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WAGE FLEXIBILITY AND LOCAL LABOUR MARKETS: HOMOGENEITY OF THE WAGE CURVE IN SPAIN

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Wage flexibility and local labour markets: homogeneity of the wage curve in Spain[∇]

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Abstract

In this paper we analyse wage flexibility in Spain and its regional differences, departing from the estimation of wage curves. Using data from the Wage Structure Survey, we proceed to estimate regional wage equations, relating the observed wage received by workers to a group of personal and job characteristics, as well as to the unemployment rate. This analysis allows us to test for the existence of regional differences in the degree of wage flexibility, which may have an important influence in the evolution of regional unemployment, given its impact on the ability of the local labour market to absorb negative shocks. Estimated results indicate that regions suffering from higher unemployment rates exhibit lower wage flexibility. Collective bargaining reforms should pursue greater wage flexibility, especially in regions with high rates of joblessness.

Keywords: Wage flexibility, wage curve, Wage Structure Survey, Spain, regional unemployment
JEL codes: J31, J64, R15, R23

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1.- Introduction

Three major features have characterised the Spanish labour market during recent decades. First, and most evident, the unemployment rate in Spain is considerably higher than in other EU countries. The minimum rate attained by the Spanish economy since 1980 was around 8% at the end of 2007, well above the EU average and exceeded only by certain recent entrants to the EU, such as Slovakia and Poland. Between 1980 and 2000, and again since 2008, the unemployment rate in Spain has been the highest among EU and OECD countries. There is a consensus in the literature (see the review by Blanchard, 2006) that differences in current unemployment rates in Europe can be explained by the different responses in each country to external shocks and the reactions to those shocks of individual national labour market institutions, and Spain is a good example for study (Bentolila and Jimeno, 2006).

A second feature is the very high volatility of employment. Data from the Labour Force Survey[1] shows that, between 1994 and 2007, more than 7 million jobs were created in Spain (more than half of the growth in employment in the EU), whereas since 2008, the number of unemployed has surged from 1.7 million to nearly 5 million, much more than any other country in the Euro zone.[2] Employment in Spain is highly procyclical with respect to its neighbours: during upturns, more jobs are created than in the rest of the EU, but during recessions, more jobs are lost. Again, labour market institutions are shown to play an important role in this matter (Bentolila and Jimeno, 2006). In particular, the (external) flexibility at the margin introduced by the extension of temporary contracts (the temporary rate has stood at well above 30% since the mid-1980s) has been regarded as key to this enormous volatility in employment growth and decline (Dolado et al., 2008).[3] In this respect, the labour institutional structure in Spain leaves little room for internal and wage flexibility and migration is rare, so that the use (and abuse) of temporary contracts is the only way to provide flexibility in labour relationships. Moreover, the integration of almost 500,000

[1] In 2002 and 2005, the Spanish Labor Force Survey experienced major methodological reforms, which do not allow for homogeneity in the data. However, the general trends are clear.

[2] In fact, since the global economic crisis began at the end of 2007, more than 5 million workers have joined the ranks of the unemployed in the Euro area as a whole. This implies that more than 50% of the newly unemployed in the Euro area are Spanish. This sharp decrease in employment reflects the fact that in Spain the labour market has mainly adjusted to the decline in output via a reduction of employment, rather than via a combination of wage and hours reductions.

[3] The Spanish labour market has experienced a number of reforms (the first in 1984, with the legalization of fixed-term contracts, the last in 2010, with strong rejection of worker's unions) that have progressively aimed to increase firms' ability to better adapt to the economic situation.

immigrants per year during the period 2000-2006 has encouraged this external flexibility, since most of these workers have been given temporary employment, and were willing to accept lower wages (Bentolila *et al.*, 2008).[4] Finally, and parallel to the volatility in the number of employed workers, a new dimension has emerged in the labour market, namely the differential treatment of certain labour market groups - the young, the female, the immigrant - who systematically present lower employment rates, and higher unemployment and temporary rates.

The third major feature of the Spanish labour market is the existence of important and persistent regional disparities in the unemployment rate. Employment growth has not been homogeneously distributed across the Spanish regions, basically due to the existence of important regional differences in wage setting, as a consequence of significant imitation effects in wage bargaining (Bande *et al.* 2007, 2008).[5] These authors show that, in general, the less productive sectors in the less productive regions link their wage growth to the conditions prevailing in the most productive sectors of the most productive regions. This increases unit labour costs, especially for less productive regions, and thus limits their ability to create employment, especially during economic upturns. As a consequence, regional unemployment disparities in relative terms exhibit a marked countercyclical behaviour.

This paper aims to analyse jointly the two latter features: the increased flexibility with persistent regional disparities. High rates of temporary employment, and a large immigrant influx, have endowed the Spanish labour market with a way to increase flexibility, which has had some impact on wages. We add new empirical evidence to the existing literature by identifying the changes in the degree of pay flexibility in the Spanish labour market during the last two decades, both at the aggregate and at the regional level, estimating regional wage curves.

The paper is organised as follow. Section 2 summarises a simple model to understand the existence of regional unemployment disparities, and describes the most recent evolution of employment and unemployment in the Spanish labour market. Section 3 summarises the

[4] During the downturn, workers holding temporary contracts have borne the brunt of job losses, as firms have adjusted to the sudden decline in demand by simply not renewing these contracts. Temporary employment dropped by 8% in 2008 and by 18.4% in 2009, while open-ended employment rose by 3% in 2008 and slightly decreased (by 0.9%) in 2009.

[5] This is a well-known problem in Spain. The International Monetary Fund and the Bank of Spain have both commented that the collective bargaining system, dominated by industry-wide agreements that cannot be modified, is too rigid. In fact, in June 2011 the Spanish government imposed a reform of the collective bargaining system. Among the main objectives of this reform, the most remarkable is making wage settlements more sensitive to economic conditions at the firm level, reducing the number of collective bargaining negotiations, eliminating the automatic renewal of collective bargaining agreements in the absence of a new agreement, and exploring ways to strengthen the link between wages and productivity growth

existing estimates of wage flexibility in Spain and Europe, and discusses our theoretical and empirical framework. Section 4 presents evidence of differences in regional labour market flexibility, using data from the Wage Structure Survey. Our conclusions are presented in Section 5.

2.- Wage flexibility in Spain and Europe: review of the empirical evidence

2.1. Theoretical rationale

Labour market flexibility is a key assumption under the standard neoclassical models, and refers to a situation where wages are flexible and the labour force is mobile in the geographical and occupational dimension. This implies that, under the standard assumptions made in this type of models, if we add perfect competition in the product market, full employment is guaranteed.

However, at least in European countries, full employment has been the exception rather than the norm since the early 1980s. The high and persistent unemployment rates registered in the European economies during the 80s and 90s have generated a large body of literature that, fundamentally, concluded first that the main source of high unemployment was an incorrect set-up of labour market institutions that avoided complete adjustment in the labour market (Layard et al., 1991 and OECD, 1994) and, some years later, that this phenomenon is better explained by the interaction between labour market institutions and the response to external shocks (Blanchard and Wolfers, 2000; Bertola et al., 2001; Nunziata, 2002), which shapes the configuration of unemployment rates.[6] Rigidity prevents labour markets from rapidly responding to external shocks, avoiding functional adjustment processes, with important differences across countries. Consequently, the economic policy recommendation was clear: the labour market should be more flexible to absorb possibly asymmetric adverse shocks. In empirical work, labour market flexibility is usually proxied by pay or wage flexibility,[7] that is, the response of wages to the general conditions of the labour market, usually measured by the unemployment rate.

A standard framework describing labour market relationships may be depicted as follows (see also Blanchard and Katz, 1997, 1999). Assume that workers set their wage through a wage

[6] Of course there are other interpretations, but they did not have as much of an impact as those referred to. See for instance Arestis *et al.* (2007) and Karanassou *et al.* (2008). In these models, it is capital accumulation which accounts for major unemployment swings in European countries.

