Collective bargaining, wage dispersion and the economic cycle: Spanish evidence

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Abstract

This research analyses the effect of a 'two-tier' system of collective bargaining (firm bargaining and multi-employer bargaining levels) on wage dispersion in Spain. The effect of collective bargaining on the two main concepts that make up wages (the contractual or basic-bargained wage, and the wage cushion) are analysed during the last period of the upward cycle (2002–2006) and the beginning of the global financial crisis (2006–2010). The wage cushion is defined as the difference between the earned wage and the basic-bargained wage. The results show that workers covered by firm bargaining experienced greater wage dispersion than workers covered by multi-employer bargaining. On the other hand, wage dispersion for all workers decreased during the analysis period, mainly during the first stage of the current economic crisis, and particularly among workers covered by multi-employer bargaining. Both the decreasing relevance of the wage cushion in actual wage formation and its reduced dispersion make it possible to explain this wage compression.

Introduction

The effects of different collective bargaining models on wage levels and wage inequalities are significant for an understanding of the different ways in which each country's labour market adjusts to the economic cycle. A key text in the literature on wage

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formation is Calmfors and Driffill's (1988) model. This showed that more centralised collective bargaining provided more monopoly power for trade unions, increasing members' relative wages but also raising the prices of some of the goods they consumed. The bigger the union, the stronger this effect and the less the incentive to raise wages because price increases will cause a decrease in real wages and a loss of firm competitiveness, resulting in the fall of profits and hiring. The empirical basis of the model considered only centralised bargaining and ignored factors such as informal coordination of bargaining across groups, the benefit and social security system, active labour market policies and union density. Although in theory their proposition remains intact, the empirical relevance of the model on which it is based is questionable (Driffill, 2006).

From the perspective of the operation of the labour market, wage differences are the key to identifying differences in productivity and, therefore, to efficient labour allocation. From the perspective of social equality, wage dispersion affects household income differences, wages being the main component. Empirical research concludes that unions reduce wage inequalities and that the effect of this compression is stronger where union membership and bargaining coverage are greater, together with high levels of centralisation and/or coordination of collective bargaining (Blau and Kahn, 2002; Teulings and Hartog, 1998; Wallerstein, 1999). This is due to two factors. Within centralised countries, multi-employer agreements set minimum wages that increase wages at the bottom of the wage distribution. In addition, multi-employer bargaining (MB) coordinates wage setting, so inter-industry and inter-firm wage differentials are lower than in less coordinated systems of collective bargaining (Plasman et al., 2006).

According to marginalist wages policy theory, high union coverage levels and centralisation and/or collective bargaining coordination will create rigidities, preventing firms from adjusting to local labour market conditions and reducing productive efficiency. Therefore, in recent decades, many countries, particularly Anglo-Saxon countries, have reformed their wage setting institutions (Organisation for Economic Co-operation and Development (OECD), 2004). In these countries, firm-level bargaining has become the most common system, decentralising collective bargaining to produce wage flexibility. As a consequence, in countries such as the UK, New Zealand and Australia, wage dispersion has been high and increasing in recent decades.

Countries such as Italy, Belgium and Spain have adopted a multi-level system of bargaining (a 'two-tier' system), where firm-level bargaining has developed alongside MB (Dell'Aringa and Pagani, 2007). Initially, the idea was to combine the benefits of some degree of centralisation and/or coordination with the benefits of greater relative-wage flexibility. However, Boeri (2014) questions the supposed beneficial effects of this system and argues that two-tier regimes may end up getting the worst of both fully centralised and fully decentralised systems. They take the higher level pay agreement as a floor, thus allowing firms to negotiate in collective bargaining only higher wages than those established at the multi-employer level. From a microeconomic perspective, this restricts firm-level bargaining to firms that can pay wages higher than the floor (mainly large firms or high productivity firms). Firms covered by firm-level agreements see their margins of adjustment reduced compared to those operating under fully decentralised regimes. From a macroeconomic perspective, the existence of a wage floor is generally associated with an increase in the wages component of firms' cost structures, generating

inflation. Boeri also argues that firms covered by firm agreements within a two-tier bargaining structure adapt to economic shocks by reducing employment more than firms with other bargaining structures and show a worse wages–productivity relation.

The empirical research does not allow us to draw clear conclusions, given that it involves combining two bargaining structures with opposite effects on wage dispersion. From a theoretical standpoint, decentralisation may lead to increased wage dispersion because firm and individual-specific characteristics are more likely to enter the wages while under centralised bargaining egalitarian union preferences are easier to accomplish (Dahl et al., 2011). Cross-country evidence suggests that centralised wage setting generally leads to less wage dispersion (OECD, 2004; Rowthorn, 1992; Wallerstein, 1999), but studies based on cross-sectional microdata do not reach unanimous conclusions. In principle, different and opposing effects on wage distribution can occur.

Analysis is helped by introducing the concept of a wage cushion, defined as the difference between the earned wage and the basic-bargained wage, regardless of the type of bargaining governing relations within the firm (Cardoso and Portugal, 2005). Dell'Aringa and Pagani (2007) consider that the wage cushion has different and important implications for analysis of wage inequality, as it can be used by employers to shape the internal structure of wage differentials in order to counteract the egalitarian effects of the wage policy pursued at MB level.

