

**THE IMPACT OF CENTRALIZATION IN COLLECTIVE
BARGAINING ON WAGE LEVELS AND ON WAGE INEQUALITY:
SPAIN 1995-2002**

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Abstract

This paper provides microeconomic evidence on the impact of centralization in collective bargaining in Spain on wage levels and on wage inequality. The time period covered by the study is 1995-2002. We make use of two waves of a detailed linked employer-employee data set. Descriptive evidence suggests that there is a clear trend towards centralization in the collective bargaining process in Spain over this seven-year period. Results indicate that centralization of wage contracts together with the decrease in the firm-level contract premium has led to a decrease in the growth of average wages. This is consistent with previous studies which conclude that a centralized wage setting tends to restrain wages. For our particular sample, if the level of firm-level contracts and the firm-level contract wage premium had remained at 1995 levels, average wages would have increased by 27% more for men and 18% more for women. As regards impact on wage inequality, we find that in terms of the decrease of firm-level contracts in favour of other contracts centralization has led to a decrease in wage variance of around 3 percent.

Keywords: Centralization in collective bargaining, Firm-level contracts, Matched employer-employee data, wage inequality.

1. Introduction

Several recent papers have analyzed the effects of unions on the wage structure by comparing wages in unionized and non-unionized labor markets. Most of the empirical evidence refers to Anglo-Saxon countries¹ because there the non-unionized sector represents a suitable counterfactual. However, most European countries are not characterized by "closed shop" labor markets and collective bargaining agreements cover instead both unionized and non-unionized workers. Furthermore in some European countries, such as Spain, Italy and the Netherlands, collective bargaining takes place simultaneously at firm level and at sectoral level (on regional and national scales). Firm-specific contracts usually override the prevailing sectoral agreements and provide an opportunity for workers to improve the labor market conditions attained at more centralized levels. Thus, the relevant question for these European countries is not how unionized and non-unionized labor markets compare, but rather how more and less centralized collective bargaining systems compare.

In this setting, there are many macroeconomic studies that analyze the effect of wage contracting centralization on the economic performance of a country, though no clear conclusion has been reached. For instance, Bruno and Sachs (1985) and Jimeno (1992) support the hypothesis of a linear relationship between centralization and macro results while Calmfors and Driffil (1988) defend the inverted-U shape with centralized and decentralized economies both performing better than their intermediate competitors. However, there is much less microeconomic evidence on how centralization and decentralization in wage contracting affect the structure of wages, due in part to the lack of suitable data. Some examples are Dell'Aringa and Lucifora (1994), who find a positive effect of this type of contracting on wages for a sample of manufacturing plants in Italy. Card and de la Rica (2006) find that firm-level contracting, as opposed to industry-wide contracting, is associated in Spain with a 5-10% wage premium. On the other hand, Hartog, Leuven and Teulings (2002) find no effect of the level of wage contracting on wage levels for the Netherlands.

Taking a microeconomic perspective, this paper addresses the extent to which the centralization process observed in Spanish industrial relations in the last decade has had a significant impact on (i) real wage levels, and (ii) overall wage inequality. We make use of two waves of a detailed linked employer-employee data set. Our methodology consists of

¹ See for instance Lewis (1986), who concludes that the average union effect on wages is positive in the US. See Card, Lemieux and Riddell (2002) for a study of the effect of unions on the wage structure of Canada, the UK and the US. Hirsch (2003) also finds higher premiums after correcting for estimation biases.

decomposition techniques to assess the relative contribution of changes in firm-level contracting on the observed changes in wage levels and in wage inequality.

Descriptive evidence shows that there is a clear trend towards "centralization" in the collective bargaining process in Spain over this seven-year period. Empirical results show that the firm-level contract wage premium undergoes a substantial decrease, particularly for women, and that the observed centralization in the collective bargaining process contributes to a compression of the overall wage distribution..

The rest of the paper is organized as follows. Section 2 provides a description of the major institutional aspects of the Spanish labor market in recent years. Section 3 briefly describes the data used in the empirical analysis, gives some descriptives and presents a semiparametric procedure to analyze the impact of firm-level contracting on the whole distribution of wages. Section 4 describes the model of earnings used to carry out the analysis and presents the empirical findings from the estimation of the different regression models. Section 5 analyzes how centralization in collective agreements affects wage dispersion. Section 6 concludes.

2. Institutional Framework

During the Franco dictatorship the Spanish labor market was centralized and highly regulated. Collective bargaining was already established through the labor laws of the time (Ordenanzas Laborales). Legal trade unions and employers' organizations negotiated contracts but the state intervened directly to determine the outcomes of the negotiation (Milner and Metcalf 1994). The post-Franco Spanish collective bargaining system is based on principles resulting from the 1980 Workers' Statute (Estatuto de los Trabajadores), which was the result of a consensus between unions and employers' organizations².

A system for the election of workers' representatives was established in order to form workers' councils and negotiate issues such as productivity, wages and working hours. In this context, the terms of the agreements reached were and still are legally binding on all workers within the scope of the agreement. It is thus understandable that the coverage of collective agreements is very high in Spain, whereas union density is relatively low. If we compare the two periods under study, in 1995 union density was 19% but 81% of the work-force was covered by collective agreements. Both rates have decreased over time: by 2002 union density was 14.9% and collective bargaining covered 72% of the workforce.

From a macroeconomic perspective, the global recession that began in the early nineties hit Spain around 1993. Unemployment rocketed to 22.6% of the working-age population.

² See Bentolila and Jimeno (2002) for a description of the development of legislation on collective bargaining in Spain since the eighties and Valdés dal Ré (2006) for a review of 25 years of the Workers' Statute.

Inflation was around 4.6 %, similar to the OECD average. At that time, it became necessary to encourage job creation and promote collective bargaining. Unions were encouraged to act as regulators of labour relations. The reform of 1994 repealed the old labor laws and encouraged the use of contractual instruments such as firm-level contracts in order to decentralize bargaining (Toharia and Malo 1997). In 1997 social actors - employers and union representatives- signed the "Acuerdo Interconfederal de la Negociación Colectiva" ["Inter-Confederation Agreement on Collective Bargaining"] focused on increasing coordination in the collective bargaining mechanism and the "Acuerdo Interconfederal de Cobertura de Vacíos" ["Inter-Confederation Agreement on the Covering of Gaps"] whose main objective was to cover certain labour relation issues that were initially left unsolved when the old labor laws were replaced by collective agreements. In particular, they were directed at extending the preexisting agreements in the sectors affected.

