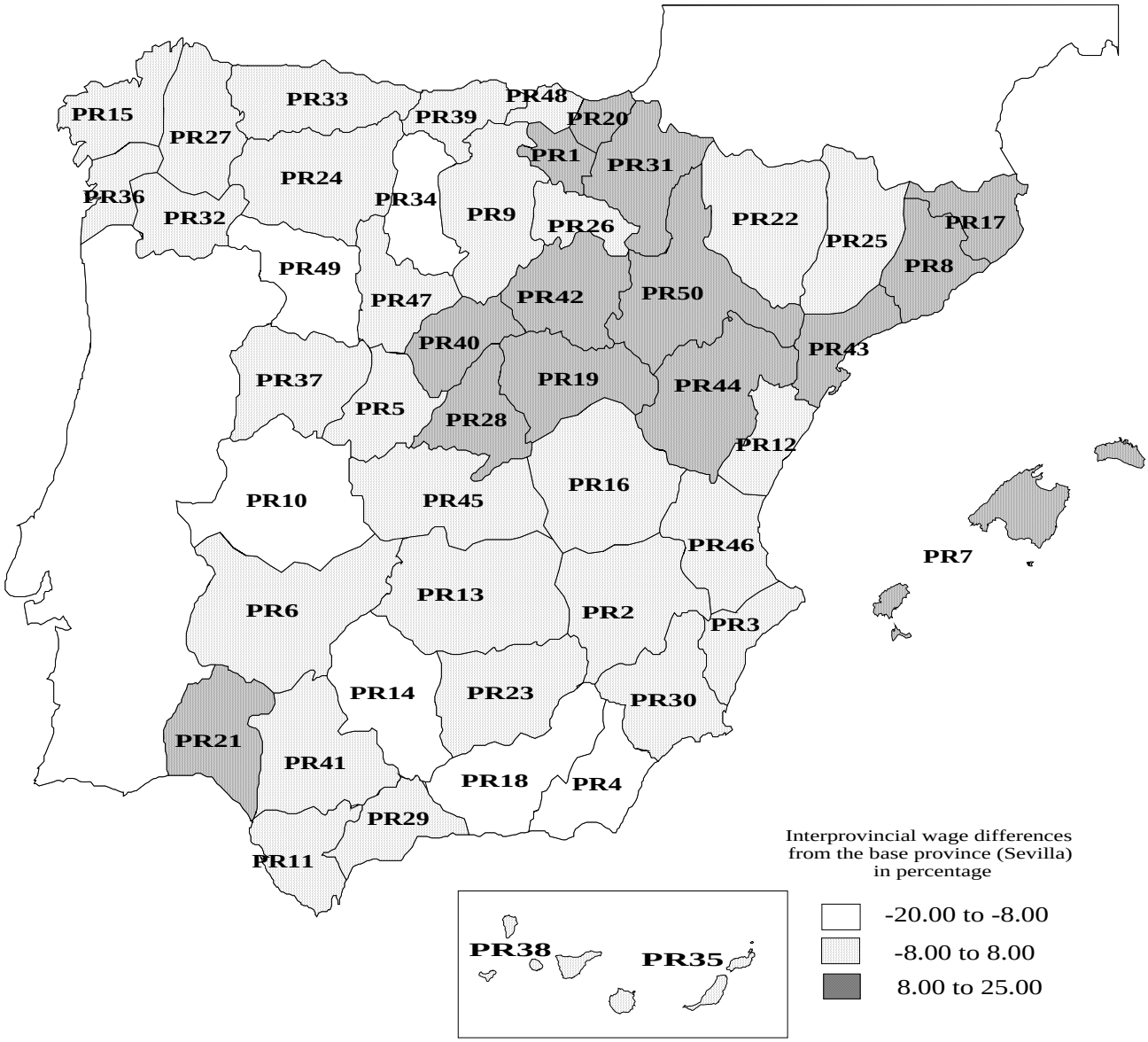
Table 8

CODE	PROVINCE	CODE	PROVINCE	CODE	PROVINCE	CODE	PROVINCE
PR1	Alava	PR14	Córdoba	PR27	Lugo	PR40	Segovia
PR2	Albacete	PR15	Coruña (La)	PR28	Madrid	PR41	Sevilla
PR3	Alicante	PR16	Cuenca	PR29	Málaga	PR42	Soria
PR4	Almería	PR17	Gerona	PR30	Murcia	PR43	Tarragona
PR5	Avila	PR18	Granada	PR31	Navarra	PR44	Teruel
PR6	Badajoz	PR19	Guadalajara	PR32	Orense	PR45	Toledo
PR7	Baleares Islands	PR20	Guipúzcoa	PR33	Asturias	PR46	Valencia
PR8	Barcelona	PR21	Huelva	PR34	Palencia	PR47	Valladolid
PR9	Burgos	PR22	Huesca	PR35	Palmas (Las)	PR48	Vizcaya
PR10	Cáceres	PR23	Jaén	PR36	Pontevedra	PR49	Zamora
PR11	Cádiz	PR24	León	PR37	Salamanca	PR50	Zaragoza
PR12	Castellón de la Plana	PR25	Lleida	PR38	Sta. Cruz Tenerife		
PR13	Ciudad Real	PR26	Rioja (La)	PR39	Cantabria		

Map 1


Asturias
Cantabria
Pais Vasco
Galicia
Navarra
La Rioja
Castilla-León
Cataluña
Aragón
Madrid
Com. Valenciana
Castilla-La Mancha
Extremadura
Baleares
Murcia
Andalucia
Canarias
Interregional wage differences
from the Spanish average
in percentage
-25.00 to -10.00
-10.00 to 0.00
0.00 to 10.00
10.00 to 30.00

Map 2


PR15
PR33
PR48
PR39
PR20
PR27
PR1
PR31
PR24
PR36
PR34
PR9
PR22
PR17
PR32
PR26
PR25
PR49
PR8
PR47
PR42
PR50
PR40
PR43
PR37
PR19
PR44
PR5
PR28
PR12
PR10
PR45
PR16
PR46
PR7
PR6
PR13
PR2
PR3
PR14
PR23
PR30
PR21
PR41
PR18
PR4
PR29
PR11
PR38
PR35
Interprovincial wage differences from the base province (Sevilla) in percentage
-20.00 to -8.00
-8.00 to 8.00
8.00 to 25.00