



Collective bargaining levels, employment and wage inequality in Spain

Raul Ramos^{a,*}, Esteban Sanromá^b, Hipólito Simón^c

^a AQR-IREA, Universitat de Barcelona, Departament d'Econometria, Estadística i Economia Aplicada, Av. Diagonal 690, 08034 Barcelona, Spain

^b Universitat de Barcelona, IEB, Departament d'Economia, Av. Diagonal 690, 08034 Barcelona, Spain

^c Universidad de Alicante, Instituto de Economía Internacional, Dpto. de Análisis Económico Aplicado, Fac. de Ciencias Económicas y Empresariales, Ap. correos 99, 03080 Alicante, Spain

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Abstract

After the increase in inequalities following the Great Recession, studies on wage bargaining systems have increasingly focused on wage inequality. This research examines wage inequality associated with collective bargaining levels in Spain, based on matched employer–employee microdata and quantile regression methods. These methods are applied across the wage distribution, following the method proposed by Firpo et al. (2011), to estimate wage premiums associated with agreement levels and to decompose the wage differentials observed at different points of the wage distribution. From the evidence obtained it can be concluded that, although the higher wages found in firm-level agreements are explained by the better observed characteristics of firms and workers covered by these collective agreements, there remains a positive wage premium. Although this premium is seen throughout the wage distribution, it favours mostly workers in the middle and upper-middle end. This slightly increases wage inequality in comparison with sectoral agreements. In contrast, workers without collective bargaining coverage generally suffer a wage penalty. This penalty is only observed on the left of the wage distribution. It becomes a significant wage premium in the upper end of the distribution, which implies a significant increase in wage inequality. In short, the evidence of this research suggests that reducing the coverage of collective bargaining could be associated with a significant increase in wage inequality. A better policy option for countries with a predominant sectoral model, such as

* Corresponding author.

E-mail addresses: rros@ub.edu (R. Ramos), esanroma@ub.edu (E. Sanromá), hsimon@ua.es (H. Simón).

Spain, would be to move towards an organized decentralization model. This would cause significant gains in employment as suggested by [OECD \(2019\)](#) and only a slight increase in wage inequality.

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1. Motivation and objectives

The wage setting system, and more specifically the collective bargaining model, is a key element to determine labour outcomes. By setting wage levels and work conditions, collective bargaining models clearly influence labour costs and, as a result, labour demand (and unemployment), price levels and external competitiveness. For this reason, it is crucial from an economic policy perspective to find the right design for the prevailing collective bargaining model in a country.

A wide literature has examined the relationship across countries between models of collective bargaining and labour outcomes such as employment and unemployment. More recently, the focus has been to analyse the effects of collective bargaining on wage inequality.

During the 1980s, there was consensus on the positive effects of centralized models on labour outcomes ([Flanagan, Soskice, & Ulman, 1983](#); [Cameron, 1984](#); [Tarantelli, 1986](#)), given that wage setters could internalize the impact of their agreements ([Soskice, 1990](#)). However, some authors supported the opposite view that decentralized wage bargaining would improve adjustment to a firm's local conditions. The hump-shaped hypothesis by [Calmfors and Drifill \(1988\)](#) reconciled both hypotheses to the detriment of sectoral bargaining. However, it was noted subsequently that a high level of coordination across units in the bargaining process could compensate for the limitations of sectoral bargaining ([Bassanini & Duval, 2006](#)).

In the following decades, the literature followed three lines: fine-tuning characterization of collective bargaining models; an improvement in empirical analyses by using longer time series and more sophisticated, rigorous econometric techniques; and a more detailed analysis of some characteristics of the bargaining models. From this wave of studies, consensus emerged on some relevant aspects. In their systematic review of the literature, [Aidt and Tzannatos \(2008\)](#) concluded that high levels of bargaining coverage are associated with higher unemployment and higher inflation; that the hump-shaped hypothesis is not confirmed when longer time series are used; and the evidence is not fully conclusive on the effects of bargaining coordination, although it seems to be more relevant during periods of change than in more stable conditions. As part of the studies produced under the ECB Wage Dynamics Network initiative, [Bertola et al. \(2012\)](#), [Galuscak, Keeney, Nicolitsats, Strzelecki, and Vodopivec \(2012\)](#) and [Druant, Fabiani, Kezdi, Lamo, and Sabbatini \(2012\)](#) found that more decentralized bargaining models are associated with higher wage flexibility than more centralized ones. [Boeri \(2014\)](#) highlighted the bad performance of two-tier bargaining structures as these models do not allow the flexibility of decentralized models nor the coordination of centralized ones. [Garnero Rycx, and Terraz \(2020\)](#) provided evidence for Belgium that wages negotiated under firm-level agreements improve the wages of multi-firm agreements over the productivity differential, and more intensely in non-competitive environments.

More recent studies considered a wider taxonomy of collective bargaining models using the rich OECD/AIAS ICTWSS database (Visser, 2019). This new set of studies provided favourable evidence for sectoral and centralized bargaining models if they offer enough flexibility to adapt wages to firm productivity (Garnero, 2021; OECD, 2018, 2019; Thommen, 2021). This result is supported by studies that highlighted the severe costs of excess coverage of bargaining and the automatic extension of collective agreements (Gal & Theising, 2015; Hijzen & Martins, 2020; Martins, 2021; Murtin, de Serres, & Hijzen, 2014). To sum up, according to the latest studies, the most efficient collective bargaining model in terms of employment (Garnero, 2021; OECD, 2019; OECD, 2018) and GDP (Thommen, 2021) is the one that takes advantage of the coordination of centralized or sectoral negotiations to set guidelines and orientations for firm-level agreements. As shown in Table 1, good examples of these models are found in Denmark, Sweden, Netherlands, Austria and Germany (Addison, 2016; Ibsen & Keune, 2018).

The increase in wage inequality after the financial and economic crisis of 2008–2009 attracted researchers' interest in the distributive effects of collective bargaining models. There is wide consensus in the literature that wage inequality is higher in countries with more decentralized bargaining models and lower in those with centralized ones, with mixed results in sectoral models depending on the adjustment margin allowed for firms (as seen in Table 1 and OECD, 2018, 2019).