From 1996 onwards the economy started to recover, and by 2000 GDP growth was 5 % . Employment started to increase and the inflation rate stabilized. Thereafter, a decreasing trend set in for the annual growth rate until 2002, when growth (2.7%) was basically the same as in 1995. Therefore, it is interesting to highlight that 1995 and 2002 are characterized by the same GDP growth rate but not by the same expectations; in 2002 the trend and the future prospects were clearly better than 7 years earlier. This different macroeconomic picture can affect the final labour market conditions agreed in collective agreements.

Another feature of the general dynamics of the Spanish Labour market that must be noted is the significant increase in Female Labour Force Participation (FLFP) from the mid eighties onwards. The FLFP rate for women from 25 to 54 years old increased from 35% in 1985 to 63% by 2002 (for comparison, the male participation rate in the same age range remained roughly constant at around 90%). The labour market could not absorb this enormous increase in participation immediately and many women, particularly the youngest ones, experienced very high unemployment rates until the late nineties. Figure 1 describes the dynamics of unemployment rates by gender and age during the period under study. As can be seen from this figure, the unemployment rate among women aged between 25 and 54 decreased from 29% in 1995 to 15% in 2002. This led to a major increase in female employment rates, which in turn implied changes in the overall composition of the labour force, as discussed below.

[Insert Figure 1]

For our analysis, in addition to the macroeconomic situation in Spain we also need to know the dynamics of wage contracts from 1995 to 2002. Has the labor market in Spain tended towards a decentralized wage setting or a centralized one? Table 1 presents the changes in the total number of workers affected in total agreements and in firm-level

collective agreements by industry in the seven period under study. The number of workers affected in total agreements increases in all three activities (industry, construction and services); however, the percentage of workers affected by firm-level agreements decreases by an average of almost three percentage points.

[Insert Table 1]

The coverage of firm-level collective agreements is highest in industry, second highest in services, and almost negligible in the construction sector. However, the percentage of workers covered by firm-level agreements in industry falls by 3 percentage points in industry and more than 4 percentage points in services, which reveals a clear trend towards a more centralized wage setting scheme over the seven year period. This can be explained by the decrease in the average size of Spanish firms since the beginning of the seventies, which has become much more pronounced in the last decade. Actually, it has been argued in the relevant literature (Fina 2001) that the small size of Spanish firms raises some doubts about the practicality of a decentralized bargaining system.

3. Data and Descriptives

Data

The primary source of data for our analysis is the Spanish Structure of Earnings Surveys (SES) of 1995 and 2002, large-sample surveys of wages, job information and worker characteristics. The surveys are directed at establishments, which are sampled in two stages. In the first stage, establishments are selected randomly and stratified by region and size. In the second stage, a sample of workers from each of the selected establishments is also randomly selected³. These surveys are restricted to private-sector establishments with 10 or more employees. This accounts for approximately 70 percent of the working population in Spain in both 1995 and 2002 in the manufacturing, construction, trade and service industries⁴. Given that establishments of 10 or more employees are not random samples of all establishments in Spain, we must be cautious in drawing inferences from our results for the whole Spanish working population. We focus on the subsample of full-time workers to ensure that our findings are comparable to those of other studies in the relevant literature. This gives a sample of 130,170 workers and 14,347 establishments for 1995 and a sample of 129,378 workers and 14,778 establishments for 2002.

³ An average of 5 workers are interviewed in establishments with 10-20 employees, 7 workers in establishments with 21-50 employees, 12 workers in establishments with 51-100 employees, 20 workers in establishments with 100-200 employees, and 25 workers in establishments with more than 200 employees.

⁴ In 2002 there were also establishments in the fields of education, health and social work, but we exclude these from the sample for comparability reasons.

The dependent variable for this analysis is the logarithm of the gross wage expressed in euros per hour. Gross wage is defined as the sum of the gross base wage and gross wage complements. Base wages are determined from the corresponding contract by occupation and category within a firm, while wage complements are defined as the set of payments above the base wage, and include factors such as seniority as well as more discretionary supplements such as incentives for productivity, attendance and punctuality awarded to individual employees. Our measure does not include bonuses for nightshifts or extraordinary payments⁵.

Descriptive Statistics

Tables 2A and 2B present weighted descriptive statistics for men and women covered by the two different levels of contracts for each year. The first stylized fact to emerge from these two tables is the major decrease in the percentage of workers covered by firm-level contracts. For men, the drop is from 24.4% to 10.6%, and for women, it is from 17% in 1995 to 7.4% in 2002. Hence, the trend towards centralization in the collective agreements for this sample is quite remarkable⁶.

[Insert Table 2A]

[Insert Table 2B]

Other features described in tables 2A-2B can be summarized as follows: For both men and women, the sample of workers in 2002 is on average younger and more highly-educated, and the change is greater in workers covered by firm-level contracts than in the rest. This compositional change is mainly driven by the sample of women covered by firm-level contracts: in 1995 24% of women covered by firm-level contracts were under 30 years old, but by 2002 the figure was 10 percentage points higher. Some interesting features emerge as regards changes in firm characteristics per type of contract. On the one hand, workers with firm-level contract tend to work in the largest establishments. This is particularly so in 2002, where 80% of women and 75% of men with firm-level contracts belong to firms that have over 200 workers (compared to 45% and 46% in 1995). Second, there is an overall change in the industry distribution of firms included in the sample. In 1995 65% of the firms in the sample belonged to manufacturing, but by 2002 this percentage fell to 48%. This decrease is offset by an increase in firms that belong to the service sector (mainly traders, hotels and other services). This change in industry distribution is particularly pronounced in firms with firm-level contracts.

⁵ Generally, young men are more likely to have this kind of complement, so by including them in the hourly wage we are drawing a distinction between groups of workers.

⁶ This decrease is much greater than the centralization observed for the whole working population. This difference arises largely because the SES survey only covers establishments with at least 10 workers, so small firms, which are less likely to be covered by firm-level contracts, are not represented.