[7] See Monastiriotis (2006) for an in-depth discussion of the issue of labour market flexibility.

bargain, and that given the expected level of prices, the real wage negotiated by the union (or worker representatives) depends negatively on the unemployment rate (higher unemployment implies higher opportunity costs of demanding a too-high wage), and positively on a set of labour market institutions, such as unemployment benefits, minimum wage, etc. Thus, the wage- setting equation in this labour market may be written as

$$w - p^e = \alpha_0 - \alpha_1 u + \alpha_2 \Psi \qquad (1)$$

where w is the log of the nominal wage, p^e is the log of the expected level of prices, u is the unemployment rate, and $\boldsymbol{\Psi}$ is a vector of j labour market institutions. We assume that the α's are positive constants. Note that α_0 measures exogenous factors determining the level of bargained real wages by workers (for instance business cycles, inflation pressures…). α_1 is the degree of wage flexibility, i.e., the unemployment-elasticity of real wages, and α_2 accounts for the effect of labour market institutions in wage bargaining.

Assume that firms operate in non-competitive markets and, thus, set prices as a margin over unit labour costs. The standard price equation may be written as

$$w - p = \nu \qquad (2)$$

where ν is the log of $(1+\eta)$, η being the price elasticity of product demand. Thus, in this standard labour market model, workers set real wages according to their bargaining power (determined by the unemployment rate), and firms set prices according to their pricing rules. If we allow expectations to be fulfilled, and solve for the unemployment rate, we derive the natural rate of unemployment

$$u_n = \frac{\alpha_0 + \alpha_2 \Psi + \nu}{\alpha_1} \qquad (3)$$

with $\frac{\partial u^n}{\partial \Psi_j} > 0$ for $i=1,2..,j,$ i.e., the natural unemployment rate is increasing in the labour market institutions. Also, note that the natural rate is increasing in the exogenous factors that push wages up (α_0), and in firm mark-ups (ν), and decreasing in the degree of wage flexibility (α_1). Given a set of product competition conditions, the evolution of the natural rate must be related to the evolution of both labour market institutions and/or wage flexibility, i.e., the response of real wages to the unemployment rate.

This basic framework has been used to explain the persistence of high unemployment rates in Europe (see *inter alia* Layard *et al.*, 1991, Blanchard and Wolfers, 2000). Different labour market institutions may explain different labour market performance, through different natural rates (or NAIRU's). Moreover, if some kind of hysteresis mechanism is found, the

lack of wage flexibility may permanently increase the natural rates (see Blanchard and Jimeno, 1995, for instance).

However, at the regional level, labour market institutions cannot be the source of regional variation in unemployment, given that, usually, legal systems ensure that workers are equally treated across regions within a country. Thus, in order to adapt the above theoretical framework to the regional context, we assume that the set of labour market institutions Ψ are constant across regions. Therefore, within each region *r* of a country we find a regional natural rate of the type

$$u_r^{\,n} = \frac{\alpha_{0,r} + \alpha_{2,r}\Psi + \nu}{\alpha_{1,r}} \qquad (4)$$

Thus, assuming also that the degree of product competition is similar across regions, the main source of geographical unemployment differences must lie in the different degree of regional wage flexibility, $\alpha_{1,r}$, and/or in the regional amenities, $\alpha_{0,r}$.

Equation (4) illustrates the assertion of Marston (1985) that regional differences in unemployment may reflect either equilibrium or a disequilibrium situation.[8] If regions differ in amenities, each region would tend towards its own natural rate. Given that amenities change slowly through time, the existence of disparities in unemployment becomes an equilibrium result. In a disequilibrium framework, NAIRUs can be similar across regions, but adjustment processes may evolve differently because of different degrees of flexibility.[9]

Whereas differences across regions in demand-side, supply-side and institutional factors have been extensively considered in the empirical literature (see Elhorst, 2003; Aragon *et al*., 2003), in recent years, the institutional settings focused on wage schemes have been increasingly considered in studies on regional unemployment disparities (see Pench *et al*., 1999; Brunello *et al*., 2001; Basile and De Benedictis, 2004). Since most of the institutions are common between regions, the focus has been put on the wage-setting mechanism, specifically on how wages respond to regional factors such as labour productivity and

[8] Additionally, equation (4) could show some degree of hysteresis so that the natural rate could depend on past unemployment. In this case, adjustment to adverse shocks will differ across regions, and disparities would increase through time. If this is the case, note that the lack of wage flexibility reinforces the disequilibrium approach.

[9] Bande and Karanassou (2011) find, however, that the concept of a natural rate of unemployment at the regional level may be misleading, since it is based on single equation unemployment models. When a system of labour demand, wage setting and labour force is considered instead, lagged adjustment processes interact with growing variables in the system (a phenomenon labeled as '*frictional growth*'), which adds to the natural rate. Therefore, nothing guarantees that in the long run the actual unemployment rate tends toward the natural rate, which does not act as an attractor, and thus is of little help in the formulation of labour market policies.

unemployment. This will be analysed in section 3. Before that, we now present evidence on the evolution of regional differences in unemployment rates for the Spanish economy.

2.2. Regional unemployment rate differences in Spain

In Spain, a cursory glance at unemployment rates allows us to appreciate large differences between regions.[10] Figure 1 reveals the wide differences in unemployment rates across Spanish regions, showing the average unemployment rate in the three high-unemployment regions (top quintile of the distribution), the three low-unemployment regions (bottom quintile) and the ratio between the rates in the high-unemployment and the low-unemployment regions over time. This figure follows closely the evolution of the national unemployment rate throughout the business cycle: an increase until the mid-1980s; a marked decrease during the expansionary phase between 1986 and 1991; a sharp rise until 1994 (when the national unemployment rate attained a peak at 24.1%); a steady reduction between 1994 and 2007, and then an abrupt surge to 1994 levels (see also Table 1).

The average difference between the top and the bottom quintiles has been about 7.5 percentage points (pp.), with the recession periods showing higher values (almost 10 pp.) and the expansionary phases showing lower (the minimum was less than 4 pp., in 2004). This is preliminary evidence that absolute differences are marked and procyclical.[11] However, when differences are computed in relative terms (i.e. as a proportion of the national rate), a countercyclical behaviour is observed. The ratio between the top unemployment regions and the bottom unemployment regions increased during expansionary phases and declined with recessive periods.[12]

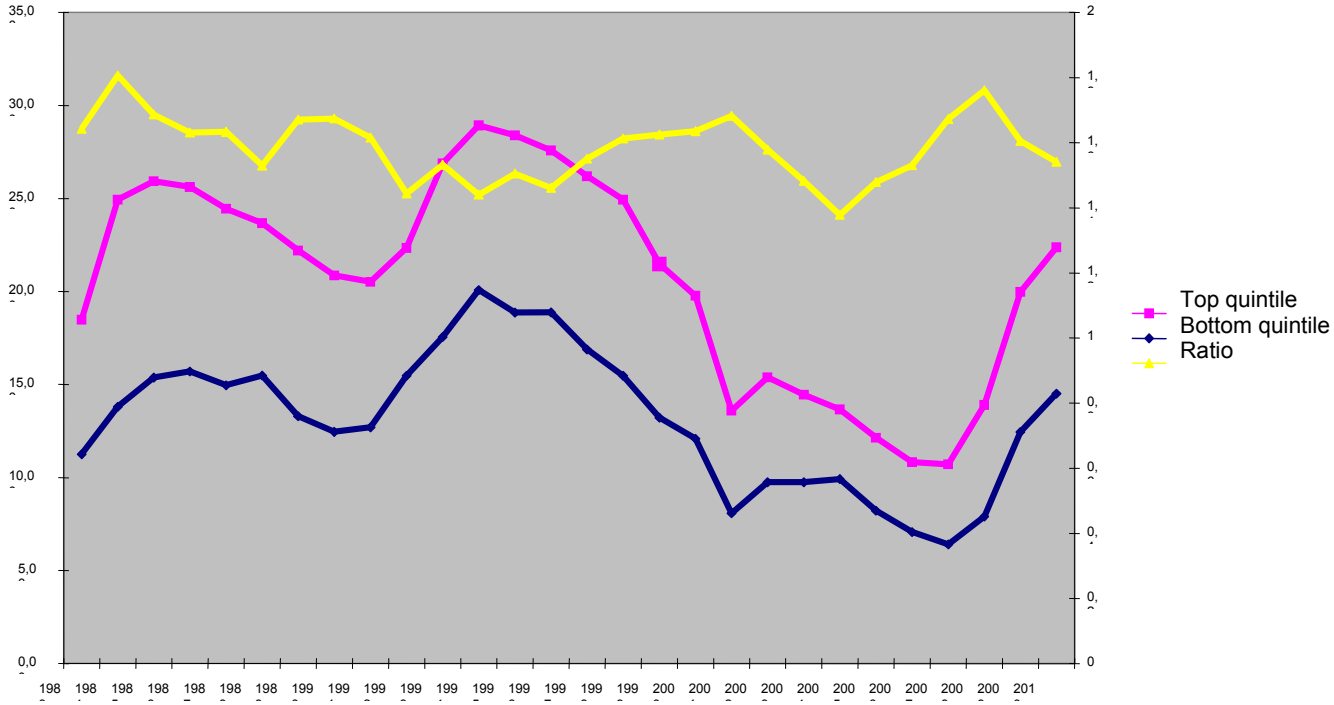
[10] All the information used here comes from the Eurostat Regio dataset and from the Spanish Labour Force Survey (EPA), elaborated by the Spanish National Statistics Institute, according to the European standard issued by Eurostat. The thorough reform of the EPA undertaken in 2002, consisting of the change of the elevation factors and of the adaptation of the definition of unemployed to that proposed by Eurostat, implied a clear break in the sample that must be borne in mind.