It is therefore of great importance in terms of economic policy to choose a wage setting system that would allow achievement of the best combination of efficiency and equity. This is particularly relevant for the countries with the worst results in both dimensions, as is clearly the case of Spain (Table 1). OECD (2012a) computed the correlation between the structural unemployment rate before the crisis and the impact on unemployment four years later. Based on this result, they grouped countries into five clusters. Spain formed a group on its own with the worst results: a high structural unemployment rate before the crisis and a huge increase in unemployment afterwards. Spain introduced an intense labour market reform in 2012 with specific measures affecting collective bargaining. This facilitated the decentralization of wage bargaining through firm-level agreements that had a priority over sectoral agreements and opt-out clauses (Bentolila, Dolado, & Jimeno, 2012; Domenech, Garcia, & Ulloa, 2018). However, firm-level agreements showed a decreasing trend after the reform and only affected 0.1% of all firms (they affected 8.7% of firms in Germany and 10% in the Netherlands), while the number of opening clauses was also very low (0.08% of firms compared to 21% in Germany, although these differences are partially explained by the higher presence of small firms in Spain). It is therefore of interest to analyse the Spanish wage setting system, as the conclusions drawn may be valid for other countries, particularly EMU countries with bargaining models that are not very sensitive to changes in the macroeconomic environment like the Spanish one, such as France, Italy and Portugal (Camarero, D'Adamo, & Tamarit, 2019).

This research examines the Spanish case. Since the literature on the effect on labour outcomes is abundant and has concluded that legislation should favour centralized or sectoral negotiations with extensive opportunities to adapt wages to business conditions, our research focuses on a less analysed area: wage inequality. More precisely, it examines whether there is a significant wage premium between wages negotiated under different bargaining levels and whether the expected higher wage inequality associated with decentralization is too high and may end up causing a problem of working poor and poverty. Taking this into account, this research examines wage inequality associated with different collective bargaining levels in Spain based on matched employer–employee microdata and quantile regression methods. The analyses are applied across the wage distribution following the method proposed by Firpo et al. (2011) to estimate wage

Table 1
Collective bargaining systems and macroeconomic performance.

	Excess coverage 2018	Nominal unit labour cost (annual average growth rate)			Employment rate 2019	Unemployment rate 2019	Current account balance (percentage of GDP)		Wage inequality (D9/D1) 2018
		1999–2007	2008–2010	2011–2019			1999–2007	2008–2020	
Belgium	40.1	1.4	2.5	1.3	65.3	5.4	2.6	0.4	2.44
Austria	71.7	0.8	2.9	1.9	73.6	4.5	1.3	2.3	3.20
Denmark	16.5	2.4	3.1	0.6	75.0	5.0	3.0	6.9	2.59
Netherlands	60.3	1.8	2.6	1.1	78.2	3.4	7.7	8.3	2.92
Sweden	23.1	2.0	2.5	2.1	77.1	6.8	5.7	4.7	2.14
Germany	37.5	0.0	2.7	2.1	76.7	3.1	2.4	7.1	3.33
Spain	53.8	3.0	2.1	−0.3	63.3	14.1	−5.6	−0.3	3.17
Finland	26.1	1.0	4.1	1.2	72.9	6.7	5.6	−0.5	2.58
Italy	45.6	2.6	2.8	0.8	59.0	10.0	−0.5	0.4	2.57
Portugal	58.6	2.5	1.5	0.3	70.5	6.5	−9.2	−2.9	3.43
France	85.2	1.8	2.4	0.8	65.6	8.4	1.0	−0.7	2.86
Greece	5.3	3.5	3.9	−0.8	56.5	17.3	−9.8	−5.1	3.46
Ireland	9.5	3.8	−1.4	−2.5	69.5	5.0	−1.5	−1.6	3.73
United Kingdom	2.6	3.1	2.1	1.7	75.2	3.8	−2.4	−3.8	3.42

Notes: The order of countries is the result of a combination of the level, coordination and flexibility of the collective bargaining model for firms.

premiums associated with agreement levels at different points of the wage distribution and the effect on wage inequality.

A range of studies has been carried out for European countries that analyse wage differentials and wage premiums between workers covered by collective agreements and those who are not covered, and between levels of agreements, as most European countries have a high level of coverage. A common finding of these studies is the estimation of a positive wage premium for workers covered by an agreement as opposed to those who are not. [Stephan and Gerlach \(2005\)](#), [Gürtzgen \(2006\)](#) and [Heinbach and Spindler \(2007\)](#), among other studies, found these positive premiums for Germany, a country where the absence of collective bargaining agreements has expanded. Evidence for a greater number of countries shows a positive premium for employees covered by firm-level agreements compared to those covered by higher-level agreements. Some studies coincide in estimating positive premiums, although of varying sizes due partly to the use of different methodologies and because they refer to countries with different institutional frameworks (some examples are [Rycx, 2003](#), for Belgium; [Card & de la Rica, 2006](#), for Spain; [Plasman, Rusinek, & Rycx, 2007](#), for Denmark, Belgium and Spain; [Daouli, Demoussis, Giannakopoulos, & Laliotis, 2013](#), for Greece; [Dahl, Le Maire, & Munch, 2013](#), for Denmark; [Andreasson, 2014](#), for Sweden; [Kaukanen, Maetzulskij, & Riukula, 2020](#), for Finland; and [Addison, Teixeira, Evers, & Bellman, 2014](#), for Germany, although [Gürtzgen, 2016](#), does not find any evidence of this positive premium for Germany).

However, there is no agreement in the literature on the effect on wage dispersion. In some studies and countries there seems to be wider dispersion in firm-level agreements. It is understood that within this bargaining framework, the firm has greater autonomy to adjust wages to the productivity of the workers. However, there is also evidence of the contrary, supported by the argument that the firm-level agreement responds to the strength and pressure of the unions. A central objective of the unions is to reduce wage differentials between workers.

For Spain, evidence on wage differentials and wage premiums by type of agreement is very limited and outdated as it refers only to 1995. [Card and de la Rica \(2006\)](#) and [Plasman et al. \(2007\)](#) estimated a positive wage premium for firm-level agreements with respect to sectoral agreements. As regards wage dispersion, [Card and de la Rica \(2006\)](#), [Dell'Aringa and Pagani \(2007\)](#) and [Canal and Rodríguez \(2016\)](#) coincide in that firm-level agreements increase wage inequality slightly, while [Plasman et al. \(2007\)](#) and [Canal and Rodríguez \(2004\)](#) found a reduction in wage inequality in these agreements.