Some of these features offer insights into the observed centralization of the bargaining process in Spain. It seems that employment has tended to shift towards those areas in which firm-level contracts have traditionally been less widely used (from manufacturing to services, male to female employment, old to young workers). At the same time, we observe a decrease in the average size of establishments in Spain, as mentioned before, which is even more pronounced in our sample.

Descriptive evidence regarding our dependent variable - log hourly wages for different type of contracts, is depicted in Table 3. The mean and standard deviation is reported separately for men and women and for 1995 and 2002. The first two columns show the unadjusted sample moments, while columns (3) and (4) show adjusted moments obtained using the re-weighting technique of DiNardo, Fortin and Lemieux (1996), which adjusts the sample for differences in observed characteristics in such a way that the weighted distribution of skill characteristics is the same in each sector as in the overall sample⁷. In order to measure wages in real terms, 2002 wages are deflated to their 1995 value.

[Insert Table 3]

The information reported in Table 3 gives us some indication of how mean wages and dispersion vary from one contracting level to another over time. Unadjusted mean wages are observed to be systematically higher in 2002, except for women covered by firm-level contracts. Average wages for women with firm-level contracts decrease in real terms over the seven-year period. Furthermore, the raw firm-level wage premium increases from .32 to .34 for men, but decreases by around 30% for women (from .34 to .23) over the seven-year period. Looking at the adjusted moments, we find that the standardized wage premium decreases by 1 percentage point for men (from 0.11 to 0.10) but by 6 percentage points for women (from 0.12 to 0.06). This difference between the raw and standardized wage premiums of men and women has to do with the change in the composition of women belonging to firms with firm-level contracts. As mentioned above, the women in the sample of female workers with firm-level contracts in 2002 are much younger than their counterparts from 1995, their mean tenure has decreased to a great extent (compared to men's mean tenure), they work mainly in firms with over 200 workers and many of them work in trade and other services in detriment to manufacturing.

To offer a broader view of the dynamics of wage dispersion per type of contract over the seven year period, Figure 2 plots both the actual and counterfactual wage distributions for both periods⁸. The latter is the distribution that would prevail in the absence of firm-

⁷ The idea behind this semiparametric procedure is to allocate a lower weight to individuals who are overrepresented in the subsample of workers covered by non firm-level contracts and viceversa.

⁸ Previous studies for the Anglo-Saxon countries, such as Dinardo, Fortin and Lemieux (1996), have shown that the effect of unions is best captured by modelling the whole distribution of wages.

level contracts. It is obtained using a procedure developed by Dinardo, Fortin and Lemieux (1996) and consists of a reweighting of the distribution of wages of workers covered by non firm-level contracts (See Appendix for further details).

[Insert Figure 2]

From Figure 2 it can be observed that firm-level contracts tend to shift the distribution of wages rightwards for both men and women, particularly in 1995. This is consistent with the higher average wage premium associated with firm-level contracts in that year. In fact, for 2002, the actual and counterfactual distributions of wages are almost identical. To conclude, this visual inspection reveals that (i) there is a clear positive relationship between firm-level contracts and wage levels in 1995 which decreases over the seven year period, and (ii) there is no clear relationship between firm-level contracts and wage dispersion in either of the two periods under analysis.

One of the aims of the paper is to see how centralization has affected overall wage inequality. To that end Figure 3 presents the overall wage distributions for 1995 and 2002. The overall wage dispersion in 2002 seems to be a little smaller than that of 1995. The empirical section of the paper measures the extent to which centralization in collective bargaining has contributed to this slight wage compression.

[Insert Figure 3]

In the next section, we estimate wage models to obtain the estimated firm-level contract premium for the two periods and then quantify the impact of changes in firm-level contracts on the overall level of wages and on overall wage inequality. The centralization observed, together with a positive firm-level contract premium, should lead to a smaller increase in wage levels. We quantify this impact separately for men and women.

4. The impact of "centralization" on wage levels

Empirical approach

To quantify the extent to which the observed centralization in collective bargaining has affected the overall level of wages, we consider a wage equation for worker i at establishment j . These assumptions lead to a model for individual wages

$$w_{ij} = \beta X_i + \delta_j + \mu_i + \varepsilon_{ij} \quad (1)$$

where w_{ij} is the log hourly wage of individual i , X_i is a set of observed characteristics of workers (such as age, education, job tenure and contract status) associated with a vector of coefficients β , δ_j represents the wage premium earned by workers due to their belonging to establishment j , μ_i represents the unobserved characteristics of individual i , such as ability. Finally, ε_{ij} is the error term, which is assumed to follow a normal distribution. To model the effect of firm-level contracting it is assumed that the wage premium earned by workers at establishment j , that is, δ_j , depends on four factors: a dummy variable for the presence of a firm-contract at the workplace (F_j), the average characteristics of the workforce at the establishment (X_j), a vector of observed characteristics of firms (Z_j) such as the size and market orientation of products, and the unobserved component of firms (ν_j), like their profitability.

These assumptions lead to a model for individual wages of the following form:

$$w_{ij} = \beta X_i + \alpha F_j + \eta X_j + \gamma Z_j + \mu_i + \nu_j + \varepsilon_{ij} \quad (2)$$

The impact of firm-level contracting on wages is measured by α . If μ_i and ν_j were uncorrelated with F_j , conditional on the observed worker and firm characteristics, α could be consistently estimated by OLS. But, as pointed out by Lewis (1986), such estimates generally suffer from upward bias resulting from the omission of unobserved variables correlated with contract status. If this is the case, the estimation of α by OLS will include the true effect as well as the bias factors arising from unobserved heterogeneity in both worker and firm.

Therefore, the relevant question when estimating the firm-level contract effect is how to eliminate these biases. This would be easier if we had longitudinal data⁹, but alternative solutions can be found that exploit the advantages of our data, such as the availability of information on the characteristics of co-workers (meaning workers in the same firm with the same occupation). If we assume that workers with higher unobserved ability tend to have co-workers with higher average skill levels, some of the effects of unobserved ability can be eliminated by controlling for the average characteristics of co-workers.

⁹ See Blanchflower (1999) for an estimation of the fixed effects of the union premium on wages.