[11] Both the difference between the maximum value and the minimum value (Figure A1 in the Appendix) and the dispersion (Figure A2 in the Appendix) move parallel to the evolution of the national unemployment rate.

[12] See also the ratio between the maximum and the minimum value in Figure A1 and the relative dispersion in Figure A2.

Figure 1

Averaged top and bottom quintiles of unemployment rates distribution and their ratio



In the series included in Table 1, we show regional unemployment rates at different moments in time from 1983 to 2010, as well as some illustrative indicators. It can be observed that regional differences in the unemployment rate are persistent across Spain. During the last 30 years, Andalusia, the Canary Islands and Extremadura have been at the bottom of the regional ranking, with unemployment rates much greater than the average. At the other extreme of the ranking, the Balearic Islands, La Rioja, Aragón and Navarre have always been in the group of regions with the lowest unemployment rates. This indicates that regional differences in Spanish unemployment rates exist and persist, contrary to the US, but similar to other EU countries (European Commission, 2000, Baddeley *et al.,* 1998), which may have adverse consequences for those regions occupying the bottom positions in the ranking, reflecting that not all regions follow the same pattern in employment changes.

Table 1. Relative regional unemployment rate

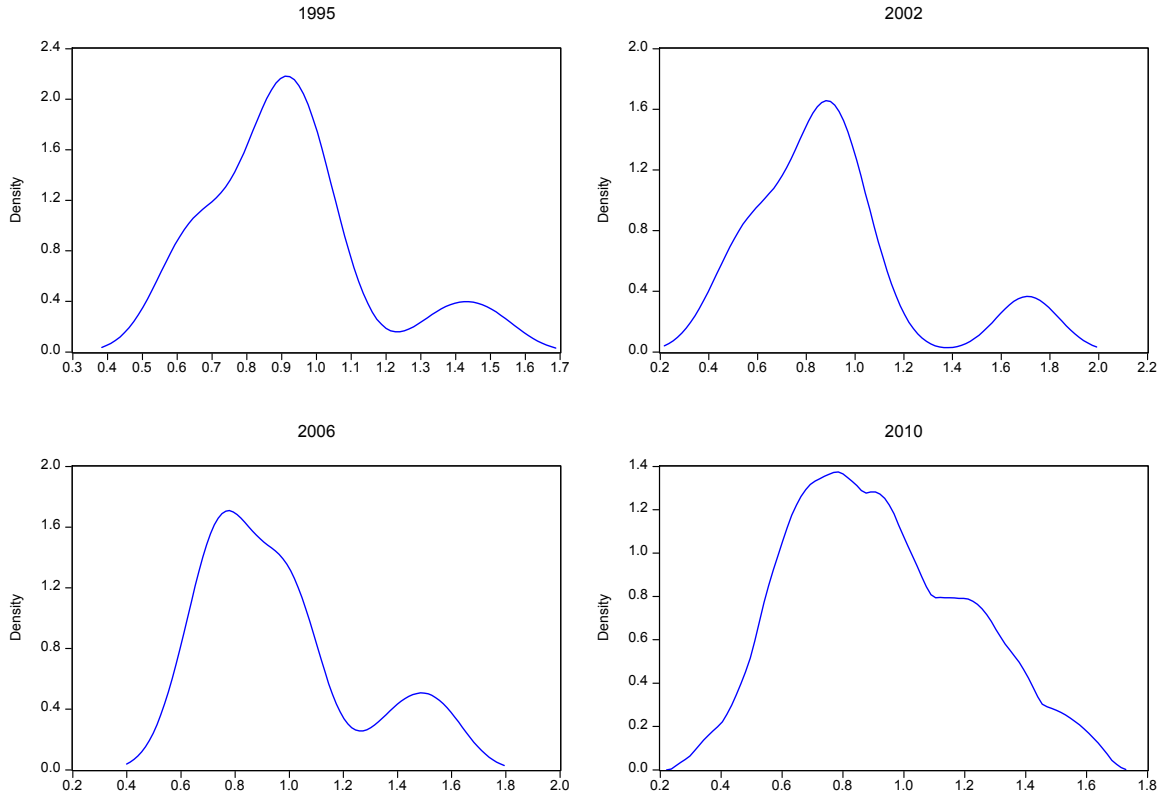
	1983	1986	1988	1990	1992	1994	1996	1998	2000	2002	2004	2007	2008	2009	2010
Andalucía (AND)	22.41	30.09	28.68	25.53	28.18	34.59	32.35	29.13	24.13	19.68	17.07	12.76	17.83	25.35	27.97
Aragón (ARA)	13.68	16.00	13.94	9.54	12.31	18.30	15.28	11.37	7.20	5.80	5.62	5.24	7.15	12.82	14.77
Asturias (AST)	13.90	18.58	19.45	17.49	16.82	21.95	20.93	18.84	16.98	9.73	10.36	8.48	8.45	13.42	15.97
Baleares (BAL)	13.93	14.19	10.92	10.54	11.55	17.80	13.41	11.29	6.53	7.61	9.16	6.98	10.18	18.02	20.37
Canarias (CAN)	19.11	25.72	22.01	22.98	24.82	26.47	21.94	18.47	13.42	11.13	11.96	10.44	17.36	26.19	28.70
Cantabria (CANT)	12.61	17.71	20.64	16.77	16.65	23.36	23.87	17.79	13.36	10.05	10.54	5.90	7.17	11.99	13.87
Castilla-León (C-L)	13.56	18.04	17.36	15.39	17.70	21.43	19.90	18.00	13.75	10.48	10.69	7.18	9.51	13.78	15.78
Castilla-Mancha (C-M)	14.08	15.17	15.11	13.09	15.66	19.70	19.43	16.79	12.50	9.52	9.52	7.61	11.59	18.81	20.99
Cataluña (CAT)	21.08	21.16	18.55	12.54	13.54	21.17	18.83	14.42	8.88	10.11	9.70	6.55	9.00	16.25	17.75
Com Valencia (VAL)	17.27	19.54	17.14	14.26	19.10	24.59	21.62	16.47	11.60	10.77	10.40	8.76	12.13	21.24	23.30
Extremadura (EXT)	16.35	27.42	26.22	24.84	25.89	31.64	30.21	28.90	23.63	19.22	17.20	13.06	15.20	20.55	23.04
Galicia (GAL)	9.89	13.46	12.43	12.29	16.24	19.93	18.65	17.35	14.88	12.17	13.61	7.64	8.73	12.59	15.40
Madrid (MAD)	16.70	19.35	16.14	12.23	12.96	20.57	20.18	16.79	11.56	7.27	6.71	6.30	8.69	14.03	16.08
Murcia (MUR)	16.62	19.64	17.49	15.95	20.97	25.52	23.56	17.28	12.73	11.38	10.67	7.56	12.63	20.73	23.35
Navarra (NAV)	15.52	18.10	14.41	11.66	11.47	14.62	11.70	10.09	5.65	5.71	5.54	4.76	6.72	10.89	11.85
País Vasco (PV)	19.62	23.18	21.22	18.64	19.56	24.39	20.62	16.91	12.08	9.59	9.71	6.12	6.45	11.04	10.55
La Rioja (RIO)	11.26	15.94	13.37	8.33	13.53	16.97	14.10	11.25	8.03	7.02	5.58	5.66	7.79	12.75	14.27
Nacional (SPA)	17.33	20.98	19.24	16.24	18.35	24.12	22.08	18.61	13.87	11.48	10.97	8.26	11.34	18.01	20.06
Max-min	12.52	16.63	17.76	17.20	16.71	19.97	20.65	19.05	18.48	13.97	11.66	8.30	11.38	15.30	18.15
Max/min	2.27	2.24	2.63	3.06	2.46	2.37	2.76	2.89	4.27	3.44	3.10	2.74	2.76	2.40	2.72
Dispersion	3.41	4.65	4.76	5.14	5.09	5.11	5.38	5.29	5.20	3.90	3.44	2.40	3.58	4.90	5.37
Relative dispersion	0.20	0.22	0.25	0.32	0.28	0.21	0.24	0.28	0.37	0.34	0.31	0.29	0.32	0.27	0.27
Q4	18.49	25.62	23.68	20.87	22.34	28.93	27.58	24.94	19.77	15.39	13.66	10.71	13.91	19.98	22.36
Q1	11.25	15.70	15.48	12.46	15.47	20.09	18.87	15.46	12.09	9.74	9.91	6.40	7.90	12.44	14.51
Q4/Q1	1.64	1.63	1.53	1.67	1.44	1.44	1.46	1.61	1.64	1.58	1.38	1.67	1.76	1.61	1.54