This study provides empirical evidence regarding the effect of collective bargaining on wage dispersion in Spain. The data set used is the *Spanish Structure of Earnings Survey* (SSES), which indicates the wage paid to workers (actual wage), the minimum wage agreed in collective bargaining (contractual wage) and the wage cushion, defined as the difference between the actual wage level and contractual wage level. We assess the effect of collective bargaining on actual wage distribution by analysing its effect on the formation and distribution of the component parts of the actual wage (the contractual wage and the wage cushion).

Data have been obtained from 2002, 2006 and 2010, so we can also analyse the effect of the recent crisis on wage dispersion. As Jenkins et al. (2012) and Immervoll and Richardson (2013) argue, the current crisis has deepened the income gap between European poor and rich citizens, thus boosting the unbalanced distribution of wealth already in evidence before 2007. In the Spanish case, the Spanish Economic and Social Council (2013) warns that the number of households with lower income has increased and the growth in higher incomes has slowed as a consequence of the economic crisis. The result has been an increase in inequality of income distribution, placing Spain among the countries with the greatest inequality growth. As the economic crisis has caused Spain to have one of the highest European unemployment rates, we may infer that income distribution inequality has been triggered by an asymmetric unemployment rate distribution rather than simply by changes in wage distribution.[1] Available 2010 wage data will allow us to test this hypothesis.

The article is organised as follows. The section 'Collective bargaining and wage dispersion: Previous empirical results' presents the most relevant previous results; 'Collective bargaining and wage dispersion: Actual and contractual wages' analyses actual and contractual wage dispersion, while 'The wage cushion and wage dispersion' will accurately

analyse wage cushion formation and dispersion. Finally, the 'Conclusion' will deal with the main conclusions.

Collective bargaining and wage dispersion: Previous empirical results

A range of studies now provide consistent evidence that overall earnings dispersion is lower where bargaining is more encompassing and/or more coordinated (Aidt and Tzannatos, 2002; Blau and Kahn, 1996, 1999; OECD, 2004; Rowthorn, 1992).

For European countries where workers may be covered by more than one negotiating level at the same time, the analysis is more complex because different levels can produce different and opposing impacts on wage dispersion (see Antonczyk et al., 2009; Checchi and Pagani, 2004; Dahl et al.,2011; Dell'Aringa and Lucifora, 1994; Dell'Aringa and Pagani, 2007; Fitzenberger et al.,2008; Gürtzgen, 2006; Hibbs and Locking, 1996; Plasman et al., 2006; Rycx,2002).

In the case of Spain, the collective bargaining model is unusual within the European context where the predominant bargaining level is the provincial sector (Nomenclature of Units for Territorial Statistics, Level 3 (NUTS 3) according to Eurostat terminology), while firm bargaining (FB) level remains minor (García-Serrano and Malo, 2002). Perhaps this strong regional component in Spain may explain its high wage dispersion compared to nearby countries (Bertola et al., 2001). Rodríguez (2001), analysing firm-level wage structures, found that wage dispersion decreased significantly in the face of a rise in union density and value of output per worker, and a fall in the average bargained wage level: bargainers seemed to allow firms to be flexible in dealing with changes in economic activity. Nevertheless, Palacio and Simón (2002, 2004) concluded that wage dispersion in Spain was too high by international standards, as workers' wages depend heavily on firm features rather than on their own qualifications: while collective bargaining exercised some wage compression effect, this was limited. Canal and Rodríguez (2004) found that while firm-level collective agreements tended to reduce wage dispersion in Spain, other characteristics of the firms covered by such agreements more than outweighed this effect so that on the whole these firms showed greater internal wage dispersion. While Plasman et al. (2006) showed that wage dispersion is lower with single-employer bargaining compared to MB in Spain, Card and de la Rica (2006) showed that single-employer bargaining was linked to a more flexible wage determination process. Dell'Aringa and Pagani (2007) found a small positive effect of single-employer bargaining on wage dispersion for Spain by using a quantile regression model and taking unobserved heterogeneity into account, consistent with Card and de la Rica (2006).

Therefore, there seems to be no consensus on the effect of 'two-tier' system of collective bargaining on wage distribution, both for the European case in general and for the Spanish case in particular. According to Plasman et al. (2006), compared to MB, single-employer bargaining may increase or decrease wage dispersion, and this may happen through the modification of inter-firm wage differentials and/or within-firm wage dispersion (see also Boeri, 2014). While most research asserts that collective bargaining decentralisation leads to increased wage dispersion, the empirical research referred to in this section analysed databases at stages of the upward cycle, making it impossible to assess

Table 1. Worker distribution by bargaining level, Spain (percentages).

	SSES02	SSES06	SSES10
National bargaining	35.2	36.9	32.4
Regional bargaining[a]	43.1	43.8	38.7
Firm bargaining[b]	21.6	19.3	28.9

SSES: Spanish Structure of Earnings Survey; NUTS 2: Nomenclature of Units for Territorial Statistics, Level 2.
[a]Provincial, autonomic, regional, local (NUTS 2 or below, according to Eurostat terminology).
[b]Firm, group of firms, workplace.

the collective bargaining effect on wage distribution within a deep recession context such as the current one. This article sets out to provide empirical evidence allowing assessment of the effect of collective bargaining on wage distribution during both upward and downward phases of the cycle.