In order to deal with the unobserved heterogeneity of firms, we control for the full set of observed firm-level characteristics that determine the level of bargaining¹⁰. As shown by Imbens (2004), if contract status is ignorable conditional on the observed control variables, then conditioning on the probability that establishment j has a firm-level contract will eliminate any bias in the estimation of α arising from the correlation of contract status with firm characteristics. To implement this idea, a probit model for the probability of a firm-level contract is fitted, the predicted probability is estimated and then included as a polynomial function in the individual earnings equation. Using this predicted probability all the relevant information is condensed into the one dimensional propensity score.

Estimation of Wage models

Tables 4A and 4B present individual (log) wage regression models for men and women respectively for the two years. The first model includes only a dummy variable which takes the value of one if the worker is covered by a firm-level contract. Column (2) incorporates all possible covariates: observed worker and firm characteristics (such as age, education, contract status, market orientation, firm size and public ownership status of the firm) and also the average characteristics of co-workers at the same establishment in the same one-digit occupation group. Finally, the third model includes the estimated propensity score (as a third order polynomial to allow for a flexible functional form) of having a firm contract as an additional regressor to control for unobserved heterogeneity across firms¹².

[Insert Table 4A]

[Insert Table 4B]

From column (1), it can be seen that over the seven-year period the unadjusted firm-specific wage premium remains stable for men at around 32% but decreases by almost 30% for women from 34% to 24%. However the adjusted wage premium, reported in column (2) is significantly lower. In particular, for 1995 the adjusted premium is 5.4% for men and 6.7% for women. In 2002 the adjusted premium is slightly lower for men at 4.6%, but drops to zero for women. All covariates, including the co-worker characteristics

¹⁰ For 1995 the same information used by Card and De la Rica (2006) is included, but for 2002 we also add financial information at industry level.

¹² Columns (1), (2) and (3) for 1995 were reported in Card and De la Rica (2006), but we show them here for the sake of comparability. Models which include mean co-worker characteristics in narrower occupational subgroups were fitted by Card and de la Rica (2006) for the SES-95 and no significant differences were found.

and the propensity score are statistically significant. Summarizing, from 1995 to 2002 the premium decreases on average for men and drops to zero for women.

Several additional points arise from Tables 4A and 4B. Belonging to a firm with an international product orientation increases wages, particularly in 2002. The penalty for holding a fixed-term contract decreases by 5-10% over this seven-year period for both men and women. This could be one of the results of the reforms that took place in Spain during the nineties, which were intended to reduce the scale of this kind of contracting and to improve the conditions of workers with fixed-term contracts¹³. Co-worker average characteristics such as education and age have a significant, positive effect on individual wages.

Decomposition of Changes in Average Wages

To quantify the relative contribution of changes in firm-level contracting to changes in average wages and changes in wage inequality, we must decompose estimates from equation 2 for the two time periods. Taking into account that sub-index i stands for individual and j for firm characteristics, from the estimate of equation 2 for 2002 and for 1995 we can compute the following decomposition:

$$\begin{aligned} \overline{W}_{02} - \overline{W}_{95} = & (\widehat{\alpha}_{02} - \widehat{\alpha}_{95})\overline{F}_{95} + \widehat{\alpha}_{02}(\overline{F}_{02} - \overline{F}_{95}) + (\widehat{\beta}_{02} - \widehat{\beta}_{95})\overline{X}_{i95} + \widehat{\beta}_{02}(\overline{X}_{i02} - \overline{X}_{i95}) \\ & + (\widehat{\pi}_{02} - \widehat{\pi}_{95})\overline{X}_{j95} + \widehat{\pi}_{02}(\overline{X}_{j02} - \overline{X}_{j95}) + (\widehat{\gamma}_{02} - \widehat{\gamma}_{95})\overline{Z}_{95} + \widehat{\gamma}_{02}(\overline{Z}_{02} - \overline{Z}_{95}) \end{aligned}$$

Therefore, changes in average wages between the two periods can be decomposed as the sum of differences in average characteristics plus the difference in average returns. Table 5 describes the total and relative contributions of changes in firm contracting in average changes in wage levels.

Results suggests that centralization of wage contracts has helped to decrease real wage levels, particularly for men. If centralization had not taken place, overall wages would have increased on average by 8% more, (20% more for men and 1% more for women). In addition, the decrease in the firm-level contract premium has also led to a lower increase in average wages, particularly for women. Had the firm-contract wage premium stayed at its 1995 level, wages would have increased by 14% more (6.9 % more for men and 17 % more for women)¹⁴. To conclude, considering the two components together we find that if the level of firm-level contracts and the firm-level contract wage premium had remained at

¹³ See de la Rica (2004) for a detailed analysis of the wage gap between workers with indefinite and fixed-term contracts.

¹⁴ These percentages are obtained by dividing the total contribution of each component by the average wage differentials across the two periods.

their 1995 levels, average wages would have increased by 27% more for men and 18% more for women.

5. The impact of "centralization" on overall wage inequality

Empirical approach

The second issue that we want to address is whether centralization in the wage bargaining process has had any effect on wage inequality. Table 1 reveals that in this seven-year period there has been a clear trend towards centralization in the collective bargaining process, illustrated by the decline in the fraction of workers covered by firm-level contracts compared to those covered by sectoral contracts. As for wage inequality, Table 3 reveals that (i) the overall dispersion of wages has decreased slightly for both men and women, (ii) the variance in wages for both men and women with firm-level contracts has increased significantly, particularly for women, and (iii) the change in wage dispersion for both men and women with non firm-level contracts is negligible. These three facts lead us naturally to conclude that without centralization the overall wage dispersion in 2002 would have increased.