Notes: Q4/Q1 stands for the ratio of the average regional unemployment rate in the top quartile over that in the bottom quartile.
Source: Own elaboration from the Spanish National Employment Survey (EPA).

A related issue is the dynamics of the distribution of relative regional unemployment rates. Prior evidence (López Bazo *et al*, 2002) has suggested that a polarization process was under way at the provincial level during the 1980s and early 1990s. However, Bande *et al.* (2009), for the period between 1980 and 2001, found a weak convergence process in the regional unemployment rates, along with a stronger polarization effect, that did not affect the whole set of Spanish regions. On the one hand, two clusters of regions were identified by these authors, with opposite unemployment behaviors: those regions in the Ebro axis and Balearic Islands showed unemployment rates below the national average, while the other cluster (Andalusia, Extremadura and the Canary Islands) showed values 1.5 times greater than the average. On the other hand, a third group was converging towards the national average. Bande *et al.* (2010) confirm that this pattern continued in the second half of the first decade of the 21st century, and that the Great Recession was inverting the process, with an ongoing process of overall relative unemployment convergence. Figure 2 clarifies this issue, presenting the estimated kernel density functions for the relative regional unemployment rates in selected moments of time.

Figure 2

Estimated kernel density functions for the relative regional unemployment rates



Notes: a gaussian kernel function is used to estimate the kernel density, while the bandwith has been selected using the Silverman option.
The relative unemployment rate is defined as the regional unemployment rate over the national unemployment rate.

These estimates confirm previous results. During the economic boom that began in the second half of the 1990s, until the upheaval of the Great Recession, regional unemployment disparities were exacerbated, since the two-mode distribution in 1995 was progressively sharpened, with a low unemployment mode around 0.9 in 2002 and 0.8 in 2006. The high unemployment mode, on the contrary, moved from 1.4 in 1995 to 1.7 in 2002 and moved back to 1.5 in 2006. However, within the low unemployment group of regions, a different behaviour can be found, and an additional mode could be identified at 0.6 in 2002 and 1.0 in 2006 (see Bande *et al.*, 2010 for a detailed account of changes in the distribution of regional unemployment rates throughout the first decade of the century). If the hypothesis of an imitation effect on the wage bargains during expansions were true, we should observe a reversal of the described pattern through the Great Recession, and this is precisely what seems to be happening in Spain. The last panel of Figure 2 shows the kernel density function for the distribution of regional unemployment rates in 2010, pointing to an ongoing process of convergence in regional unemployment rates towards the national average. This result indicates that the process of wage formation is a fundamental element in the explanation of unemployment disparities in the Spanish economy.

In sum, wage imitation policies across regions and industries have led to differences in regional wages being clearly lower than differences in regional productivity (Bande et al., 2008). This has caused a differential behaviour in the creation of employment across regions, which has in turn generated a kind of polarisation in unemployment rates. Against this background, our aim in this paper is to investigate regional wage flexibility in Spain, making use of the wage curve as an appropriate measure of wage flexibility.

3.- Wage curves in Spain: regional differences

The wage curve is the term used to describe the negative relationship between the levels of unemployment and wages that arises when these variables are expressed in local terms, reflecting that for two identical individuals, one working in an area of high unemployment and the other working in a region with low joblessness, the former has lower earnings. Since the initial work by Blanchflower and Oswald (1994), many studies have found that this relationship is rather similar across countries, and it can be represented by:[13]

[13] See Nijkamp and Poot (2005), Montuenga and Ramos (2005) and Blanchflower and Oswald (2005) for lists of countries in which wage curves have been found.

$$w_{ir} = -0.1\ u_r + other\ terms$$

where w_{ir} is the log of the wage of an individual living in region r; u_r is the log of the regional unemployment rate and the *other terms* are control variables for worker and job characteristics. Here, the coefficient –0.1 is the elasticity of wages with respect to unemployment, indicating that, for a given region and a given point in time, doubling the unemployment rate implies a decrease of one tenth in wages, *caeteris paribus*.

However, this "empirical law of economics" of a –0.1 elasticity of wages with respect to unemployment, advocated by Blanchflower and Oswald (1994, 2005), is not as uniform as claimed. Several studies have obtained estimated values for this elasticity that differ noticeably across countries. For instance, the unemployment coefficient is not significantly different from 0 in the Nordic countries (Albaek *et al.*, 2000 for Denmark, Finland, Iceland, Norway and Sweden; Brunstad and Dyrstad, 1997 and Barth et al., 2002 for Norway). Using a homogenous data set, Montuenga *et al*. (2003) show that the elasticity varies across some EU countries, ranging from a value of about –0.20 in the UK and France, through to –0.05 in Portugal, with Spain and Italy in the medium range. Values slightly higher have been found for the same countries in Sanz de Galdeano and Turunen (2006). In Central-Continental countries, coefficients are much more reduced, less than -0.05 in absolute values (see Winter-Ebmer, 1996 and Falk and Leoni, 2009 for Austria; Janssens and Konings, 1998, for Belgium; Buettner, 1999, Bellmann and Blien, 2001, Ammermüller et al., 2010, Baltagi et al., 2009, for Germany; Iara and Traistaru, 2004, for Poland, Hungary and Romania). The disparity increases when developing countries are investigated. No wage curve is found in China (Sabin, 1999; Wu, 2004), Taiwan (van der Meulen Rodgers and Nataraj, 1999), Slovenia and Kyrgyzistan (Blanchflower, 2001), whereas the coefficient is close to -0.2 in the Baltic countries (von Hagen and Traistaru-Siedschlag, 2005) and above, in absolute value, -0.2 in Estonia and Latvia (Blanchflower, 2001).[14]

In the neoclassical framework, workers would be willing to live in a high unemployment area if they receive some type of reward, according to the compensating differentials theory (Harris and Todaro, 1970), either non-pecuniary (life conditions, amenities, etc…) or monetary. Therefore, one possible reason for living in places with higher unemployment rates can be associated with receiving higher wages. The empirical evidence of the wage curve seems to run against this theory. Considering differences on the time interval solves this

[14] It should be noted that the bulk of the evidence presented is difficult to compare directly. First, data statistics are specific to each country, and even when analysing the same country, data sources may be different. Second, some of the econometric problems discussed later are not dealt with properly in the literature.

apparent contradiction. A positive relationship between wages and the rate of unemployment (as predicted by the compensating differential theory) is satisfied in the long term, whereas the negative relationship (represented by the wage curve) is valid in the short term (Morrison et al., 2006; Johnes, 2007).