Collective bargaining and wage dispersion: Actual and contractual wages

Data set

We use data from the SSES for the years 2002, 2006 and 2010 provided by the National Statistics Institute (INE). This nation-wide survey covers workers in the manufacturing, construction and services sectors.[2] The SSES collects detailed information on workers' wages, as well as on workers' personal characteristics (such as gender, age, educational attainment and nationality), job characteristics (such as tenure, occupation, contract and job type) and firm characteristics (such as size, ownership, region, sector or type of collective bargaining).

The predominance of collective bargaining at a level higher than the firm characterises the Spanish bargaining system, as the highest percentage of workers falls within provincial sectoral collective bargaining arrangements (Table 1). Spain is thus at an intermediate level, in terms of both centralisation and collective bargaining coordination (OECD, 2004). Until the 2012 labour reform (Royal Decree-Law 3/2012), firm agreements took the wage levels and labour conditions negotiated at the sector level (national or regional agreements) as a minimum from which improvements in the overall remuneration of workers could be sought. FB was possible only in firms with a union presence strong enough to establish a second tier of negotiation and to provide the opportunity to improve on the labour conditions agreed upon at a higher level of negotiation. Other companies, especially small ones, simply applied the sectoral agreement (national or regional) to which they were bound, even though it had not been signed by them. Hereinafter, in order to make the analysis easier, we simplify the bargaining structure by splitting the surveyed workers into those covered by FB and those covered by MB (higher than firm level). The analysis focuses on how collective bargaining decentralisation (FB) has an effect on wage dispersion.

The examined wage concept (expressed logarithmically) is the hourly wage in the October of each analysed year. The survey contains very accurate information on

payments made to workers by the firm, so we can identify each worker's minimum wage (contractual wage) and the wage he or she earns (actual wage). The actual wage represents the hiring cost for the company, while the contractual wage is the minimum bargained wage for a normal worker's performance. Therefore, the actual wage is the contractual wage plus any other variable supplement paid by firms in October and the overtime payment (year bonuses paid in October are not included). Wages for 2002 and 2010 have been deflated and expressed in 2006 Euro, based on the 2006 Consumer Price Index.

Once the actual wage and the contractual wage are known, the wage cushion can be calculated for each worker as the difference between the actual wage and the contractual wage. Institutional aspects (e.g. general policies applied by trade unions when leading bargaining talks with the aim of reducing wage dispersion, making working conditions uniform) are more relevant in determining the contractual wage. By contrast, actual wage formation is rather influenced by labour market supply and demand-related issues or competence in product markets. So, the wage cushion stands for the part of the actual wage whose evolution is closely linked to labour and product market conditions.

Wage dispersion

Tables 2 and 3 show wage differences by percentiles, during the periods 2002–2006 and 2006–2010, for both contractual wages and actual wages, as well as for both bargaining levels. According to Table 2, as actual wages grew in the lowest part of the distribution, wage dispersion tended to shrink. Additionally, this effect appeared to be greater in the case of workers covered by MB and for the period 2006–2010. On the other hand, Table 3 shows how contractual wages behaved in a different way. In the case of workers covered by FB, wage growth was concentrated at the opposite extremes of wage distribution for each period, so a final effect on wage dispersion was not expected to be observable a priori. In the case of workers covered by MB, a compression of wages could be expected, although not a particularly noticeable one, as wage growth for the 2002–2006 period seems stable in the central part of the wage distribution.

Table 4 analyses wage dispersion based on variance. The information gathered allows us to conclude that, for the whole sample, actual wage dispersion decreased for the period 2002–2010, particularly during the recession stage, whereas contractual wage dispersion was barely reduced. This difference indicates that trade unions generate certain stability in wage distribution regardless of cycle development, while actual changes in wage distribution reflect the adjustment of firms to market changes.

The results in Table 4 confirm that bargaining level is a decisive factor in wage dispersion, and five provisional conclusions can be reached. First, workers covered by firm-level bargaining showed greater wage dispersion. Second, actual wages presented more dispersion than contractual wages, regardless of bargaining level. This result contrasts with those of Bonhomme and Hospido (2012), Arranz and García-Serrano (2014) and Casado and Simón (2015), who observed certain countercyclical wage behaviour in the Spanish case.[3] Third, dispersion tended to reduce along the period of analysis – even more so in case of actual wages – whereas the contractual wage distribution hardly altered. Fourth, dispersion decreased more intensively during the crisis (2006–2010), particularly for workers covered by MB. Fifth, contractual wages distributions presented different changes depending on the bargaining level. The trade union effect was more

Table 2. Logarithm of actual wage and wage differences (2002–2006 and 2006–2010) along wage distribution, at different levels of bargaining.

Percentile	Firm bargaining					Multi-employer bargaining				
	SSES02	SSES06	SSES10	Dif. 02–06	Dif. 06–10	SSES02	SSES06	SSES10	Dif. 02–06	Dif. 06–10
10	1.73	1.78	1.80	0.06	0.02	1.54	1.58	1.68	0.05	0.10
20	1.98	2.01	2.01	0.03	0.00	1.68	1.73	1.82	0.05	0.09
30	2.17	2.18	2.15	0.01	−0.02	1.79	1.84	1.92	0.05	0.09
40	2.32	2.32	2.30	0.00	−0.02	1.90	1.95	2.03	0.05	0.08
50	2.46	2.46	2.43	0.00	−0.03	2.03	2.07	2.14	0.04	0.07
60	2.58	2.59	2.57	0.01	−0.02	2.18	2.21	2.27	0.03	0.06
70	2.72	2.71	2.70	0.00	−0.02	2.36	2.38	2.41	0.02	0.03
80	2.87	2.86	2.85	−0.02	−0.01	2.57	2.59	2.60	0.02	0.01
90	3.11	3.08	3.08	−0.03	0.00	2.84	2.85	2.86	0.01	0.01

Source: National Statistics Institute (INE) *Spanish Structure of Earnings Survey* (SSES).