We can go a step further in trying to assess the magnitude of the impact of centralization on wage dispersion over this seven-year period. Following Dinardo and Lemieux (1997) we show the effect of firm-level contracts on wage inequality by performing a simple variance decomposition. This allows us to separate the effect of firm contracts into between-group and within-group components. The decomposition is based on two wage equations (corresponding to results from model (3) in the wage estimation section), one for the sample of workers covered by firm-level contracts and the other for the sample of workers covered by other contracts. One way of decomposing the variance of wages is the following:

$$\begin{aligned} Var(w) &= \hat{F} \times Var(X\beta | F_j = 1) + (1 - \hat{F}) \times Var(X\beta | F_j = 0) \\ &+ \hat{F} \times Var(\varepsilon | F_j = 1) + (1 - \hat{F}) \times Var(\varepsilon | F_j = 0) + \hat{F} \times (1 - \hat{F}) \times \Delta^2 \end{aligned} \quad (3)$$

where F is the fraction of firm-level contracts and Δ is the premium associated with firm-level contracting, that is, $E(w / F_j = 1) - E(w / F_j = 0)$

Results

Table 6 presents each of the components of this variance decomposition. We have computed two counterfactual variances: the first is shown in the 6th row, and presents the variance that there would have been in the 2002 sample if the fraction of firm-level

agreements had remained at the 1995 level . The second counterfactual variance is constructed under the assumption of no firm-level contracts in 2002, and is presented in row 7. From Table 6 a clear conclusion emerges: if a centralization process of wage bargaining had not taken place in Spain over this seven year period, the overall variance in wages would have been almost two percent greater. Instead, the observed overall variance has actually decreased by around one percent. Hence, centralization has led to a decrease in overall wage variance of around three percent.

[Insert Table 6]

This result is in line with the findings of Teulings and Hartog (1998) and Blau and Kahn (2002), who show that the more centralized the wage setting, the more compressed the wage distribution is. In order to compare our results with those of the Anglo-Saxon countries, we would have to accept, as Disney, Gosling and Machin (1996) point out, that an employer's decision to accept a firm-level contract is comparable to the voluntary union recognition process. They find de-unionization in the US and in the UK to be an important factor in explaining the rise in wage inequality during the eighties in the two countries. If firm-level contracts are comparable to unionization, then our results clearly contrast with their findings. However, it is not clear that the process of firm-level contracting is actually comparable to a union recognition process.

6. Conclusions

Descriptive evidence shows a clear tendency towards "centralization" in the collective bargaining process in Spain during the 1995-2002 period. This paper addresses the impact of that centralization on real wage levels and on real wage inequality.

To that end we make use of two waves of a detailed linked employer-employee data set. Our methodology consists of using decomposition techniques to assess the relative contribution of changes in firm-level contracting on the observed changes in wage levels and in wage inequality.

Our results suggests that centralization of wage contracts has contributed to a decrease in real wage levels, particularly for men. If centralization had not taken place, overall wages would have increased on average by 8% more, (20% more for men and 1% more for women). In addition, the decrease in the firm-level contract premium has also led to a lower increase in average wages, particularly for women. Had the firm-contract wage premium stayed at its 1995 level, wages would have increased by 14% more (6.9 % more for men and 17 % more for women). Considering the two components together, we find that if firm-level contracts and the firm-level contract wage premium had remained at their 1995 levels, average wages would have increased by 27% more for men and 18% more for women.

As regards the impact of centralization on wage inequality, we find that as of 2002, the wage dispersion of workers, both men and women, covered by firm-level contracts is higher than that of those covered by other contracts. Therefore, centralization in terms of a decrease in firm-level contracts in favour of other contracts must naturally lead to a decrease in the overall wage variance. We find that centralization of wage bargaining in Spain has led to a decrease in wage variance of around 3 percent. This result is in line with the findings of Teulings and Hartog (1998) and Blau and Kahn (2002), who show that the more centralized the wage setting, the more compressed the wage distribution is.

APPENDIX

Table A1

Probit Model for the Probability of having a firm level contract

<i>Variable</i>	1995	2002
<i>Average characteristics of the workforce</i>		
Age	0.162 (0.042)	0.065 (0.060)
Squared Age	-0.001 (0.0005)	0.001 (0.0007)
Education	0.065 (0.015)	0.036 (0.017)
<i>Occupational distribution by firm</i>		
Managers and Technicians	0.928 (0.215)	1.122 (0.266)
Clerical Workers	0.487 (0.222)	0.322 (0.315)
Service Workers	-0.428 (0.279)	0.833 (0.285)
Qualified Manual Workers	0.521 (0.153)	0.843 (0.237)
<i>Product Market Orientation</i>		
International market	0.151 (0.078)	0.252 (0.122)
<i>Establishment Size Distribution</i>		
21-50	0.248 (0.114)	0.515 (0.078)

Re-weighting procedure

Following the notation of the model presented in Section 4, the observed density of wages in the subsample of workers covered by other contracts is given by

$$f(w | F_j = 0) = \int f^{oc}(w | x) f(x | F_j = 0) dx \quad (4)$$

where $f^{oc}(w/x) = f(w/x, F_j = 0)$. The distribution that would prevail if all workers were paid under the wage structure of workers covered by other contracts would be,

$$f^{oc}(w) = \int f^{oc}(w | x) f(x) dx \quad (5)$$

As shown in full detail by Dinardo, Fortin and Lemieux (1996) this last equation can be written as follows,

$$f^{oc}(w) = \int \lambda(x) f^{oc}(w | x) f(x | F_j = 0) dx \quad (6)$$

A comparison of equations (4) and (6) indicates that the counterfactual density is simply the "reweighted" version of the actual density of wages in the subsample of workers covered by other contracts, where the sample weights are replaced by the weighting factor $\lambda(x)$, which is shown to be equal to $\lambda(x) = \Pr(F_j = 0) / \Pr(F_j = 0 | x)$. The numerator is just the proportion of workers covered by non firm-level contracts in the sample and the denominator is the probability of belonging to this subsample of workers conditional on the covariates, which is estimated using a probit model. The covariates used to estimate the probit model consist basically of a flexible functional form of human capital variables. Once the weighting factor is constructed each worker i is weighted by $\lambda_i = \lambda(x_i)$.