On theoretical grounds, the wage curve can be deduced from, first, bargaining models where the existence of frictions (hiring and firing costs) in the labour market is the source of agents' negotiation power, leading to a sharing of the income generated between employers and employees. Thus, in regions with a high rate of unemployment, worker bargaining power is restricted, since there are fewer outside opportunities for a job, resulting in lower negotiated wages. Second, in models based on the efficiency wage hypothesis (e.g. Shapiro and Stiglitz 1984, Campbell and Orszag, 1998), unemployment acts as a device that prevents workers from shirking, when the cost of monitoring is too high for the employer, or quitting. In regions with high unemployment rates, wages can be lower, since incentives to shirk or to quit are reduced by the lower probability of finding a job outside. By contrast, in places where unemployment is low, incentives to shirk and to quit are higher, given the higher probability of finding a new job. Under both theories, the geographical aspects of unemployment have become an important issue when trying to explain wage curves and their spatial dimension, so that the existence of a wage curve has been related to the increasing dispersion in unemployment rates across regions (see García and Montuenga, 2003, and Suedekum, 2004).

Empirically, the wage curve can be estimated by adding the regional unemployment rate to the typical wage equation

$$w_{irt} = a + f_r + d_t + b\,X_{irt} + \beta\,u_{rt} + \varepsilon_{irt} \qquad (5)$$

where the subindex i denotes the individual, r the region and t the year. $\boldsymbol{X}_{irt}$ is a vector of workers' personal aspects including, among others, race, marital status, gender, level of education, as well as other variables related to the specific workplace, such as experience, type of contract, occupation, activity, etc. Thus, w_{irt} and u_{rt} stand, respectively, for the hourly earnings and the regional unemployment rate (both in logs). Finally, f_r and d_t are, respectively, the fixed regional and time effects. Fixed time effects in (5) take into account the influence of variables which are supposed to be time-variant but constant across states. Fixed regional effects are included to capture each region's structural features, such as local amenities. These fixed regional effects constitute the key element of the wage curve, since they capture the permanent features of the environment so that the unemployment rate is basically affected by the transitory aspects of the relationship between wages and unemployment. When regional fixed effects are not included, the unemployment elasticity captures both the permanent and

transitory components of the relationship between wages and unemployment rates, allowing for a positive long-term relationship, as predicted by the theory of compensating differentials**.**

Our focus is on the coefficient β. A wage curve exists when the estimate of β is negative and statistically significant. The log specification of the unemployment rate is common in the literature. The value of the coefficient β is then interpreted as a measure of the degree of wage flexibility. The greater the absolute value of β, the greater the response of wages to unemployment rate fluctuations, and hence, a higher wage flexibility (or lower wage rigidity). Attaching regional unemployment rates to each individual makes it possible to associate each worker with the relevant local labour market.

Some econometric issues must be considered. First, as regards the plausible endogeneity of unemployment, prior research (García and Montuenga, 2003) has shown that this is not the case in Spain, since unemployment rates are shown to be predetermined. Second, since wages may respond to unemployment through changes in standard rates, overtime rates, or the proportion of overtime to total hours, and overtime is typically remunerated at a premium rate, the marginal cost of labour that is independent of hours worked is the standard hourly wage paid for the working period (see Hart, 2003). Third, regional prices must be used to compute real wages in order to control for differences in life costs. Fourth, whereas the dependent variable is expressed in individual terms, unemployment rates are expressed in aggregate terms, leading to a bias known as the "common group effect" (Moulton, 1986, 1990). Finally, and related to the previous issue, given that the unemployment rate does not change across individuals, the true number of degrees of freedom of the estimation is not the number of individual observations, but rather the product of the number of regional markets times the number of time periods. Since this dimension may be small in datasets (as it is in our own case), measures of the unemployment rates disaggregated by the characteristics of the workers (gender, age, education level) should be used (see also Kennedy and Borland, 2000, and Montuenga *et al.*, 2003, 2006).

4.- Empirical results

In this section, we summarize our empirical approach and present the main econometric results of the estimation of a wage curve at the regional level for Spain. We begin by describing our dataset. Obviously, in order to estimate wage equations we need individual data on wages and on personal and job characteristics. At the same time, the regional

dimension of our approach requires a sufficient number of observations in order to achieve robust econometric results, as many of the properties of the estimators hold only under the assumption of large samples. Our main database is the Wage Structure Survey (WSS), conducted by the Spanish Statistics Institute (INE) in 1995, 2002 and 2006, comprising a large number of observations, with regional disaggregation at the NUTS II level. It does not represent the whole set of employed workers, since only wage earners are included in the sample.

The reference population in the survey was originally formed by employees working in establishments with at least 10 workers, involved in any activity except agriculture, farming, fishing, public administration, defence, social security, private households, and extra-territorial organisations and bodies. This initial design has been modified in the subsequent waves. For instance, the 2002 survey included additional economic activities, as for instance education, health and social work or other community, social and personal service activities. In the 2006 survey, firms of between 1 and 9 workers were also included.

The main advantage of this statistical source is its large size, providing detailed information about wage-earners and about the establishments where they are working. Each observation is a matched employer-employee data providing a set of information related to the characteristics of the individual as well as job and workplace information.

The estimation of the wage curve (5) involves relating the individual wage to the appropriate unemployment rate, controlling for as many personal and job characteristics as possible. In principle, the more precisely the unemployment rate is defined, the better the wage elasticity to local unemployment is computed. Ideally, an individual unemployment rate would proxy the risk of joblessness for a particular worker. In practice, there are many difficulties in achieving highly disaggregated unemployment rates. In our case**,** the most reliable statistical source for the unemployment rate, i.e., the *Labour Force Survey*, has the disadvantage of providing non-significant figures of active and unemployed population when the level of disaggregation is high.

Initially, we attempted to calculate unemployment rates at the regional level by gender, age (4 groups) and education (4 levels) but found ourselves with many empty or unreliable figures. Consequently, we reduced the level of disaggregation, and computed unemployment rates at the regional level by gender and educational groups alone. However, as indicated above, this introduced another problem, since the estimation of an equation such as (5) involves variables with different levels of aggregation, which may lead to biased estimates if all of the workers in a group share the same unemployment rate. More precisely, estimates of the more

aggregated variable (the unemployment rate) tend to exhibit lower standard errors. We also explored the possibility of estimating the wage curve for each year and region, and compared the slope coefficients for the unemployment rate, but found insignificant coefficients, with incorrect signs in many cases.

We then adopted a different approach, pooling the information gathered in the three waves of the survey into a unique dataset. This implied homogenising the different variables, in order to make them comparable.[15] Specifically, we restricted our analysis to those sectors reported in the 1995 survey, and dropped from the sample variables with different levels of information which were not possible to reconcile (for instance, type of property, or type of market towards which production is directed). Moreover, we had to drop from the 2006 survey those observations corresponding to firms of between 1 and 9 workers. Thus, we ended with a sample of 777,789 observations. Unemployment rates are disaggregated by region, gender and education (four levels). Additionally, in order to make the computed wages comparable we had to deflate them with the regional consumer price index provided by the INE.[16] Finally, the hourly wage was computed without taking into account extraordinary payments (as discussed in the previous section). The Appendix provides the definitions of the variables included in the estimated wage equation.

Given the results presented in Section 2, we concluded that Spanish regions form groups (or clusters) as regards the behaviour of the unemployment rate and hypothesised that this different behaviour could be explained by different degrees of sensitivity of wages to the unemployment rate, i.e., different levels of wage flexibility. Since the estimation of the wage curve allows for the identification of such elasticity, following Livanos (2010) we explored this line next, splitting our sample into three groups of regions: first, those with high unemployment rate (Group H), formed by Andalusia, Extremadura and the Canary Islands; second, a group formed by Aragon, the Balearic Islands, Navarre, the Basque Country and La Rioja, which exhibit low unemployment rates (Group L). The remaining 9 Spanish regions are regarded as regions with medium unemployment rates (Group M).

Equation (5) was therefore estimated by OLS for the whole sample and for each group, including regional and time fixed effects, as well as all of the variables described in the Appendix, which account for the main personal and job characteristics. For brevity, we only

[15] Note that, despite the fact that the WSS provides data for three waves it is not a panel, since the surveyed firms are not necessarily the same, neither are the workers included in the sample.

[16] Given the change in the base year of the CPI in 2002, we had to use the regional CPI increase since 1995 provided by the INE. Therefore, the 1995 deflator takes value 1, and the values for 2002 and 2006 were calculated accordingly, and thus nominal wages could be deflated.

report the results obtained for the unemployment rate coefficient. (Full results are available upon request.) Table 2 summarises the main results.