Table 3. Logarithm of contractual wage and wage differences (2002–2006 and 2006–2010) along wage distribution, at different levels of bargaining.

Percentile	Firm bargaining					Multi-employer bargaining				
	SSES02	SSES06	SSES10	Dif. 02–06	Dif. 06–10	SSES02	SSES06	SSES10	Dif. 02–06	Dif. 06–10
10	1.27	1.33	1.33	0.06	0.01	1.28	1.33	1.44	0.05	0.11
20	1.43	1.51	1.54	0.08	0.03	1.39	1.45	1.55	0.06	0.10
30	1.57	1.65	1.68	0.08	0.03	1.47	1.54	1.64	0.06	0.10
40	1.69	1.76	1.80	0.07	0.04	1.55	1.62	1.72	0.07	0.10
50	1.82	1.87	1.92	0.05	0.05	1.62	1.69	1.79	0.07	0.10
60	1.95	2.00	2.07	0.04	0.07	1.70	1.78	1.87	0.07	0.09
70	2.10	2.16	2.23	0.06	0.07	1.80	1.87	1.97	0.07	0.10
80	2.28	2.34	2.43	0.06	0.09	1.94	2.02	2.12	0.08	0.10
90	2.55	2.60	2.70	0.06	0.10	2.22	2.29	2.36	0.07	0.07

Source: National Statistics Institute (INE) *Spanish Structure of Earnings Survey* (SSES).

clearly reflected in contractual wages' behaviour; consequently, their effects on wage distribution may vary according to the different goals of trade unions at each bargaining level. In this case, the final result was an increase in contractual wage dispersion for workers covered by FB and a reduction for workers covered by MB. The greater the number of latter workers, together with a higher absolute value of the compression, the more marked was the decrease in dispersion of contractual wages as a whole.

Variance decomposition

A deeper analysis of the effect of bargaining level on wage dispersion is based on the variance decomposition methodology of Dell'Aringa and Pagani (2007). The analysis

Table 4. Actual wage dispersion and contractual wage dispersion according to bargaining level (variance as a measure of dispersion, wages in logarithms).

	2002	2006	2010
Contractual wages			
Multi-employer bargaining	0.174	0.179	0.169
Firm bargaining	0.286	0.273	0.290
All workers	0.202	0.200	0.201
Actual wages			
Multi-employer bargaining	0.288	0.271	0.222
Firm bargaining	0.302	0.280	0.260
All workers	0.308	0.285	0.246

begins with the estimate of two standard log wage equations, one for the subsample of workers covered by FB and the other for the subsample of workers covered by MB

$$\log w_{FB} = X_{FB}\beta_{FB} + \varepsilon_{FB} \tag{1}$$

$$\log w_{MB} = X_{MB}\beta_{MB} + \varepsilon_{MB} \tag{2}$$

where w is actual or contractual wage, X is a vector of worker and firm characteristics, β is a vector of coefficients and ε is a vector of error terms.[4] Once estimates are carried out, we proceed to decompose the variance of log wages for the whole sample – that is, including every worker regardless of the bargaining level to which they belong – Var $(X\beta+\varepsilon)$, into three components. The first component represents the part of the variance attributable to wage differences due to differences among workers' and firms' observable characteristics (average between-groups variance)

$$s \times \mathrm{Var}\left(X_{FB}\beta_{FB} \mid FB\right) + (1-s) \times \mathrm{Var}\left(X_{MB}\beta_{MB} \mid MB\right) \tag{3}$$

where s and $(1-s)$ are the fraction of workers covered by FB and MB.

The second component represents the part of the variance attributable to wage differences due to differences among non-observable characteristics (average within-groups variance) – that is, differences in the variance of the error terms

$$s \times \mathrm{Var}\left(\varepsilon_{FB} \mid FB\right) + (1-s) \times \mathrm{Var}\left(\varepsilon_{MB} \mid MB\right) \tag{4}$$

Finally, the third component represents the part of the variance due to the wage gap between the two groups of workers

$$\bar{X}_{FB}\beta_{FB} - \bar{X}_{MB}\beta_{MB} \tag{5}$$

where $\bar{X}_{FB}$ and $\bar{X}_{MB}$ are the mean values of the explanatory variables computed on the two samples of FB and MB workers.

Table 5 shows the decomposition results for both contractual and actual wages. In columns 1, 4 and 7, we see that the part of the variance attributable to both observable (lines 2 and 10) and non-observable (lines 5 and 13) characteristics was greater in case of workers covered by FB (contrary to Dell'Aringa and Pagani, 2007), and particularly (as expected) in the case of contractual wages, reflecting trade union activity in the firm. If we take the effect as a whole, the part of the variance attributable to non-observable characteristics (lines 6 and 14) explains the higher percentage of the variance value (lines 8 and 16), according to Dell'Aringa and Pagani (2007). Finally, the part of the variance explained by the wage gap, as stated by Dell'Aringa and Pagani (2007), represents a residual value in the 3 years, whereas it is much higher for actual wages.