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Table 1. Evolution of Collective Bargaining in Spain 1995-2002

	Total Agreements		Firm Collective Agreements			
	Affected Workers (thousands)		Affected Workers (thousands)		Affected Workers (%)	
	1995	2002	1995	2002	1995	2002
Total	7.605,1	9.696,5	1.043,7	1.025,9	13,72	10,58
Industry	2.525,0	2.751,9	451,1	409,8	17,9	14,9
Construction	821,7	1.117,1	8,224	6,84	1,0	0,6
Services	3.528,7	5.044,0	582,5	605,95	16,5	12,01

Source: Boletín de Estadísticas Laborales

Table 2A. Women' Characteristics by Type of Contract 1995-2002

<i>Independent variable</i>	<i>All contracts</i>		<i>Firm-Specific</i>		<i>Other Contract</i>	
	1995	2002	1995	2002	1995	2002
<i>Age Distribution</i>						
Under 30	0.36	0.35	0.24	0.34	0.39	0.35
30-44	0.47	0.45	0.54	0.44	0.45	0.45
45-55	0.13	0.16	0.18	0.19	0.12	0.16
Over 55	0.03	0.04	0.03	0.03	0.03	0.04
<i>Education Distribution</i>						
Primary	0.26	0.26	0.26	0.13	0.26	0.27
Secondary	0.64	0.58	0.60	0.64	0.65	0.58
University	0.10	0.15	0.15	0.23	0.09	0.15
Fraction Temporary Contracts	0.31	0.26	0.17	0.16	0.33	0.27
Mean Tenure (years)	8.69	5.59	13.01	8.86	7.81	5.33
<i>Establishment Size Distribution</i>						
11-20	0.18	0.39	0.06	0.07	0.21	0.41
21-50	0.23	0.14	0.14	0.07	0.25	0.15
51-100	0.17	0.09	0.15	0.05	0.17	0.10
101-200	0.16	0.03	0.20	0.01	0.16	0.03
Over 200	0.25	0.35	0.45	0.80	0.21	0.32
<i>Industry Distribution</i>						
Manufacturing	0.59	0.38	0.75	0.42	0.55	0.38
Construction	0.02	0.02	0.01	0.01	0.02	0.02
Trade	0.15	0.18	0.07	0.24	0.16	0.17
Hotels	0.09	0.13	0.02	0.04	0.11	0.13
Transportation	0.03	0.04	0.06	0.13	0.02	0.04
Financial Services	0.07	0.06	0.06	0.07	0.07	0.06
Other Services	0.06	0.19	0.05	0.10	0.06	0.20
<i>Product Market Orientation</i>						
Local-Regional	0.86	0.88	0.83	0.86	0.87	0.88
International	0.14	0.12	0.17	0.14	0.13	0.12
<i>Occupational Distribution</i>						
Managers and Technicians	0.13	0.20	0.22	0.37	0.11	0.19
Clerical Workers	0.31	0.22	0.33	0.19	0.30	0.22
Service Workers	0.11	0.18	0.03	0.19	0.13	0.17
Qualified Manual Workers	0.29	0.19	0.31	0.16	0.29	0.19
Non-qualified Manual Workers	0.15	0.21	0.09	0.07	0.16	0.22
Number of Observations	29,637	40,056	5,033	3,001	24,604	37,055

Notes: Samples are weighted and include all full time workers with valid information on key variables in EES-95 and EES-02 for each year respectively.

Table 2B. Men' Characteristics by Type of Contract 1995-2002

<i>Independent variable</i>	<i>All</i>		<i>Firm-Specific</i>		<i>Other Contract</i>	
	1995	2002	1995	2002	1995	2002
<i>Age Distribution</i>						
Under 30	0.21	0.26	0.13	0.17	0.24	0.27
30-44	0.44	0.44	0.40	0.41	0.45	0.45
45-55	0.26	0.22	0.36	0.31	0.23	0.21
Over 55	0.09	0.08	0.10	0.12	0.09	0.07
<i>Education Distribution</i>						
Primary	0.37	0.31	0.37	0.23	0.37	0.32
Secondary	0.53	0.57	0.50	0.60	0.54	0.56
University	0.10	0.12	0.13	0.17	0.09	0.12
Fraction Temporary Contracts	0.26	0.28	0.08	0.10	0.31	0.30
Mean Tenure (years)	11.26	7.90	15.84	14.62	9.77	7.10
<i>Establishment Size Distribution</i>						
11-20	0.21	0.47	0.05	0.09	0.25	0.51
21-50	0.26	0.16	0.12	0.09	0.31	0.17
51-100	0.17	0.09	0.15	0.07	0.17	0.09
101-200	0.15	0.03	0.22	0.02	0.13	0.03
Over 200	0.22	0.25	0.46	0.74	0.14	0.20
<i>Industry Distribution</i>						
Manufacturing	0.67	0.53	0.86	0.64	0.61	0.51
Construction	0.08	0.14	0.01	0.01	0.10	0.15
Trade	0.08	0.09	0.04	0.06	0.09	0.10
Hotels	0.04	0.05	0.01	0.01	0.05	0.05
Transportation	0.04	0.07	0.05	0.19	0.07	0.06
Financial Services	0.06	0.05	0.03	0.03	0.04	0.06
Other Services	0.04	0.07	0.02	0.06	0.07	0.07
<i>Product Market Orientation</i>						
Local-Regional	0.86	0.87	0.76	0.72	0.89	0.89
International	0.14	0.13	0.24	0.28	0.11	0.11
<i>Occupational Distribution</i>						
Managers and Technicians	0.15	0.19	0.21	0.29	0.14	0.17
Clerical Workers	0.09	0.08	0.08	0.08	0.10	0.08
Service Workers	0.05	0.07	0.01	0.05	0.06	0.08
Qualified Manual Workers	0.54	0.53	0.58	0.51	0.53	0.53
Non-qualified Manual Workers	0.11	0.11	0.08	0.05	0.13	0.11
Number of Observations	100,533	89,322	24,566	9,511	75,967	79,811

Notes: Samples are weighted and include all full time workers with valid information on key variables in EES-95 and EES-02 for each year respectively.