Table 2

OLS estimation of the wage equation

	All Regions	Group H	Group M	Group L
β	-0.082*	-0.0602*	-0.0992*	-0.1134*
t-statistic	-5.42	-2.56	-4.81	-3.29
Nº of observations	777,789	126,729	486,851	164,209
Nº of clusters	408	72	216	120

Notes: *t*-statistic based on robust standard errors. Nº of clusters refers to the number of different unemployment rates within each group. See text for definition of Groups, and Appendix for other variables included in the estimated model. * indicates 95% significance.

From Table 2 it can be seen that the wage elasticity to unemployment at the aggregate level is -0.08, not statistically different from either the standard value of -0.1 found in the literature (Blanchflower and Oswald, 1994, 2005) or the "mode" value of, -0.07 reported by Nijkamp and Poot (2005) in their meta-analytic study, once publication bias is dealt with. When disaggregating in the three sets of regions, to take into account that unemployment rates are quite different across those regions, we obtain very interesting results, summarised in the last three columns of Table 2. Differences in the estimated coefficients are not very large, but statistically significant between the three groups.[17]. Specifically, in regions with unemployment rates close to the national average (Group M), the unemployment elasticity is almost the "typical" -0.10 (estimated coefficient of -0.0992, not statistically different from -0.1). However the estimates for the other two groups are dramatically different. Thus, the group of high unemployment (Group H) exhibit a much lower degree of wage elasticity (-0.0602) while the group of low unemployment (Group L) almost doubles this figure, with an estimated elasticity of -0.1134. These results indicate that high unemployment is related to low wage elasticity, while low unemployment is related to higher sensitivity of wages to local labour market conditions. Consequently, if wage flexibility is a mechanism that allows for

[17] Standard Wald tests strongly reject the null that the slope coefficient for the unemployment rate is similar across the three models at the 1% confidence level. The F(2, 777719) statistic is 1127,72, with a *p*-value of 0.000. We therefore conclude that the estimated slope coefficients for the three models are statistically different.

absorbing external shocks without largely affecting employment, our results seem to indicate that regions which suffer from larger unemployment rates exhibit lower wage flexibility.

5.- Conclusions

The advent of external shocks to economies has direct impact on their labour markets. The existing literature has achieved some consensus in claiming that differences in the performance of labour markets across areas (countries, states, regions, etc.) are strongly driven by the interaction between such shocks and the institutions of the corresponding labour market. Whereas differences across countries in institutions are evident (Layard and Nickell, 1999, Eichhorst *et al*., 2008) only a few of them can be thought to have an impact at the regional level. Considering that most of the institutions (unemployment benefits, tax wedge, minimum wage, etc.) as well as monetary and fiscal policies, are common to all regions within a country (at least in the main European countries), only some characteristics of the labour market may give rise to differences within countries.

Leaving aside regional amenities such as climate, orography, etc., which are initial endowments difficult to modify over time, differences in supply-side, demand-side and institutional factors may play an important role in shaping differences in labour market performance (usually reflected through the unemployment rate).

Human capital accumulation, the structure by age, gender or nationality, as well as characteristics related to sector of activity, the type of contracts or firm size, etc., which form part of the demand and supply sides of employment, all influence the response of workers to external shocks through changes in labour participation, in firm allocation, in work place (migration) and wage flexibility. Individual and job characteristics provided in statistical datasets allow for controlling all of these factors, while regional fixed effects can account for amenities. However, the role that institutions play in labour markets must be explicitly addressed.

In Spain, it has been shown that, among those three factors, neither migration (Jimeno and Bentolila, 1998) nor labour participation nor firm allocation (López Bazo et al., 2002) have been especially effective in absorbing negative shocks. Only wage flexibility has seemed to play some (limited) role in absorbing those shocks (García and Montuenga, 2003, Jimeno and Bentolila, 1998). Our aim has been to study the role of regional wage flexibility in Spain using wage curves. The fact that most of the institutions are common within a country leads

us to consider wage flexibility, apart from regional amenities, as a relevant force in driving differences in regional unemployment rates.

Whereas an "empirical law of economics" has been claimed to reveal that unemployment elasticity is about -0.1 across countries, periods of time and data bases, we have provided some review of the literature whose results depart from this "empirical law". Accordingly, we have proceeded to estimate a national wage curve, along with regional wage curves, to assess whether wage flexibility differs across regions or a set of regions.

Using data for three moments of time, 1995, 2002 and 2006, to make use of the most extensive data base for wages and individual and job characteristics, the Wage Structure Survey, we have estimated wage curves considering three sets of regions: those with persistently higher unemployment rates than the national average; those with persistently lower rates, and those with figures around the national rate. To do this, we disaggregated unemployment rates as much as possible, distinguishing between regions, but also across gender and educational levels.

Our hypothesis is very simple: if wage flexibility is a mechanism to absorb external shocks in order to accommodate employment variations, those regions with low wage flexibility should exhibit, *ceteris paribus*, higher unemployment rates. The estimated results confirm this hypothesis.

In this context, spurring flexibility in regional labour markets, especially those with severe rigidities, seems crucial and unavoidable. The recent reform of the legal framework for wage bargaining (enacted by the Spanish Goverment in June, 2011) goes along these lines, since it tries to foster firm-level agreements with respect to province-level ones, while not overthrowing the current hierarchy of regional and industry nation-wide agreements. In other words, in the case of a contradiction between a province-level and a firm-level agreement, the latter will prevail. This will imply that wage conditions could be settled taking into account the individual characteristics of the involved workers and firms. This, in turn, would provide incentives for workers and firms to bargain at the firm or at the industry level. The former type of agreements would account for the actual economic conditions within the firms, the latter for the overall aggregate economic performance. In both cases, wage flexibility would increase.

Nevertheless, fostering firm-level agreements may involve some problems with respect to implementation, especially in those economies where micro-firms are the rule, as is the case of Spain. The reform could not provide satisfactory arrangements for the agreements in this type of firm, where the bargaining power is unequally distributed, and which could give rise to

undesirable results. In fact, this is the main challenge: increasing the degree of labour market flexibility but maintaining adequate working conditions. In other words, the challenge is to eliminate certain rigidities to facilitate employment growth, not to worsen the working conditions of the currently employed, and simultaneously to increase firm profits by cutting wage costs. Bande *et al.* (2010) find the existence of a wage premium in firm-level agreements, independent of the personal and job characteristics, indicating that the wage imitation effects found at other levels of bargaining are also present in these type of agreements. Fostering firm-level bargaining without taking into account this fact may, in practice, impose greater rigidity on firms, and thus provoke unexpected results. Therefore, at this stage some creativity is required. Our proposal is to maintain province-level agreements, with a modification of the payment structure within them. Specifically, we propose an increase in the variable part of the pay, which should be set in the province agreements based on variables such as firm size, productivity, productive investments, evolution of profits, local economic growth, price of the product in the relevant markets, etc. Based on their individual circumstances, firms and workers could adhere, or not, to these agreements in the firm-level agreement. This arrangement would increase the degree of wage flexibilty and allow for greater employment growth at such time as the business cycle recovers.

References

Albaek, K., Asplund, R., Blomskog, S., Barth, E., Gudmundsson, B., Karlsson, V. Y Madsen, E. (2000): Dimensions of the wage-unemployment relationship in the Nordic countries: Wage flexibility without wage curves, *Research in Labor Economics*, 19, pp. 345-81.

Ammermuller, A, Lucifora, C, Origo, F and T. Zwick (2010). Wage Flexibility in Regional Labour Markets: Evidence from Italy and Germany. *Regional Studies*, 44(4), 401-421.

Aragon Y., Haughton D., Haughton J., Leconte E., Malin E., Ruiz-Gazen A. and Thomas-Agnan C. (2003): Explaining the pattern of regional unemployment: the case of the Midi-Pyrénées region, *Papers in Regional Science* 82, 155-74.

Arestis, P., Baddeley. M. andn M. Sawyer (2007): The relationship between capital stock, unemployment and wages in nine EMU countries. *Bulletin of Economic Research*, 59(2), pp. 125-148.

Baddeley M., Martin R. and Tyler P., 1998. European regional unemployment disparities: convergence or persistence?, *European Urban and Regional Studies*, 5, 195-215.

Baltagi, B., Blien, U. and Wolf, K. (2009): New evidence on the dynamic wage curve for Western Germany: 1980-2004, *Labour Economics*, 16, pp. 47-51.

Bande, R., M. Fernández y V. Montuenga (2007): Regional disparities in the unemployment rate: the role of the wage setting mechanism in Spain, 1987-1992, *Regional Studies*, vol. 41(2), págs. 235-251.