These results may indicate a positive effect of FB on wage dispersion. In order to assess this effect for all workers in the sample, regardless of bargaining level, the previous exercise was repeated for the counterfactual variance, which is the variance to be observed if the characteristics of workers (and their firms) covered by FB were paid similarly to the sample of workers covered by MB (columns 2, 5 and 8). The difference between the current variance and counterfactual variance may be the effect of FB on wage variance after controlling for composition effects (columns 3, 6 and 9). Following the method proposed by DiNardo and Lemieux (1997), wage equation coefficients of the subsample of workers covered by MB were applied to the distribution of both observable and non-observable characteristics of workers covered by FB. As seen in lines 8 and 16, the effect was positive. This means that FB exercises a positive effect on wage dispersion, in line with the results obtained by Card and De la Rica (2006) and Dell'Aringa and Pagani (2007). Besides, the contribution of the three effects (lines 3, 6 and 7 for contractual wages and lines 11, 14 and 15 for actual wages) is positive, which confirms that in the 'two-tier' system of collective bargaining, wage dispersion is boosted by firm-level bargaining.

Once the positive effect of firm-level bargaining on wage dispersion has been identified, it is necessary to check the consistency of this effect over time. Table 4 showed a reduced dispersion over time in actual wages, particularly during the first years of the economic crisis. However, contractual wage dispersion did not undergo any changes; on the contrary, it slightly increased during the crisis. The behaviour of the institutional component of wages (contractual wage) seems to indicate that a great part of the actual wage dispersion reduction (wages finally earned by workers) can be explained by a reduced wage cushion dispersion. Besides, a greater increase in contractual wages compared to actual wages reveals that the wage cushion is becoming less relevant in wage formation. The following section analyses the behaviour of the wage cushion over time in order to test these hypotheses.

The wage cushion and wage dispersion

There is a paucity of literature that analyses the effect of collective bargaining on wage cushion and wage-drift dispersion. Ordine (1996) analysed the impact of insider and outsider factors in the Italian two-stage wage setting process, whose outcomes were identified in the wage cushion at the local level. Data for 1983–1988 suggested that insider factors (productivity, inventories and the insider workers power) were important

Table 5. Variance decomposition. Contractual wages and actual wages.

	2002			2006			2010		
	Current variance	Counterfactual variance	Effect of firm bargaining	Current variance	Counterfactual variance	Effect of firm bargaining	Current variance	Counterfactual variance	Effect of firm bargaining
	1	2	3	4	5	6	7	8	9
Contractual wages									
Effect between									
1. Var. multi-employer barg.: $\mathrm{Var}(X\beta\,|\,MB)$	0.066	0.066	0.000	0.058	0.058	0.000	0.050	0.050	0.000
2. Var. firm bargaining: $\mathrm{Var}(X\beta\,|\,FB)$	0.113	0.036	0.077	0.093	0.039	0.053	0.099	0.052	0.047
3. Average: $(1-t)\times \text{row1} + t\times \text{row2}$	0.076	0.060	0.016	0.064	0.055	0.009	0.064	0.051	0.014
Effect within									
4. Var. multi-employer barg.: $\mathrm{Var}(\varepsilon\,|\,MB)$	0.108	0.108	0.000	0.121	0.121	0.000	0.110	0.110	0.000
5. Var. firm bargaining: $\mathrm{Var}(\varepsilon\,|\,FB)$	0.172	0.034	0.139	0.181	0.043	0.137	0.190	0.042	0.148
6. Average: $(1-t)\times \text{row4} + t\times \text{row5}$	0.121	0.092	0.029	0.131	0.107	0.024	0.133	0.090	0.043
7. Wage gap effect: $(1-t)\times t\times \phi$	0.005	0.002	0.004	0.005	0.001	0.004	0.003	0.002	0.001
8. Overall variance: $\mathrm{Var}(X\beta+e) = \text{row3}+\text{row6}+\text{row7}$	0.202	0.154	0.049	0.200	0.163	0.037	0.201	0.143	0.058
Actual wages									
Effect between									
9. Var. multi-employer barg.: $\mathrm{Var}(X\beta\,|\,MB)$	0.134	0.134	0.000	0.124	0.124	0.000	0.114	0.114	0.000
10. Var. firm bargaining: $\mathrm{Var}(X\beta\,|\,FB)$	0.140	0.055	0.085	0.124	0.064	0.060	0.134	0.069	0.065
11. Average: $(1-t)\times \text{row9} + t\times \text{row10}$	0.135	0.118	0.018	0.124	0.113	0.010	0.120	0.101	0.019
Effect within									
12. Var. multi-employer barg.: $\mathrm{Var}(\varepsilon\,|\,MB)$	0.154	0.154	0.000	0.147	0.147	0.000	0.108	0.108	0.000
13. Var. firm bargaining: $\mathrm{Var}(\varepsilon\,|\,FB)$	0.162	0.044	0.118	0.156	0.058	0.098	0.126	0.073	0.054
14. Average: $(1-t)\times \text{row12} + t\times \text{row13}$	0.156	0.131	0.025	0.148	0.131	0.017	0.113	0.098	0.016
15. Wage gap effect: $(1-t)\times t\times \phi$	0.017	0.002	0.015	0.014	0.002	0.013	0.013	0.003	0.010
16. Overall variance: $\mathrm{Var}(X\beta+e) = \text{row11}+\text{row14}+\text{row15}$	0.308	0.251	0.057	0.286	0.246	0.040	0.246	0.202	0.044