Table 3. Mean Log Wages by Type of Contract 1995-2002

<i>Group</i>			<i>Standardized</i>	
	<i>Mean</i>	<i>Std. Dev</i>	<i>Mean</i>	<i>Std. Dev</i>
1995				
<i>All Workers</i>				
Overall	1.680	0.511		
Firm Contract	1.951	0.471	1.837	0.498
Other Contract	1.608	0.496	1.727	0.501
<i>Men</i>				
Overall	1.745	0.509		
Firm Contract	1.989	0.457	1.885	0.489
Other Contract	1.672	0.502	1.781	0.502
<i>Women</i>				
Overall	1.472	0.454		
Firm Contract	1.763	0.489	1.643	0.488
Other Contract	1.419	0.427	1.522	0.441
2002				
<i>All Workers</i>				
Overall	1.695	0.502		
Firm Contract	1.987	0.524	1.945	0.524
Other Contract	1.661	0.487	1.856	0.541
<i>Men</i>				
Overall	1.774	0.507		
Firm Contract	2.070	0.487	2.032	0.498
Other Contract	1.735	0.497	1.932	0.543
<i>Women</i>				
Overall	1.531	0.456		
Firm Contract	1.748	0.552	1.715	0.522
Other Contract	1.511	0.429	1.658	0.481

Notes: For 1995, samples are 130.170 for all workers, 100.533 for men and 29.637 for women.

For 2002, samples are 129.377 for all workers, 89.320 for men and 40.056 for women.

Table 4A. Log Wage Regressions for MEN

Independent Variable	1995			2002		
	(1)	(2)	(3)	(1)	(2)	(3)
Firm Contract	0.317 (0.013)	0.075 (0.009)	0.054 (0.010)	0.335 (0.022)	0.069 (0.016)	0.046 (0.016)
Worker's Characteristics						
Education		0.024 (0.001)	0.024 (0.0009)		0.021 (0.001)	0.021 (0.001)
Age		0.010 (0.0002)	0.010 (0.0002)		0.010 (0.0002)	0.009 (0.0002)
Temporary Contract		-0.184 (0.006)	-0.181 (0.006)		-0.102 (0.006)	-0.099 (0.006)
Firm's Characteristics						
International Market		0.022 (0.010)	0.009 (0.011)		0.076 (0.011)	0.049 (0.011)
Publicly Owned		0.054 (0.035)	0.044 (0.035)		0.034 (0.024)	0.017 (0.024)
20-50 Workers		0.070 (0.008)	0.048 (0.008)		0.085 (0.008)	0.056 (0.010)
51-100 Workers		0.134 (0.009)	0.093 (0.011)		0.102 (0.013)	0.076 (0.014)
101-200 Workers		0.151 (0.010)	0.095 (0.013)		0.151 (0.019)	0.127 (0.019)
Over 200 Workers		0.220 (0.011)	0.144 (0.016)		0.156 (0.014)	-0.039 (0.030)
Average Characteristics of Coworkers						
Education		0.004 (0.002)	0.003 (0.002)		0.003 (0.002)	0.002 (0.002)
Age		0.003 (0.0009)	0.002 (0.0009)		0.003 (0.001)	0.002 (0.001)
Proportion under 30		-0.088 (0.017)	-0.086 (0.017)		-0.035 (0.019)	-0.044 (0.019)
Proportion over 50		-0.111 (0.020)	-0.102 (0.020)		-0.052 (0.024)	-0.067 (0.024)
Proportion Female		-0.045 (0.016)	-0.045 (0.016)		0.008 (0.021)	0.050 (0.022)
Propensity Score			0.663 (0.114)			0.967 (0.223)
Squared Propensity Score			-1.269 (0.316)			-0.736 (0.625)
Cubic Propensity Score			0.847 (0.242)			-0.019 (0.548)
R-Squared	0.068	0.509	0.512	0.045	0.477	0.480

Table 4B. Log Wage Regressions for WOMEN

Independent Variable	1995			2002		
	(1)	(2)	(3)	(1)	(2)	(3)
Firm Contract	0.343 (0.024)	0.108 (0.012)	0.067 (0.013)	0.238 (0.048)	0.026 (0.026)	0.007 (0.022)
Worker's Characteristics						
Education		0.017 (0.001)	0.017 (0.002)		0.016 (0.003)	0.016 (0.002)
Age		0.009 (0.0004)	0.009 (0.0004)		0.007 (0.0004)	0.007 (0.0004)
Temporary Contract		-0.157 (0.012)	-0.153 (0.012)		-0.105 (0.007)	-0.114 (0.007)
Firm's Characteristics						
International Market		0.026 (0.015)	0.009 (0.015)		0.113 (0.019)	0.059 (0.017)
Publicly Owned		0.137 (0.033)	0.129 (0.032)		-0.0097 (0.039)	0.003 (0.032)
20-50 Workers		0.025 (0.011)	0.021 (0.011)		0.061 (0.009)	0.046 (0.010)
51-100 Workers		0.067 (0.013)	0.049 (0.014)		0.052 (0.013)	0.043 (0.014)
101-200 Workers		0.096 (0.015)	0.060 (0.017)		0.110 (0.018)	0.112 (0.018)
Over 200 Workers		0.149 (0.013)	0.063 (0.016)		0.113 (0.014)	-0.070 (0.029)
Average Characteristics of Coworkers						
Education		0.008 (0.002)	0.006 (0.003)		0.012 (0.003)	0.011 (0.003)
Age		0.005 (0.001)	0.004 (0.001)		0.005 (0.002)	0.004 (0.002)
Proportion under 30		-0.036 (0.021)	-0.038 (0.020)		-0.060 (0.024)	-0.073 (0.024)
Proportion over 50		-0.153 (0.031)	-0.137 (0.030)		-0.104 (0.036)	-0.119 (0.036)
Proportion Female		-0.156 (0.015)	-0.142 (0.014)		-0.182 (0.022)	-0.182 (0.023)
Propensity Score			0.019 (0.146)			0.545 (0.337)
Squared Propensity Score			0.597 (0.413)			1.479 (0.989)
Cubic Propensity Score			-0.277 (0.288)			-1.918 (0.849)
R-Squared	0.074	0.506	0.514	0.022	0.447	0.453

Total & Relative Contribution of Centralization on Changes in Average Wages			
	Overall	Men	Women
$\bar{W}_{02} - \bar{W}_{95}$	0.046	0.029	0.059
\bar{F}_{02}	0.0967	0.106	0.075
\bar{F}_{95}	0.227	0.244	0.169
$(\hat{\alpha}_{02} - \hat{\alpha}_{95})\bar{F}_{95}$	-0.0063	-0.0020	-0.010
$\hat{\alpha}_{02}(\bar{F}_{02} - \bar{F}_{95})$	-0.0039	-0.0059	-0.0006
Total contribution	-0.0102	-0.0079	-0.0106
Relative contribution	-22.17%	-27.24%	-17.96%