Bande, R., M. Fernández y V. Montuenga (2008): Regional Unemployment in Spain: Disparities, Business Cycle and Wage-Setting, *Labour Economics*, vol 15(5), pp. 885-914.

Bande, R., Fernández, M. y Montuenga, V. (2009): Las tasas de paro regionales españolas: ¿convergencia o polarización?, en Fernández, M., Montuenga, V. y Riveiro, D. *(Coord.):"El mercado de trabajo en España: otros aspectos relevantes",* Ed. Lóstrego, Santiago de Compostela: 199-221.

Bande, R., Fernández, M. y Montuenga, V. (2010): Desequilibrios territoriales en el mercado laboral español y la estructura de la negociación colectiva. *Papeles de Economía Española,* 124, pp. 193-213

Bande, R: and M. Karanassou (2011):"The NRU and the Evolution of Regional Disparities in Spanish Unemployment". *Paper presented at the 4th Summer Conference in Regional Science, Dresden (Germany), July 1st, 2011.*

Barth, E., Bratsberg, B., Naylor, R. and Raaum, O. (2002): Explaining variations in wage curves: theory and evidence, memorandum 03/2002, University of Oslo.

Basile R. and De Benedictis L. (2008) Regional unemployment and productivity in Europe *Papers in Regional Science*, 87(2), 173-192

Bellmann, L. and Blien, U. (2001) Wage curve analyses with establishment data, *Industrial and Labour Relations Review* 54(4), 851-63.

Bentolila, S. y J.F. Jimeno (2006). Spanish Unemployment: The End of the Wild Ride? in M. Werding (ed.), *Structural Unemployment in Western Europe: Reasons and Remedies*, Cambridge MA, London UK: MIT Press.

Bentolila, S. Dolado, JJ. and Jimeno, JF. (2008) Does Immigration Affect the Phillips Curve? Some Evidence for Spain *European Economic Review,* 52, 1398–1423

Bertola, G. F.D. Blau, y L.M. Kahn (2001). Comparative Analysis of Labor Market Outcomes: Lessons for the US from International Long-Run Evidence. in A.Krueger and R. Solow eds., *The Roaring Nineties: Can Full Employment Be Sustained?*

Blanchard, O. (2006). European unemployment: the evolution of facts and ideas. *Economic Policy*, 21: 5–59.

Blanchard, O. and Katz, L. (1997): What do we know and we do not know about the natural rate of unemployment, *Journal of Economic Perspectives*, 11(1), pp. 51-73.

Blanchard, O. and Katz, L. (1999): Wage dynamics: Reconciling theory and evidence, *American Economic Review*, *AEA Papers and Proceedings*, 89(2), pp. 69-74.

Blanchard, O. and J. Wolfers (2000): The role of shocks and institutions in the rise of European unemployment: the aggregate evidence, *Economic Journal* 110, 1-33.

Blanchflower, D. (2001): Unemployment, well-being and wage curves in Eastern Europe. *Journal of the Japanese and International Economies*, 15(4), pp. 364-402.

Blanchflower, D. and Oswald, A. (1994): *The Wage Curve*. Cambridge, MA, MIT Press.

Blanchflower, D. and Oswald, A. (2005): The wage curve reloaded, NBER WP 11338.

Brunello G., Lupi C. and Ordine P. (2001) Widening differences in Italian regional unemployment, *Labour Economics* 8, 103-29.

Brunstad, R. and Dyrstad, J. (1997): Booming sector and wage effects: an empirical analysis of Norwegian data, *Oxford Economics Papers* 49, 89-103.

Buettner, T. (1999): The effect of unemployment, aggregate wages, and spatial contiguity on local wages: An investigation with German district level data, *Papers in Regional Science*, 78, pp. 47-67.

Campbell, C. and Orszag, M. (1998): A model of the wage curve, *Economics Letters*, 59, 119-25.

Dolado, J., Bentolila, S. y JF. Jimeno (2008): Two-tier employment protection reforms: The Spanish experience, *CES-Ifo-DICE, Journal for International Comparisons*, vol. 6 (4), 49-56.

Eichhorst, W., Feil, M. y C. Braun (2008) What Have We Learned? Assessing Labor Market Institutions and Indicators, DP 3470, IZA, Bonn.

Elhorst, JP. (2003): The mystery of regional unemployment differentials: Theoretical and empirical explanations, *Journal of Economic Surveys*, vol. 17, págs. 709-749.

European Commission 2000 Sixth Periodic Report On The Social and Economic Situation and Development Of Regions In The European Union, Bruxelles.

Falk, M. and T. Leoni (2009) Estimating the Wage Curve with Spatial Effects and Spline Functions. Economics Bulletin Volume 31, Issue 1

García, I. and Montuenga, V. (2003) The Spanish wage curve: 1994-96, *Regional Studies* 37, 929-45.

Harris, J. and Todaro, M. (1970): Migration, unemployment and development: A two-sector analysis, *American Economic Review* 60, 126-42.

Hart, R. A. (2003): Overtime working, the Phillips curve and the wage curve: British engineering, 1926–66, *The Manchester School*, 71(2), pp. 97-112.

Iara, A. and Traistaru, I. (2004) How flexible are wages in accession countries?, *Labour Economics* 11(4), 431-50.

Janssens, S. and Konings, J. (1998): One more wage curve: The case of Belgium, *Economics Letters*, 60, pp. 223-227.

Jimeno J. and Bentolila S. (1998) Regional unemployment persistence (Spain, 1976-1994), *Labour Economics* **5**, 25-51.

Johnes, G. (2007): The wage curve revisited: Estimates from a UK panel, *Economic Letters*, 94, 414-420.

Karanassou, M., Sala, H. and P. Salvador (2008): Capital Accumulation and Unemployment: New Insights on the Nordic Experience, *Cambridge Journal of Economics*, 32, 977-1001.

Kennedy, S. and Borland, J. (2000): A wage curve for Australia? *Oxford Economic Papers*, 52, pp. 774-803.

Layard, P., Nickell, S. and Jackman, R. (1991): Unemployment. Oxford, Oxford University Press.

Layard, R. and Nickell, S (1999): Labour market institutions and economic performance en Ashenfeter, O.C. y Card, D (Editores), *Handbook of Labour Economic,* vol 3, North Holland, Amsterdam.

Livanos, I. (2010). The wage-local unemployment relationship in a highly regulated labour market: Greece, *Regional Studies*, 44(4), 389-400.

López-Bazo E., Del Barrio T. and Artis M. (2002) The regional distribution of Spanish unemployment. A spatial analysis. *Papers in Regional Science* 81, 365-89.

Marston, S. (1985) Two views of the geographic distribution of unemployment. *Quarterly Journal of Economics* 100, 57-79.

Monastiriotis, V. (2006): In F. Caroleo and S. Destefanis (eds.), *Regions, Europe and the Labour Market. Recent Problems and Developments*. Physica Verlag.

Montuenga, V., Fernández, M. and García, I. (2003): Wage flexibility: Evidence from five EU countries based on the wage curve, *Economics Letters*, 78 (2), 169-174.

Montuenga, V., Fernández, M. and García, I. (2006): Regional wage flexibility: The wage curve in five EU countries In F. Caroleo and S. Destefanis (eds.), *Regions, Europe and the Labour Market. Recent Problems and Developments*. Physica Verlag, forthcoming.

Montuenga, V and Ramos, JM. (2005): Reconciling the wage curveand the Phillips curve, *Journal of Economic Surveys*, 19, pp. 735-765.

Morrison, P., Papps, K. and Poot, J. (2006): Wages, employment labour turnover and the accessibility of local labour markets. *Labour Economics*, 13, 639-663.

Moulton, B. (1986): Random group effects and the precision of regression estimates, *Journal of Econometrics*, 32, pp. 385-397.

Moulton, B. (1990): An illustration of a pitfall in estimating the effects of aggregate variables on micro units, *Review of Economic and Statistics* 72, 334-38.

Nijkamp, P. and Poot, J. (2005). The last word on the wage curve?, *Journal of Economic Surveys*, 19, 421-450

Nunziata, L. (2002): Unemployment, Labour Market Institutions and Shocks. *Economics Papers 2002-W16*, Economics Group, Nuffield College, University of Oxford

OECD (1994) The OECD Jobs Study. OECD, Paris.