t and $(1-t)$ are, respectively, the fractions of workers covered by firm bargaining (FB) and multi-employer bargaining (MB); $\phi = \bar{X}_{FB}\beta_{FB} - \bar{X}_{MB}\beta_{MB}$. Current variance is the variance of estimated wage for both groups of workers. Counterfactual variance is the variance that would prevail if FB workers' characteristics were rewarded in the same way as for MB workers. Effect of firm bargaining: Current variance − Counterfactual variance.

determinants of the wage cushion. Palenzuela and Jimeno (1996) showed that for Spain in 1990, bargaining by works councils yielded an average positive wage cushion of around 5% and that wages were strongly affected by the total number of workers and negatively affected by the proportion of temporary workers. Cardoso and Portugal (2005) found that the wage cushion tended to increase wage differentials, working partly as a flexibility mechanism to overcome the constraints imposed by collective bargaining and enhancing returns to worker and firm attributes. Bastos et al. (2009), using information for 1991–2000 Portuguese firms, analysed wage formation in the two-tiered wage setting system, focusing on the role of firm heterogeneity within industries. They concluded that in more heterogeneous industries, the industry wage floor was lower while the average wage cushion was higher. Finally, Jung and Schnabel (2011) found that the wage cushion in western Germany varied with profits and labour shortages. Plants with single-employer agreements were less likely to have a wage cushion, while plants bound by multi-employer agreements seemed to pay wage premiums to overcome the restrictions imposed by the centralised bargaining system.

We have defined the wage cushion as the difference between the logarithm of actual wage and logarithm of contractual wage (Cardoso and Portugal, 2005)

$$wc_{ij} = \log\left(\frac{w_{actual_{ij}}}{w_{contractual_{ij}}}\right) \tag{6}$$

where wc is the wage cushion, i stands for the worker and j stands for the bargaining level.

Table 6 shows that the wage cushion was always higher for workers covered by FB, both in absolute terms (lines 1 and 2) and in relation to the actual wage (lines 3 and 4). That is, workers covered by FB received higher wages, and on average, there was a greater difference relative to contractual wages than that observed for workers covered by MB. Besides, the percentage of workers with a positive wage cushion was higher for those covered by FB. On the other hand, temporal analysis also indicates a

Table 6. Wage cushion: Mean and relative values, workers without wage cushion and dispersion.

	2002	2006	2010
Mean value			
1. Multi-employer bargaining	0.436	0.403	0.342
2. Firm bargaining	0.575	0.522	0.462
Wage cushion/actual wage			
3. Multi-employer bargaining	20.5%	18.7%	15.5%
4. Firm bargaining	23.5%	21.3%	18.9%
Workers without wage cushion			
5. Multi-employer bargaining	13.9%	15.9%	19.9%
6. Firm bargaining	8.7%	12.1%	17.6%
Variance			
7. Multi-employer bargaining	0.18	0.16	0.13

wage cushion reduction over time, for both absolute and relative values and at both bargaining levels, in line with Table 2. Moreover, the percentage of workers with a positive wage cushion has also been reducing. Finally, Table 6 shows that wage cushion dispersion has also being reducing step by step, particularly among workers covered by MB and mostly during 2010. Summing up, Table 6 shows first that the wage cushion was becoming less relevant in wage formation, owing both to the reduction of its value in relation to the actual wage and to the number of workers earning it. Second, its dispersion was reducing, particularly among workers covered by MB, and mostly during 2010.

Table 7 provides a deeper analysis of the relationship between wage dispersion and the level of collective bargaining, comparing correlation coefficients between contractual and actual wages, and the wage cushion. Given that the standards governing collective bargaining in Spain guarantee that firm negotiation generates higher contractual wages, the positive signs observed in every relation for the 3 years confirm that, on one hand, higher contractual wages were reflected in both higher actual wages and a higher wage cushion value (lines 1 and 2). On the other hand, lines 3 and 4 show that those higher contractual wages resulting from FB were linked to greater dispersion levels for both actual wages and the wage cushion.

Table 7. Correlations between contractual wages and actual wages, wage cushion, actual wage dispersion and wage cushion dispersion.[a]

	2002	2006	2010
1. Actual wage	0.961	0.971	0.976
2. Wage cushion	0.792	0.825	0.889
3. Dispersion of the actual wage	0.750	0.939	0.883
4. Dispersion of the wage cushion	0.731	0.715	0.839

[a]All coefficients are significant at 0.05.

Finally, wage cushion variance has been decomposed following the same methodology as for that proposed for wage variance decomposition (Table 8). In this case, the analysis begins with the estimate of two wage cushion equations: one for the subsample of workers covered by FB and the other for the subsample of workers covered by MB

$$wc_{FB} = X_{FB}\alpha_{FB} + \delta_{FB} \tag{7}$$

$$wc_{MB} = X_{MB}\alpha_{MB} + \delta_{MB} \tag{8}$$

where wc is the wage cushion, X is a vector of worker and firm characteristics, α is a vector of coefficients and δ is a vector of error terms.[5] In this case, interest is focused on the component corresponding to the difference between the current variance and the counterfactual variance, which measures the effect of FB on wage cushion variance after controlling for composition effects. As observed in columns 3, 6 and 9 of line 8, the positive values for all years confirm the positive effect of firm collective bargaining on wage cushion dispersion.