Analysing these aspects of the Spanish case is particularly interesting for several reasons. The available evidence is scarce, partly contradictory and refers to a time in the distant past. After the Great Recession, the Spanish economy and its labour market experienced a long-lasting, deep economic crisis with unemployment reaching extreme levels, which may have altered the bargaining power of workers and created difficulties for firms to continue to pay efficiency wages. Furthermore, in 2012 a broad labour reform was passed that modified multiple aspects of the labour framework, with potential effects on wage levels.

The study makes several contributions. First, it quantifies the wage premium between types of agreement for the years 2002, 2006, 2010 and 2014. For the latter two years, it analyses the premium with respect to the absence of an agreement, in the context of broad coverage of collective bargaining, an aspect that has only been studied for Germany to date. Second, it identifies the bargaining level at which wage premiums are greatest by conducting an analysis across the complete wage distribution. Third, the evolution of differences between types of agreement and between the quantiles of the distribution provides evidence on whether it has varied slightly with the end of growth and the impact of the deep recession and the effect on wage inequality. Based

on the overall evidence, economic policy recommendations are made for Spain that are suitable for other EMU countries with similar wage performance.

The rest of the paper is structured as follows. After this introduction, the next section provides a description of the Spanish institutional collective bargaining framework. Next, a brief description of the databases and the evidence is presented in Sections 3 and 4, respectively. Section 5 includes recommendations for reforming the bargaining models in Southern Europe, while Section 6 presents some concluding remarks.

2. Institutional framework of collective bargaining in Spain

After returning to democracy, Spain regulated the labour market following the model in force in neighbouring countries of Western Europe. The wage setting system was approved in the Workers' Statute of 1980. As well as using the example mentioned as a reference, it sought to compensate for some specific features derived from the young democracy, such as low union membership and under-representation of unions in an economy with predominantly small and medium-sized firms.

Consequently, the Workers' Statute established that unions obtain the capacity to negotiate collective agreements based on a minimum result in union elections (10% national or 15% regional), irrespective of the number of members. The agreements are negotiated by sector, usually at provincial level, between the business associations and unions that have obtained the minimum number of representatives in union elections. In this way, many small and medium-sized firms are not present on either side of the table in the negotiations. Despite this, all firms in a sector, including those absent from the negotiation, must apply the agreement because it has the force of law. It must be fulfilled by all firms in the same sector and territory, according to the general principle of automatic effectiveness. Therefore, the agreement legally extends to all firms automatically, irrespective of their size and without the need for them to adhere to it. It applies to all workers, both unionized and not. Furthermore, until the reform of 2012, the agreements had an unlimited "after effect" (ultra-activity). These features explain the very high coverage of collective bargaining in Spain (around 80% of wage earners), although there is very low union density (approximately 18%) (ILO, 2015).

There is also the possibility of negotiating firm-level agreements. Bargaining is carried out by the board of managers and the work council (or the workers' representatives in firms of less than 50 workers). Firm-level agreements cannot establish conditions that are worse for workers than sectoral agreements. These legal restrictions and the small size of Spanish firms explain the low incidence of decentralized bargaining and the low percentage of workers covered by firm-level agreements. In practice, firm-level agreements are negotiated at the request of the firm workers' committee in large firms with a high union presence, and generate higher wages than sectoral agreements.

The far-reaching labour reform approved in 2012 amid the economic crisis gave rise to changes in the collective bargaining system.¹ These changes sought to facilitate wage flexibility on a microeconomic level and enable fast modifications to be made to wages and other conditions to adapt to the economic cycle. Legal changes relating to collective bargaining and wage determination focused on four aspects. (a) The reform introduced the applicative priority of firm-level agreements over sectoral agreements, with very few exceptions. This promoted decentralization of

¹ For a review of changes in the characteristics of collective bargaining in OECD countries see Visser (2016).

collective bargaining. (b) It facilitated the opening clauses of sectoral agreements. (c) It enabled firms to revoke the most advantageous conditions that the sectoral agreement may have been applying (including wages, hours worked and work schedule). (d) It limited the after effect to one year after the end of the agreement.

Literature on the impact on wages of these modifications to the legal framework concludes that there was greater wage moderation, which gave rise to greater macroeconomic wage flexibility (Arpaia & Kiss, 2015; Izquierdo, Lacuesta, & Puente, 2013; International Monetary Fund, 2015; Izquierdo & Puente, 2015). There is also evidence to sustain that the wage adjustment did not affect workers equally, but had a greater impact on new hires (Fernández-Kranz, 2015; OECD, 2015; Orsini, 2014) and low wage earners (López-Mourelo & Malo, 2015). In contrast, the evidence on microeconomic wage flexibility is scarce. The International Monetary Fund (2015) observed that after implementation of the reform, sectoral and regional wages continue to respond very weakly to specific variations in economic conditions. To date, the literature has not analysed the effect that the labour reform may have had on wage differentials and wage inequality, in accordance with the bargaining level.

The effect of the labour reform on wage differentials depends largely on the effective use by employers of each of the above wage flexibility factors. The effects of the 2012 labour reform on wage inequality can be summarized in the following hypotheses. (1) The wage premium of firm-level agreements with respect to sectoral agreements may have grown due to the reform of Article 41 of the Workers' Statute (more favourable wages and working conditions than the agreement) and the possible overriding of supra-firm agreements. However, it may have decreased due to the greater decentralization of bargaining. The possible effect of the limitation of ultra-activity (the “after effect”) seems minimal. Therefore, the expected effect on wage inequality is not clear. (2) The premium of sectoral agreements with respect to workers who are not covered will a priori decrease due to the amendments to Article 41 and the possibility of overriding the sectoral agreement. Therefore, wage inequality may have increased. In summary, the effects of the 2012 labour reform on wage differentials depending on bargaining level, when they exist, are expected to have the opposite sign and are likely to be scarce.