Table 6. Overall effect of centralization on the variance of log wages 1995-2002

	1995	2002	Change
1. Variance firm-contract	0.156	0.174	0.018
2. Variance other contract	0.123	0.120	-0.003
3. Fraction with firm level contracts	0.227	0.0967	-0.1303
4. Overall variance	0.131	0.125	-0.006
5. Variance with 1995 firm contracts	0.131	0.133	0.002
6. "Centralization" effect			-0.008
7. Variance without firm contracts	0.131	0.120	-0.011

Notes: For 1995, samples are 130,170 workers and for 2002, samples are 129,377 workers

The "centralization" effect is computed as the difference between the change in rows 4 and 5

Figure 1. Unemployment Rate by Gender and Age group

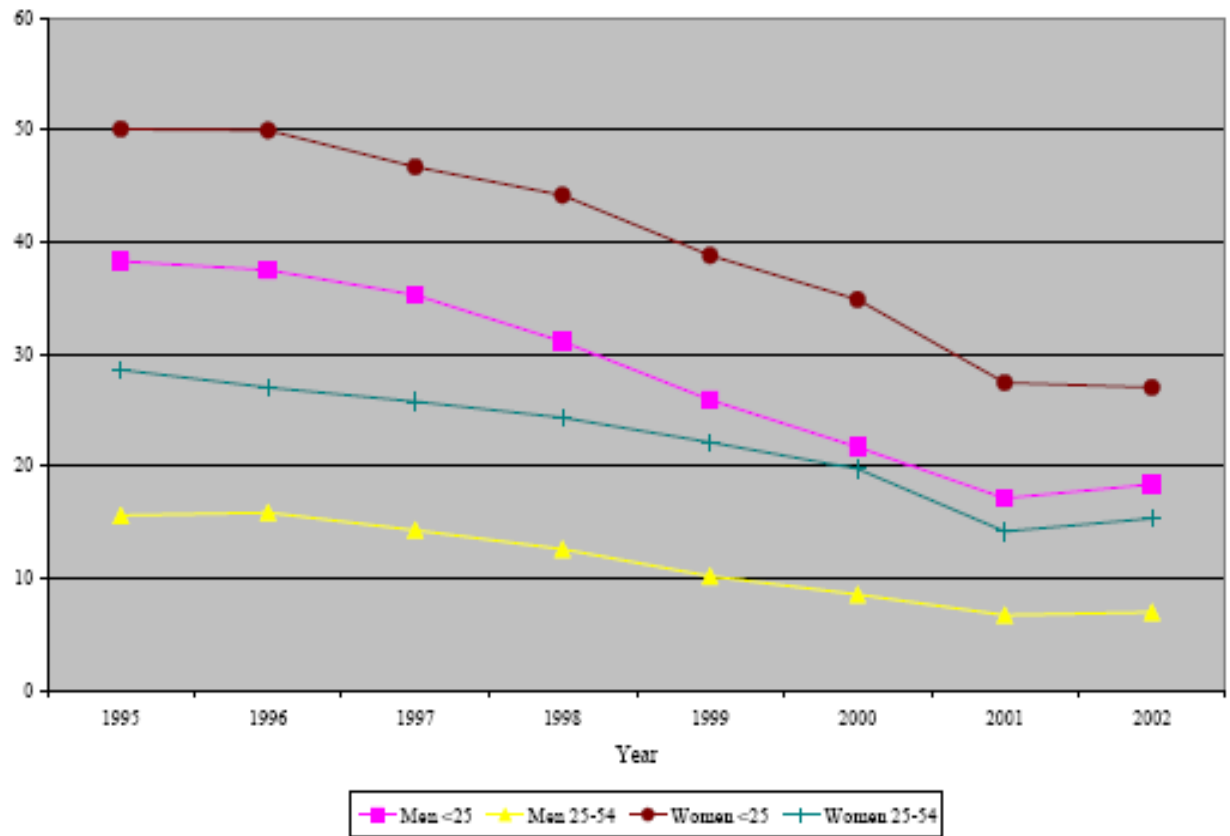


Figure 2. Effect of Firm Contracts on the Distribution of Wages

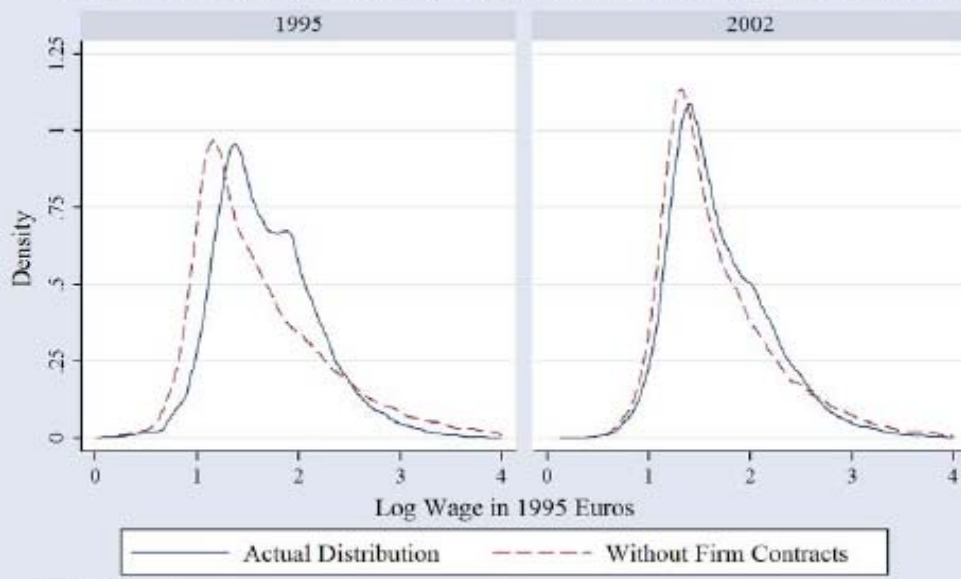


Figure 3. Density of log wages for the overall sample 1995-2002