Table 8. Variance decomposition. Wage cushion.

	2002			2006			2010		
	Current variance	Counterfactual variance	Effect of firm bargaining	Current variance	Counterfactual variance	Effect of firm bargaining	Current variance	Counterfactual variance	Effect of firm bargaining
	1	2	3	4	5	6	7	8	9
Effect between									
1. Var. multi-employer barg.: $\mathrm{Var}(X\alpha\,|\,MB)$	0.066	0.066	0.000	0.058	0.058	0.000	0.050	0.050	0.000
2. Var. firm bargaining: $\mathrm{Var}(X\alpha\,|\,FB)$	0.113	0.036	0.077	0.093	0.039	0.053	0.099	0.052	0.047
3. Average: $(1-t)\times row1 + t\times row2$	0.076	0.060	0.016	0.064	0.055	0.009	0.064	0.051	0.014
Effect within									
4. Var. multi-employer barg.: $\mathrm{Var}(\delta\,|\,MB)$	0.108	0.108	0.000	0.121	0.121	0.000	0.110	0.110	0.000
5. Var. firm bargaining: $\mathrm{Var}(\delta\,|\,FB)$	0.172	0.034	0.139	0.181	0.043	0.137	0.190	0.042	0.148
6. Average: $(1-t)\times row4 + t\times row5$	0.121	0.092	0.029	0.131	0.107	0.024	0.133	0.090	0.043
7. Wage cushion gap effect: $(1-t)\times t\times\phi$	0.005	0.002	0.004	0.005	0.001	0.004	0.003	0.002	0.001
8. Overall variance: $\mathrm{Var}(X\alpha+\delta)=row3+row6+row7$	0.202	0.154	0.049	0.200	0.163	0.037	0.201	0.143	0.058

t and $(1-t)$ are, respectively, the fractions of workers covered by firm bargaining (FB) and multi-employer bargaining (MB); $\phi = \bar{X}_{FB}\,\beta_{FB} - \bar{X}_{MB}\,\beta_{MB}$. Current variance is the variance of estimated wage cushion for both groups of workers. Counterfactual variance is the variance that would prevail if FB workers' characteristics were rewarded in the same way as for MB workers. Effect of firm bargaining: Current variance − Counterfactual variance.

Therefore, the dispersion analysis in Tables 6 and 7 and the variance decomposition in Table 8 appear to confirm a positive relationship between single-employer bargaining and wage cushion dispersion, contributing to greater actual wage dispersion. On the other hand, the temporal analysis indicates that the wage cushion dispersion was most deeply reduced for workers covered by MB (Table 9). In order to understand the reasons, we analyse the wage cushion along its distribution at both bargaining levels.

Table 9. Wage cushion and wage cushion differences (2002–2006 and 2006–2010) along wage cushion distribution, at different levels of bargaining.

Percentile	Firm bargaining					Multi-employer bargaining				
	SSES02	SSES06	SSES10	Dif. 02–06	Dif. 06–10	SSES02	SSES06	SSES10	Dif. 02–06	Dif. 06–10
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.15	0.09	0.03	−0.05	−0.06	0.06	0.04	0.00	−0.02	−0.04
30	0.26	0.20	0.13	−0.06	−0.07	0.15	0.11	0.08	−0.03	−0.03
40	0.37	0.32	0.25	−0.06	−0.07	0.23	0.20	0.16	−0.03	−0.04
50	0.50	0.44	0.36	−0.06	−0.08	0.33	0.29	0.25	−0.04	−0.05
60	0.62	0.56	0.48	−0.06	−0.08	0.44	0.40	0.34	−0.04	−0.06
70	0.76	0.71	0.63	−0.05	−0.08	0.58	0.53	0.46	−0.04	−0.08
80	0.93	0.89	0.82	−0.04	−0.07	0.75	0.71	0.60	−0.04	−0.10
90	1.20	1.15	1.09	−0.05	−0.06	1.01	0.97	0.83	−0.04	−0.14

SSES: Spanish Structure of Earnings Survey.

Table 9 shows wage cushion differences by percentiles during 2002–2006 and 2006–2010. Wage cushion differences between the years 2002–2006 and 2006–2010 were negative at both bargaining levels for all percentiles, according to their average value decrease from 2002 to 2010 (Table 6). However, there are differences depending on the bargaining level. For workers covered by MB, differences tend to increase moving up the distribution (particularly during 2006–2010): this determines wage cushion compression throughout the analysed period as observed in Table 6. For workers covered by FB, differences remain stable along the distribution, which explains the much smaller wage cushion compression throughout the analysed period, reflected in Table 6.

Conclusion

This research has closely examined how the 'two-tier' collective bargaining system affects wage dispersion in Spain by analysing its effect on the components of the actual wage, the contractual wage and the wage cushion, within a time framework covering economic growth (2002–2006), and part of the actual crisis (2006–2010). The results indicate that workers covered by FB earned higher wages and experienced greater wage dispersion than workers covered by MB, both in terms of actual and contractual wages. Variance decomposition analysis confirmed how FB had a positive effect on wage dispersion once composition effects were controlled.