3. Data

The microdata used in the research correspond to the 2002, 2006, 2010 and 2014 waves of the Wage Structure Survey (WES) carried out by Spain's National Statistics Institute (INE). This is a statistical operation conducted every four years that constitutes the Spanish sample of the *European Structure of Earnings Survey*, a survey undertaken with harmonized methodology in all member countries of the European Union, based on independent cross sections. This survey uses a two-stage sampling technique among wage earners based on the social security contribution accounts of their firms. It covers employees registered with Social Security throughout the month of October during the year of reference. Although the sectoral coverage of the survey has been extended over time, the four waves analysed are representative of practically all establishments in the private sector. It only leaves out certain sectors of activity such as agriculture or domestic service. However, firms with less than ten employees are covered by the survey only after the 2006 wave. It consists of a matched employer–employee database that provides highly detailed information about wages and the characteristics of workers (sex, age, education and nationality), their job positions (occupation, seniority, type of contract and undertaking of supervision tasks), the firms (sector, size, region, type of ownership and type of market) and information referring

Table 2
Wage premiums by collective bargaining level in Spain.

	2002	2006	2010	2014
Firm collective agreement	0.065***	0.075***	0.064***	0.055***
No agreement	–	–	–0.114***	–0.045***
Number of observations	164,494	179,386	144,467	139,894
R^2	0.57	0.56	0.56	0.53

*** $p < 0.01$.

to the type of collective agreement in each of the establishments considered.² The wage concept used in this research is hourly gross wage and its calculation incorporates any type of payment by the firms, including commissions, bonuses for night and weekend work, and overtime payments.

The type of collective bargaining that exists is indicated by each firm as a response to a specific question of the WES. Until the 2006 wave, the possible responses to this question only considered different types of collective agreement. From the 2010 wave, this question includes whether a collective agreement or any other form of regulation exists. Therefore, it explicitly considers the possibility that no collective agreement exists.

Much like previous studies on the same issue, the analysis is limited to full-time employees working in the private sector, given the differences in the wage determination processes with respect to the public sector. The explanatory variables that have been considered cover the characteristics of individuals and their job positions and firms.

The final sample is made up of 164,494 observations for 2002; 179,386 for 2006; 144,467 for 2010; and 139,894 for 2014.

4. Results

As shown in Tables S.1, S.2 and S.3 of the supplementary material, a descriptive analysis of raw data from WES shows significant wage differentials between bargaining levels and confirms that workers employed in firms with their own agreement have differential characteristics that, in general terms, are systematically associated with higher wages (i.e., they are men, older, have higher education and more tenure, and work in large manufacturing firms with an international focus).

Table 2 shows selected results of estimating a Mincer equation that relates the logarithm of individual wages to variables associated with the characteristics of the workers, their job position, the characteristics of the firm where they work, and the collective bargaining level.³ This equation was estimated separately for each of the waves of the Wage Structure Survey (2002, 2006, 2010 and 2014), using the sample elevation factors on an individual level. The controls consider gender, nationality (native/immigrant), educational level (3 levels), age (4 categories), years of seniority in the firm and its square, whether workers have a dead-end contract or not, occupational category (6 groups), the region of the establishment on a NUTS1 level (7 regions), the sector of activity (12 sectors), the size of the firm (3 categories), the firm's principal market (4 groups) and an

² To analyse the proposed topic, it would be more appropriate to use a longitudinal matched employer–employee database. However, the only source that meets these requirements for the Spanish economy, the Continuous Professional Life Sample, does not provide information about the type of collective agreement that affects the worker.

³ Full results are included in Table S.4 of the supplementary material.

additional series of variables that include the average characteristics of the workers of each firm and that, as argued by [Daouli et al. \(2013\)](#), enable the control (at least partially) of the possible bias derived from the non-random assignment of workers between firms. Finally, the level of collective bargaining is considered, which for the period 2002–2006 only takes two values (firm-level agreement or higher level agreement). However, for the period 2010–2014, it takes three values (firm-level agreement, higher level agreement or absence of an agreement). The category of reference for this group of variables in the estimates is the existence of agreements at a higher level than the firm. Given that the variable of interest (the predominant level of collective bargaining) and other characteristics of the firm are aggregated at a higher level than that of the endogenous variable (the logarithm of individual wages), the standard errors of the estimate have been corrected by applying the cluster option at firm level. [Card and de la Rica \(2006\)](#) also indicate that the analysis should consider the tendency of the firm to adopt one type of collective bargaining or another. For this reason, a probit model was used to estimate the probability that a specific firm is covered by collective bargaining at firm level, as opposed to a higher level agreement. This model was estimated for each of the years available, introducing the characteristics of the firm and its workers as explanatory variables. This provided a propensity score, which was subsequently introduced as an additional regressor in the Mincer equations for each of the four waves. For the two waves corresponding to 2010 and 2014, the same procedure was carried out for the probability of not having an agreement as opposed to the probability of having a sectoral agreement.⁴ Therefore, in these two equations, an additional regressor was introduced that includes the propensity score obtained through this additional analysis. The inclusion of the propensity scores in the Mincer equations controls the potential impact on the estimates of the possible situation where the predominant type of collective bargaining in a firm is correlated with specific unobservable factors that may simultaneously affect wages.

The results obtained in relation to the control variables coincide with those in the literature. With respect to the level of collective bargaining, the evidence shown in [Table 2](#) indicates the existence of a wage premium associated with firm agreements. In 2002, this premium was 6.5 logarithmic points. It increased slightly in 2006 to 7.5 logarithmic points and then dropped to 6.4 logarithmic points in 2010 and 5.4 logarithmic points in 2014. As the findings reveal, the premium remained relatively stable over time, although a cyclical profile cannot be ruled out. In fact, the estimated coefficient increased during the years of economic growth, then fell during the first phase of the crisis and during the second recession after the labour reform of 2012. This result is most probably explained by the wage dynamics of firms with their own agreement. Two elements confirm this hypothesis. First, based on Wage Dynamics Network studies, [Bertola et al. \(2012\)](#) conclude that wage adjustment to changes in the economic situation is more frequent in firms that have their own collective agreement. Similarly, [Bentolila, Izquierdo, and Jimeno \(2010\)](#) noted that newly signed agreements are more sensitive to the cycle. Therefore, the agreements in large firms have adapted more quickly to the crisis. Second, data from the Annual Labour Cost Survey show that the wage dynamics of firms with more than 200 workers – those more likely to sign their own agreement – have been more moderate than the average since 2008. These data and the aforementioned studies coincide with the idea that the probable reduction in wage differential between firm and sector agreements is essentially due to greater wage flexibility during the crisis in firms with their own agreements.

⁴ The results of these estimates are available from the authors on request.

Table 3

Wage gap by collective bargaining level in Spain throughout the wage distribution. Conditioned quantile regression.