Pench L., Sestito, P and Frontini E. (1999) Some unpleasant arithmetics of regional unemployment in the EU. Are there any lessons for EMU?, *Economic Papers* No. 134, European Commission, Brussels.

Sabin, L. (1999) The development of urban labour markets: China's urban wage curve, 1980-92, *Journal of Development Studies* 35, 134-52.

Sanz de Galdeano, A. and Turunen, M. (2006). The Euro Area Wage Curve *Economics Letters*, 92(1), pp. 93-98.

Shapiro, C. and Stiglitz, J. (1984): Equilibrium unemployment as a discipline device, *American Economic Review*, 74, pp. 433-444.

Suedekum, J. (2006): Regional unemployment disparities, agglomeration, and the wage curve. In F. Caroleo and S. Destefanis (eds.). *Regions, Europe and the Labour Market. Recent Problems and Developments*. Physica Verlag, forthcoming.

Van der Meulen Rodgers, Y. and Nataraj, S. (1999): Labor market flexibility in East Asia: Lessons from Taiwan, *Economic Development and Cultural Change* 48, 51-69.

Von Hagen, J. and Iulia Traistaru (2005): Macroeconomic Adjustment in the New EU Member States. Center for European Integration Studies Rheinische Friedrich-Wilhelms-Universität Bonn

Winter-Ebmer, R. (1996): Wage curve, unemployment duration and compensating differentials, *Labour Economics* 3, 425-34.

Wu, Z. (2004): Wage curve for urban China: a panel data approach. *Applied Economic Letters*, 11, 425-428

Appendix

Figure A1

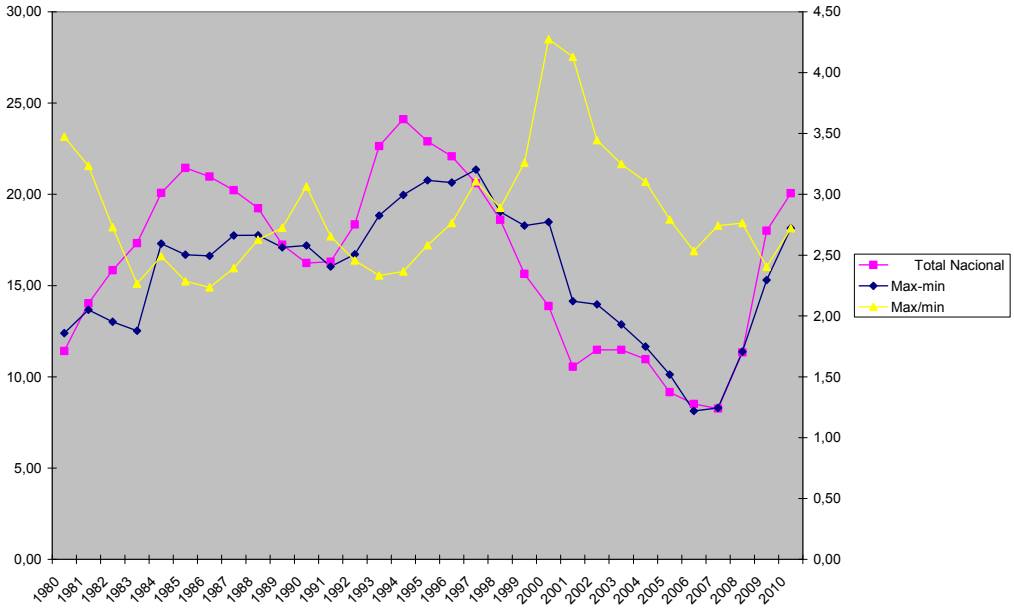


Figure A2

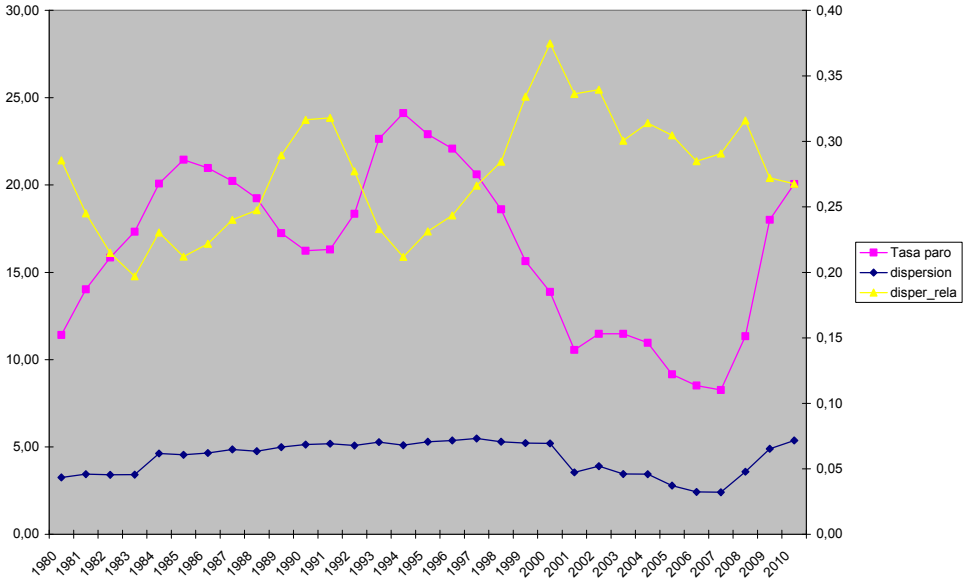


Table A1. List of included variables in the wage equation regression. Definitions.

Variable	Definition
lu	Log of the Unemployment rate
female	=1 if observation is female
Ed1-Ed4	Education level • Ed1: primary • Ed2: secondary I • Ed3: secondary II • Ed4: Higher
Exp1-Exp5	Experience: Age-education-6-years of tenure • Exp1: 4 years or less • Exp2: 5 to 9 years • Exp3: 10 to 15 years • Exp4: 15 to 20 years • Exp 5: more than 20 years
Expsqr	Experience squared
Tenure1-Tenure4	Tenure: • Tenure1: less than a year • Tenure 2: 1 to 4 years • Tenure 3: 5 to 9 years • Tenure 4: more than 10 years
Ocup1-Ocup9	Occupation level: • Ocup1: Legislators, senior officials and managers • Ocup2: Professionals • Ocup3: Technicians and associate professionals • Ocup4: Clerks • Ocup5: Service workers and shop and market sales workers • Ocup6: Skilled workers • Ocup7: Plant and machine operators and assemblers • Ocup8: Elementary occupations (services) • Ocup9: Elementary occupations (other activities)
Age1-Age3	Age group • Age1: 25 to 54 • Age2: less than 25 • Age3: more than 54
Contract1-Contract2	Type of contract • Contract1: permanent • Contract2: fixed-term
Wktime-Wktime2	Working time status • Wktime1: full time job • Wktime2: part-time job
Size1-Size3	Size of the firm (number of workers) • Size1: 10 to 49 workers • Size 2: 50 to 99 workers • Size 3: more than 100 workers
Wagr1-Wagr3	Type of wage agreement: • Wagr1: national agreement • Wagr2: regional agreement • Wagr3: firm-level agreement
Sector1-Sector22	Sector of economic activity • Sector1: Mining and quarrying • Sector2: Manufacture of food products, beverages and tobacco • Sector3: Manufacture of textiles and textile products • Sector4: Manufacture of leather and leather products • Sector5: Manufacture of wood and wood products • Sector6: Manufacture of pulp, paper and paper products; publishing and printing • Sector7: Manufacture of coke, refined petroleum products and nuclear fuel • Sector8: Manufacture of chemicals, chemical products and man-made fibres • Sector 9: Manufacture of rubber and plastic products • Sector10: Manufacture of other non-metallic mineral products • Sector11: Manufacture of basic metals and fabricated metal products • Sector12: Manufacture of machinery and equipment n.e.c. • Sector13: Manufacture of electrical and optical equipment • Sector14: Manufacture of transport equipment • Sector15: Manufacturing n.e.c. • Sector16: Electricity, gas and water supply • Sector17: Construction • Sector18: Wholesale and retail trade; repair of motor vehicles. motorcycles and personal and household goods • Sector 19: Hotels and restaurants • Sector20: Transport, storage and communication • Sector21: Financial intermediation • Sector22: Real estate, renting and business activities

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