When analysing the time pattern of wage dispersion, an actual wage compression was observed at both bargaining levels and during both analysed sub-periods (2002–2006 and 2006–2010). Wage compression occurred particularly during the period of economic crisis and, above all, among workers covered by MB. Contractual wages underwent hardly any dispersion changes for workers. The wage cushion (both in absolute terms and in relation to actual wage) was shown to be higher for workers covered by FB, and the percentage of workers with a positive wage cushion was also higher for workers covered by FB. Therefore, despite the wage cushion being a wage formation method used by firms regardless of the level of bargaining, it was mainly related to FB level, thus contributing to greater actual wage dispersion at this bargaining level. Correlation coefficient and wage cushion variance decomposition analysis seemed to support this hypothesis, finding a positive effect of FB on the level and wage cushion dispersion.

Finally, temporal analysis revealed a decrease in the weight of the wage cushion weight relative to actual wages, as well as a decrease in wage cushion dispersion. Both effects were stronger among workers covered by MB during the economic crisis, in line with the behaviour observed in the compression of actual wages.

Consequently, this research provides empirical evidence on wage compression in Spain between 2002 and 2010, particularly during the period of crisis. However, recent research warns of an increasing inequality in household income distribution in developed countries since the beginning of the economic crisis (OECD, 2013), and particularly in the Spanish case (see, for example, Arranz and García-Serrano, 2014; Spanish Economic and Social Council, 2013). If we take into account the fact that wages constitute most of household income, there seems to be some contradiction between the outcomes of this research in relation to wage dispersion and the existing data on income distribution. The explanation for such an apparent contradiction is that household income distribution is conditioned by the 'wage effect' (changes in the wages of those who are in paid employment at the beginning and end of the period) and the 'employment effect' (the change in the number of people who are paid workers). In the current economic crisis, Spain, alongside Greece, experienced the greatest unemployment rate increases in the European Union. During the period 2006–2010, the unemployment rate increased from 8.3% to 20.1%. However, the highest unemployment rates were generally found among those with the lowest household incomes. In 2006–2010, young people between 20 and 24 years old increased their unemployment rates by 24.2 percentage points, workers with basic education by 19.7 percentage points and those with low qualification levels by 16.2 percentage points (National Statistics Institute, 2015). All this undoubtedly contributed to an increase in the household income gap such that International Labour Organization (ILO, 2014), in a 29-country study of income distribution in 2006–2010, identified Spain as the country where such household income inequality grew most. A key explanatory element may be that 76.4% of such differences came from the unemployment rate effect. The unemployment rate increase, rather than wage dispersion, may have been the main contributor to growing household income disparities in Spain, at least until 2010. Besides, as this research concludes, the Spanish bargaining system tends to reduce wage inequalities, particularly through sectoral collective bargaining, so any neoliberal legislative measure to decentralise collective bargaining and promote firm collective bargaining may further increase household income differences.

Such a warning is relevant in the Spanish case, as the structural reform of collective bargaining, proposed by the Socialist Party in 2011 and carried out by the People's Party (the main conservative party in Spain) in 2012, is aimed at decentralising collective bargaining, promoting firm-level bargaining by giving priority to firm-level bargaining content as far as labour relations are concerned. It is particularly significant that, since the 2012 reform, wages negotiated at firms have prevailed over those negotiated through national or sectoral collective bargaining, thus eliminating the provision of the Statute of Workers' Rights (in force since 1980) that collective bargaining at firm level should equal or improve the wages agreed at national or sectoral levels. Promoting firm-level bargaining significantly favours an increase in wage inequality distribution, as this article brings to light, and therefore of household incomes, thus boosting the unemployment effect.

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Notes

1. The effect of the economic crisis on wages distribution will be influenced by wages development, as well as by changes in the composition of the wage-based labour force. As a whole, wage increases agreed in collective bargaining were reduced almost by half between 2007 and 2010, from 4.21% to 2.16% (Spanish Economic and Social Council, 2014), although not so steeply as the drop in firm revenues. During 2009 and 2010, wages inertia was boosted by the authorities' denial of a crisis and the lack of appropriate economic policies. On the other hand, the composition of the wage-based labour force was substantially altered by high levels of firm closure between 2008 and 2010. There was a 9% decrease in firms with 1–49 workers, 14.3% in firms between 50 and 199 workers and 21.5% in firms with more than 200 workers (National Statistics Institute, 2015).
2. For the first time, 2010 Spanish Structure of Earnings Survey (SSES) includes information on civil servants (almost 8% of surveyed workers); they have been removed to guarantee data homogeneity relative to the 2002 and 2006 surveys. This fact has increased the number of workers subject to firm agreements by two points.
3. The divergence in the results should be probably found in the different databases used as well as in the methodology followed to measure wage dispersion.
4. The variables introduced in the estimates are as follows:

   Human capital, worker features and job characteristics: sex, age, level of education, length of the contract (permanent or temporary), type of contract (full-time or partial-time), seniority at firm (years), qualification level.

   Firm features: activity sector, product market (the firm sells the products at regional, national or international levels), type of firm (public or private), region, establishment size (less than 50 workers, between 50 and 199 workers, more than 199 workers), collective bargaining level (firm, national, regional). Estimates are available upon request.
5. Estimates are available upon request.

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