	Firm collective agreement				No agreement	
	2002	2006	2010	2014	2010	2014
Percentile 10	0.040***	0.051***	0.051***	0.033***	−0.145***	−0.133***
Percentile 25	0.065***	0.066***	0.068***	0.056***	−0.114***	−0.077***
Median	0.078***	0.078***	0.084***	0.075***	−0.069***	−0.025***
Percentile 75	0.073***	0.073***	0.088***	0.090***	−0.026***	0.020***
Percentile 90	0.068***	0.065***	0.093***	0.094***	−0.011***	0.044***

Notes: Results obtained from the estimation of conditioned quantile regressions incorporating the controls detailed in Table 3. ***, ** and * indicate that the coefficients are statistically significant at 1%, 5% and 10%, respectively.

The probable decrease in wage premium between 2010 and 2014 could have partly been driven, as indicated earlier, by growing decentralization of bargaining, facilitated by the labour reform of 2012. This result would confirm the evidence that firm agreements are better adapted to the firm's economic conditions.

The results for no collective agreement, a level which gained importance in the later years that were considered, show a negative effect on wages. In 2010, this amounted to 11.2 logarithmic points, while in 2014 it was only 4.3 points. Thus, it seems that this regime, driven by regulatory changes associated with labour reform, is related to comparatively lower wages once the rest of the factors are controlled. Consequently, it is linked to higher wage flexibility. The reduction in the average penalty between 2010 and 2014 may be due to the fact that firms that were not subject to an agreement could implement the bulk of the wage adjustment at the beginning of the crisis, as they were more flexible. There are no data available for this period to confirm this hypothesis. On the contrary, firms subject to a sector agreement with an average duration of over two years needed more time to moderate their wages. This may have been facilitated after 2012 by some of the measures approved in the reform, such as opt-out clauses or greater facility to withdraw non-negotiated wage supplements. However, it cannot be ruled out that the reduction in the wage penalty for non-covered workers may also be due to a composition effect, owing to the entry of many small tertiary firms into this category.

The above evidence corresponds to an analysis of averages based on an estimate using ordinary least squares. The results obtained using quantile regressions are presented below. The use of quantile regressions allows to analyse if the effect of the different levels of collective bargaining is not linear and varies across the whole of the wage distribution, affecting, therefore, to the wage inequality. Two methods were used to obtain this result: a standard quantile regression (Koenker & Bassett, 1978) and an unconditioned quantile regression, which was introduced more recently by Firpo, Fortin, and Lemieux (2009). While the former quantifies the effects of the explanatory variables on the conditioned distribution of the dependent variable (and, consequently, on the within-groups wage dispersion for groups of workers with the same observed characteristics), the second quantifies the effects on the unconditioned distribution (including an additional effect of between-groups wage differences), which is of more interest.

Tables 3 and 4 display the main results of estimating conditioned and unconditioned regressions of the Mincer equation, which relates the logarithm of individual salaries with the aforementioned variables for each of the years considered, in a similar way to the results in Table 2. Only the results obtained for the variables associated with the predominant level of collective bargaining

Table 4
Wage gap by collective bargaining level in Spain throughout the wage distribution. Unconditioned quantile regression.

	Firm collective agreement				No agreement	
	2002	2006	2010	2014	2010	2014
Percentile 10	−0.025***	0.058***	0.003	0.004	−0.223***	−0.202***
Percentile 25	0.064***	0.103***	0.082***	0.070***	−0.180***	−0.128***
Median	0.147***	0.144***	0.117***	0.083***	−0.067***	−0.041***
Percentile 75	0.073***	0.074***	0.090***	0.080***	−0.069***	0.021**
Percentile 90	0.045***	−0.005	0.030***	0.063***	−0.117***	0.108***

Notes: Results obtained from estimating the conditioned quantile regressions incorporating the controls detailed in Table 3. ***, ** and * indicate that the coefficients are statistically significant at 1%, 5% and 10%, respectively.

are presented.⁵ As shown in Table 3 (conditioned regression), the wage premium associated with having a firm agreement had an inverted U shape in 2002 and 2006. After 2010, coinciding with the crisis, the premium was higher for individuals on the right part of the wage distribution, and therefore showed a growing trend. In line with the findings of Canal and Rodríguez (2016), the results for more recent years show that wage dispersion – and wage inequality – rises in firms that have their own agreement. It can also be verified that the differences between the wage premiums observed throughout the distribution became more pronounced during the crisis. The results for workers not covered by an agreement were very different in the two years 2010 and 2014. In 2010, not having an agreement systematically represented a wage penalty compared with being covered by a multi-firm agreement, but this penalty was higher on the left side of the wage distribution, increasing the wage inequality. However, in 2014, there were considerable differences across the distribution. A positive wage premium could be observed for workers on the right hand side of the distribution, causing great wage inequality. The different results for 2010 and 2014 are probably due to major changes in the composition of the firm and workers over time. The 2014 data are more representative.

The results in Table 4 (unconditioned regression) are similar but have two differential characteristics that are worth highlighting. First, the positive premium of the firm-level agreement maintains its inverted U shape over time. Its effect is clear: at all times it widens the wage inequality in the lower part of the distribution, while it reduces it in the upper part and is not affected by the economic crisis or the labour reform of 2012. In contrast, the unconditioned distribution has a much more pronounced concavity than the conditioned distribution. This may indicate that the between-groups effect dominates the central part of the distribution, while the opposite is the case at the two tails, as there the estimated premium is higher in the conditioned regression.

The final part of the empirical analysis involves the Oaxaca-Blinder decomposition (Blinder, 1973; Oaxaca, 1973) of wage differentials between bargaining regimes with respect to the explained components due to differences in the endowment of the characteristics observed (component of characteristics or explained part) and, alternatively, due to the difference in wage returns of these characteristics (component of returns or unexplained part). This decomposition was developed for the average wage differentials (using the traditional Oaxaca-Blinder decomposition) and

⁵ The detailed results are available from the authors on request.

for the wage differentials observed at different points of the wage distribution (using the equivalent method proposed by [Firpo et al., 2011](#), based on the unconditioned quantile regression). Following the recommendations of [Firpo et al. \(2011\)](#), the empirical strategy has evolved from initially carrying out a robustness test. The results of the standard econometric decomposition were compared with an alternative decomposition that – when the former is combined with the reweighting method of [DiNardo, Fortin, and Lemieux \(1996\)](#) based on the use of counterfactual distributions – enables the presence of two additional error terms to be considered that may arise from the non-linearity of the model. The results of the two methods are comparable in practice, given that the effect of the errors is generally relatively small (Tables S.5 and S.6 of the supplementary material), where the composition effect corresponds to the characteristics component and the bargaining level effect to the returns component. Therefore, the rest of the analysis focuses on the results of the standard decomposition without reweighting (Tables 5–7 and Figs. S1 and S2 in the Supplementary material; in these latter figures the characteristics component is divided between the effects of the characteristics of the individuals, their job positions and their firms).

As it can be seen in Fig. S1, the wage differential is positive in favour of firm-level agreements with respect to sectoral agreements and can be observed across the entire wage distribution (although it is not constant as it has an inverted U shape, and is higher for the wages in the central quantiles, normally from the third decile). Furthermore, when the evolution over time is compared, the slope of the curve decreases, particularly in 2014 when it is substantially flatter in the middle and upper part. Table 5 and Fig. S1 show that firm agreements only increase wage inequality moderately.

As previously mentioned, the decomposition of these differences reveals that the endowment of characteristics has a greater relative explanatory capacity across the wage distribution in all years. Specifically, they represent around three quarters of the average difference observed, decreasing somewhat over time from 79% in 2002 to 73% in 2014. The characteristics with the highest explanatory capacity are those relating to job position and firm. In contrast, the individual characteristics have a low prominence, revealing that the labour force characteristics are fairly similar between bargaining regimes systematically throughout the entire distribution. Nevertheless, these individual characteristics gain a degree of importance as the wage distribution advances, as men with a high level of education and extensive professional experience have a greater presence at the right end. The job position characteristics have a growing trend as there is a greater presence of permanent jobs and good occupations towards the right of the distribution. Meanwhile, the characteristics of the firm have greater quantitative importance and an upward trend until a fairly advanced point of the distribution, but drop at the right end to produce a slightly concave shape. The most relevant characteristics for explaining this trend are the market in which the firm operates, the composition of the workforce within it and the *propensity score* (which highlights the importance of controlling the possible correlation between the predominant type of collective bargaining in the firm and the unobservable factors that may simultaneously affect wages). Finally, the wage premium (corresponding to the unexplained component of the decomposition) shows a clear inverted U shape, with a fairly large size in the central quantiles of the distribution and very low or zero values (even negative in some parts) at the ends. The inverted U shape of the wage premium, which is slightly off-centred towards the right, enables us to conclude that firm-level agreements favour the workers in the central part of the wage distribution more greatly and favour to a much greater extent the workers with higher wages, while in general they have no effect (except in 2006) on the workers with the lowest wages of the firm. A possible explanation for these results would be that recently hired workers are concentrated in this first decile, as the

Table 5

Decomposition of wage differentials between workers covered by firm and sectoral agreements. Estimates with unconditioned quantile regression. Methodology of Fortin-Lemieux-Firpo without reweighting. 2002–2006.

	2002				2006			
	Average	q = 0.10	q = 0.50	q = 0.90	Average	q = 0.10	q = 0.50	q = 0.90
Difference	0.315***	0.144***	0.434***	0.275***	0.309***	0.188***	0.398***	0.279***
Total explained component	0.249***	0.169***	0.286***	0.229***	0.234***	0.130***	0.255***	0.284***
Total unexplained component	0.065***	−0.026***	0.147***	0.046***	0.075***	0.058***	0.144***	−0.005***
<i>Explained component</i>								
Gender	0.006***	0.004***	0.006***	0.009***	0.003***	0.001***	0.002***	0.005***
Nationality	−0.000*	0.000	0.001**	−0.002***	0.000	0.002**	0.002***	−0.005***
Age	0.017***	0.005***	0.014***	0.033***	0.011***	0.003***	0.009***	0.021***
Education	0.007***	0.002***	0.005***	0.014***	0.008***	0.003***	0.005***	0.016***
Tenure	0.049***	0.025***	0.058***	0.054***	0.046***	0.022***	0.049***	0.067***
Contract	0.007***	0.009***	0.011***	0.002	0.007***	0.007***	0.008***	0.002*
Occupation	0.032***	0.011***	0.030***	0.055***	0.030***	0.007***	0.026***	0.056***
Region	−0.000	−0.002***	0.003***	−0.003***	−0.002**	−0.001**	0.000	−0.006***
Sector	−0.020***	−0.030***	−0.013***	−0.019***	−0.029***	−0.042***	−0.021***	−0.037***
Size of firm	0.030***	−0.001	0.031***	0.064***	0.010***	0.013***	0.009**	0.006
Market of firm	0.025***	0.019***	0.026***	0.026***	0.021***	0.011***	0.018***	0.027***
Pscore	0.064***	0.081***	0.071***	−0.012	0.121***	0.084***	0.131***	0.140***
Composition of firm workforce	0.032***	0.044***	0.045***	0.008	0.008***	0.019***	0.015***	−0.008
Number of observations	164,494	164,494	164,494	164,494	179,386	179,386	179,386	179,386

* p < 0.1.

** p < 0.05.

*** p < 0.01.

Table 6

Decomposition of wage differentials between workers covered by firm and sectoral agreements. Estimates with unconditioned quantile regression. Methodology of Fortin-Lemieux-Firpo without reweighting 2010–2014.

	2010				2014			
	Average	q = 0.10	q = 0.50	q = 0.90	Average	q = 0.10	q = 0.50	q = 0.90
Difference	0.261***	0.115***	0.345***	0.262***	0.210***	0.101***	0.269***	0.213***
Total explained component	0.197***	0.112***	0.227***	0.232***	0.153***	0.097***	0.186***	0.149***
Total unexplained component	0.065***	0.003	0.117***	0.030***	0.057***	0.005	0.083***	0.064***
<i>Explained component</i>								
Gender	0.004***	0.002***	0.004***	0.005***	0.006***	0.003***	0.005***	0.008***
Nationality	−0.000	0.000	0.001	−0.003***	−0.001*	0.001	0.000	−0.003***
Age	0.008***	0.004***	0.007***	0.013***	0.006***	0.003***	0.006***	0.011***
Education	0.007***	0.003***	0.008***	0.008***	0.005***	0.003***	0.006***	0.010***
Tenure	0.038***	0.017***	0.040***	0.057***	0.032***	0.018***	0.034***	0.045***
Contract	0.003***	0.003***	0.005***	−0.000	0.003***	0.003***	0.004***	−0.000
Occupation	0.015***	0.004***	0.014***	0.031***	0.003*	0.003***	0.007***	0.003
Region	0.004***	0.003***	0.007***	0.002	−0.001	−0.001	0.000	−0.004***
Sector	−0.012***	−0.020***	−0.008***	−0.020***	−0.004***	−0.010***	0.003	−0.017***
Size of firm	0.007**	−0.015***	−0.001	0.055***	0.001	0.004	−0.001	−0.006
Market of firm	0.017***	0.014***	0.015***	0.014***	0.017***	0.012***	0.015***	0.018***
Pscore	0.094***	0.080***	0.117***	0.074***	0.076***	0.040***	0.093***	0.103***
Composition of firm workforce	0.012***	0.015***	0.020***	−0.003	0.007***	0.018***	0.014***	−0.019***
Number of observations	140,820	140,820	140,820	140,820	139,894	134,539	134,539	134,539

* p < 0.1.

** p < 0.05.

*** p < 0.01.

Table 7

Decomposition of wage differentials between workers with no agreements and covered by sectoral agreements. Estimates with unconditioned quantile regression. Methodology of Fortin-Lemieux-Firpo without reweighting.

	2010				2014			
	Average	q = 0.10	q = 0.50	q = 0.90	Average	q = 0.10	q = 0.50	q = 0.90
Difference	−0.141***	−0.274***	−0.090***	−0.114***	−0.028*	−0.229***	−0.014	0.141***
Total explained component	−0.024**	−0.050***	−0.020***	0.006	0.019**	−0.026***	0.030***	0.037***
Total unexplained component	−0.117***	−0.224***	−0.069***	−0.120***	−0.047***	−0.202***	−0.043***	0.104***
<i>Explained component</i>								
Gender	−0.010***	−0.005***	−0.009***	−0.015***	−0.007***	−0.004***	−0.007***	−0.013***
Nationality	0.000	−0.000	−0.000	0.000	−0.000	0.000	0.000	−0.000
Age	−0.003**	−0.001**	−0.002***	−0.006***	0.000	−0.000	−0.001	0.002
Education	0.010***	0.004***	0.011***	0.013***	0.009***	0.002*	0.009***	0.018***
Tenure	−0.019***	−0.010***	−0.020***	−0.030***	−0.000	−0.001	−0.000	0.000
Contract	−0.004***	−0.004***	−0.006***	0.000	−0.004***	−0.004***	−0.005***	−0.000
Occupation	0.041***	0.012***	0.035***	0.078***	0.034***	0.014***	0.037***	0.049***
Region	−0.010***	−0.006***	−0.012***	−0.007***	−0.004***	−0.001	−0.007***	−0.004**
Sector	−0.031***	−0.024***	−0.038***	−0.018***	−0.021***	−0.012***	−0.024***	−0.030***
Size of firm	−0.002***	−0.001	−0.004***	−0.002**	0.001	0.001*	0.002***	−0.003***
Market of firm	−0.002**	−0.002***	−0.003***	−0.001**	−0.002*	−0.001**	−0.002***	−0.002**
Pscore	−0.012***	−0.014***	0.012***	−0.045***	−0.002	−0.038***	0.014***	−0.000
Composition of firm workforce	0.018***	0.001	0.016***	0.039***	0.015***	0.018***	0.012***	0.019***
Number of observations	108,662	108,662	108,662	108,662	105,619	105,619	105,619	105,619

* p < 0.1.

** p < 0.05.

*** p < 0.01.

same agreement can establish lower wages for them than for the rest of the workers, provided that there is an objective, reasonable justification.⁶ From this evidence, it is possible to conclude that wage inequality has changed slightly, increasing only in the lower part of the wage distribution and perhaps decreasing in the upper part.

Fig. S2 shows the decomposition of the wage differentials between workers covered by a sector agreement and those who were not covered in 2010 and 2014. Contrary to the results of Fig. S1, the evidence shown in Fig. S2 reveals how the factor with the greatest explanatory capacity of the wage differential is the negative wage premium, by far. The endowment of characteristics of uncovered workers seems only slightly worse than that of workers covered by sectoral agreements. For example, the differences in individual characteristics are practically imperceptible across the entire distribution (only a greater presence of young women). The differences in job position characteristics are also growing in this case, as a result of the different incidence of temporary hiring over the entire wage distribution. The characteristics of the firms penalized uncovered workers in terms of their wages, particularly in 2010 as there was a greater presence of low salary sectors and of firms operating predominantly in the local market. The incidence of these characteristics is relatively constant over the distribution. However, the component with the highest explanatory capacity of the wage differentials observed is, in this case, the negative wage premium of workers without coverage with respect to the sectoral agreement. In 2010, the entire distribution was affected, although unequally, as it had a clearly inverted U shape and the highest penalties were observed at the two ends of the distribution. In contrast, in 2014, a growing trend was noted along the distribution from negative but decreasing values in the first half, to positive and strongly increasing values at the right end. Therefore, the results of the most recent period seem to indicate that market forces significantly widen wage differentials and wage inequality between workers, while sectoral agreements reduce them.

In short, when the wage premiums that emerged under the different wage bargaining levels were compared, it was observed that free functioning of the market implies low wages for most of the workers and high wage inequality. Sectoral agreements reduce wage differentials due to the positive premium generated because they increase the wages of workers in the lower part of the wage distribution, and significantly reduce wage inequality. Firm-level agreements seem to rectify this correction. As they give rise to a higher positive premium for workers in the central part and some of the workers on the right of the distribution, they reestablish part of the previously existing wage differentials and slightly increase wage inequality. Therefore, wages established in sectoral agreements respond to the bargaining power of union organizations and favour the majority of their members and voters (predominantly relatively low wage earners). On the contrary, firm-level agreements enable the more productive firms to pay efficiency wages to the more productive workers, those who they have an interest in retaining and motivating, given that they accumulate more training and experience and their wages are situated in the middle and upper-middle part of the distribution. However, it is surprising that the workers at the higher end of the distribution receive a relatively lower premium, which probably does not reduce their wages with respect to the previous situation.

⁶ According to ruling 17/2016 of Spain's National High Court, these double pay scales emerged in the 1990s and have been used more at times of economic crisis.

5. Policy implications

As a result of the literature review carried in the first section of the article and the empirical results, a clean-cut conclusion can be drawn about the preferable collective bargaining model for Spain and other southern countries of EMU. In addition, a series of economic policy recommendations can be made to improve the design of collective bargaining.

One clear conclusion of this research is that reduced collective bargaining coverage leads to high wage inequality, with the risk of generating a relevant problem of working poor among the less favoured population groups. This situation could generate a significant increase in income inequality.⁷ In this sense, although sectoral agreements could help to reduce inequality, they can cause other types of problems. These include few job opportunities for young and low-skilled workers because wages are raised excessively in the lower part of the distribution, and closing wage differences, as highlighted by [OECD \(2004\)](#). Firm-level agreements broaden wage inequality, since the wage premium is concentrated in the centre and right of the wage distribution, but without reducing wages in the lower part for non-coverage reasons. Thus, a sectoral negotiation with a wide margin to adapt wages to productivity (organized decentralized systems following the OECD taxonomy for 2018 and 2019), and generate better labour outcomes in terms of employment and unemployment, would also imply a higher wage dispersion that would avoid difficulties in accessing employment without causing significant increases in income inequality. This is, therefore, the recommended option for countries with sectoral bargaining models but without sufficiently developed opt-out options, and for those with decentralized bargaining systems with low coverage (such as some countries in Eastern Europe).

Small businesses predominate in Spain and other southern European countries. Therefore, favouring decentralized bargaining levels has little practical effect, as the Spanish case showed after the 2012 reform. In fact, this policy may abruptly lower bargaining coverage, as happened in Greece. It is therefore necessary to design more effective strategies.

A first option is to limit automatic extensions, since the evidence shows that they halt the creation of new, less productive companies ([OECD, 2012b](#)) and reduce the level of employment. This option can be achieved by excluding from the automatic extension new or recently created firms ([Addison, 2016](#)). The duration of the extension could also be adjusted to that of the agreement ([Villanueva, 2015](#)), and cease to be active once the agreement has expired (avoiding what is known as the “after effect”). [OECD \(2018\)](#) has strongly recommended conditioning extensions to the existence of minimum thresholds of representativeness of social agents, to guarantee that the agreement that is reached really reflects the needs of the entire sector. This idea is relevant to the Spanish case, since the thresholds set at the end of the Franco dictatorship reflected the weakness of unions and employers’ representatives at that time. According to the European Company Survey by Eurofound, the representativeness in collective bargaining of Spanish employers’ associations is still not very high (40.6% of total firms) ([Martínez-Matute & Martins, 2020](#)). Therefore, establishing representativeness requirements seems an appropriate option. Finally, given that extensions have been shown to cause wage rigidity and this is very harmful in recessive stages, the extension could be conditioned to the level or to the evolution of unemployment in the sector.

⁷ The increases in the minimum wage in Spain in recent years have been very high (from 645 euros/month in 2014 to 965 in 2021, an increase of 49.6%) and this policy measure has probably reduced the wage inequality in the lower part of the distribution where most workers who are not covered by collective bargaining are situated. However, even taking into account the potential compensating effect of minimum wage increases, it does not seem advisable to reduce bargaining coverage in a generalized way.

A second option, which could complement the previous one, consists of providing opening clauses. These are particularly necessary in cases in which the sectoral agreements do not establish sufficiently wide wage intervals, as is the case in southern European countries. The German model provides a good example in this regard. Germany has temporary hardship clauses, which in the Spanish case could respond to clear objective criteria to speed up their approval (for example, a considerable decrease in a firm's turnover) and permanent opt-out clauses, for example, to promote a firm's competitiveness (Addison, 2016; Ibsen & Keune, 2018).

A final aspect of interest consists of identifying the right moment to introduce these reforms. Caldera, de Serres, and Yashiro (2016) concluded that making collective bargaining more flexible during a recessive business cycle phase has an uncertain effect, since the induced wage moderation will not quickly translate into employment if domestic demand is weak, and the pro-competitive effect will be limited by the stagnation of external demand. In contrast, Thommen (2021) concludes that the reform of collective bargaining must be carried out in an expansive phase of the business cycle, because that is when it has positive effects, except for favouring opening clauses that can be expanded at any time with positive effects. Redesigning the collective bargaining model would therefore be a reform to be carried out preferably once the economy has recovered from the crisis caused by the COVID pandemic.

6. Concluding remarks

Choosing the right collective bargaining model is clearly relevant in terms of labour market outcomes and inequality. In fact, the reform of collective bargaining models should try to achieve the best combination of efficiency and equity. This research focused on the relationship between collective bargaining levels and wage inequality. From this perspective, the Spanish economy provides an interesting case study considering the characteristics of the collective bargaining model after labour market reforms.

Using microdata from an employer–employee matched dataset representative of Spanish firms, we found a significant wage premium associated with firm-level agreements compared to multi-firm ones. This premium does not seem to have been affected by the labour reform of 2012. An analysis of the impact on wages of an absence of a collective agreement, a situation which has become more prevalent due to the labour reform, showed that this area of negotiation is generally associated with comparatively low wages because of a wage penalty.

When the analysis is extended across the entire wage distribution, the results confirm that the wage premium in favour of firm agreements has an inverted U shape (favouring workers in the middle and upper-middle part of the wage distribution). To a limited extent, this increases the wage inequality in comparison with multi-firm agreements. In turn, when the wage differentials are decomposed between firms without an agreement compared to those covered by sectoral agreements, a wage penalty can be observed on the left side of the distribution. However, it decreases throughout the distribution and becomes a positive wage premium at the right tail of the distribution. Therefore, the overall evidence confirms that, in the absence of an agreement, wage inequality increases significantly between workers. Sectoral agreements reduce wage inequality and firm agreements slightly increase it.

Consequently, it can be concluded that the collective bargaining model that best combines efficiency and equity is an organized decentralized system with sectoral bargaining but with conditional extensions and wide opening clauses. In any case, Pineda, Rycx, and Voiral (2021) found no relationship between collective bargaining models and poverty rates since the size of the welfare state also matters in this context. Therefore, wage inequality caused by the limited

decentralization proposed for Spain and other southern countries of the EMU (limiting extensions and facilitating opening clauses) apparently would not cause a great problem in terms of wage and income inequality.

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