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INITIAL OFFERS AND OUTCOMES IN WAGE BARGANING: WHO WINS?

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ABSTRACT: The initial works council's wage claim, and the initial firm's (counter)offer, as well as the fraction of the disputed wages the works council is able to capture conditional on initial disagreement, are analyzed using Spanish data on wage settlements. After a given initial wage claim, the rules of the system force the firm either to accept it or to make a counteroffer prior to a fixed and short deadline. In this context signaling models predict that the wage claim should try to screen the firm's level of profitability, while the (most likely forced) offer is expected to reveal little information. Both hypotheses are tested and neither one is rejected. The analysis of the fraction of the disputed wages the workers get after initial disagreement, as well as the length of the negotiation period, provide further evidence in favor of signaling models since we find they are related to both observed and private information. Moreover, conditional on covariates, for a number of sectors we cannot reject that the parties "split the difference" between both initial offers. This solution coincides with Rubinstein's (1982) wage, the solution for the complete information game.

KEYWORDS: CLAIM, OFFER, WAGE SETTLEMENT, BARGAINING POWER, COLLECTIVE BARGAINING, WAGES, PANEL DATA, SAMPLE SELECTION.
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1. Introduction.

Wage negotiations or renegotiations have been long studied in the wage bargaining literature. Early theoretical work focused on explaining why union wage demands should fall during a conflict.[1] However, during the 1980s, developments in non-cooperative bargaining theory helped explain the formation of the union's claims and the firm's offers by specifying the negotiation procedure in detail (Rubinstein, 1982; Grossman and Perry, 1986; Admati and Perry, 1987). In the nineties, the bulk of the theoretical work was devoted to the determination of wage contracts under conflicting threats in relation to the bargaining structure (Fernández and Glazer, 1991; Cramton and Tracy, 1992, 1994, and 2003; and Gu and Khun, 1998).

In relation to this growing literature, recent empirical work has focused on testing the implications of the theoretical models on conflicting activity (for example, delays and strikes during negotiations) and/or on the formation of wage outcomes (Card, 1990; Cramton and Tracy, 1992, 1994; Cramton, et al., 1999; Jiménez-Martín, 1999). However, very little empirical work has focused on the sequence of offers made by agents during collective negotiations. Hamersmesh (1973) and Bowlby and Schriver (1978), who test the *split the difference model* using data from forty-three negotiations, and over 200 negotiations, respectively, and Treble (1990), who analyzes the probability of arbitration in a negotiation process using data on the complete sequence of offers in the British Coal Industry for the period 1893-1914, are notable exceptions.

In this paper we have two objectives: firstly, to analyze the formation of the first round of offers (i.e., the union's initial *claim* and the firm's initial *offer*), and, secondly, conditional on initial disagreement, to analyze the determinants of the share of the relative *wage platform* (i.e. the ratio of the difference between the agreement and the initial offer to the difference between the initial claim and the initial offer) the workers are able to obtain, which constitutes one of the novelties of this paper.[2] By focusing in this two aspects of the negotiation process and stripping away the rest (for instance, strike determination) we inevitably sacrifice realism, but by using a more abstract representation we think can get a much clearer interpretation of the results.

On regard to the first objective, assuming the firm has private information concerning its willingness to pay, we want to assess how much of the firm's private information the union's claim captures, and, upon rejection of the initial claim, how much information, if any, is revealed through the firm's offer. These questions are conditional on negotiation procedures which, apart from other institutional aspects to be described later on, force the firm to respond before a predetermined (exogenous to the negotiation process and unknown for the econometrician) deadline. This is a

[1]See Kennan (1986) for a detailed survey of early work.

crucial feature of the Spanish system: after an initial wage claim by the union, the firm must either accept it or make a counteroffer before a predetermined (i.e. non-negotiable) deadline.[3]

The deadline for the firm's offer is not a subject of negotiation and is very often set by industry standards. In fact, the law governing Spanish working relations (*Estatuto de los Trabajadores* or *Workers Statute*) provides a general guideline for collective negotiation practices. In particular, the article 89 of the law describes the bargaining procedures: "*Both parties are obliged to negotiate under the bona fide principle. …. Within a month from reception of the negotiation proposal, the parties must set a negotiation table; the other party should respond to the initial proposal, and both parties can then fix a calendar or plan for negotiations.*"[4]

The deadline practically never exceeds a fortnight. In a sense, it imposes a pseudo *cooling-off* period or, in the terminology of Cramton and Tracy, a first-phase threat period.[5] The deadline should reduce the amount of information revealed by the initial offer of less impatient firms because, according to Cramton and Tracy, it is not optimal for them to reveal their private information until a fraction of the contract has passed. Alternatively, the deadline would have very little influence on very impatient firms, which either accept the initial claim or make an offer which is immediately accepted by the union. While in their model, in which no deadline on firm's offers is imposed, it is expected that an important fraction of the firms' initial offers would be accepted by the union, in our data only 7.9 percent of the firms' initial offers are accepted by the union.

A second objective of this paper is to analyze, conditional on initial disagreement after the first round of offers, final outcomes such as the share of the wage platform the union is able to get (μ).[6] As regards the share of the wage platform, note that upon rejection of the initial offers, the agreement (w) is a linear combination of both initials (c and o respectively): $w = \mu.c + (1-\mu).o$ where $0 \le \mu \le 1$ is the share of the wage platform the union is able to get. By analyzing μ (and not w) we shall be able to make more evident how the parties divide the quantities under dispute and how the sharing rule relates to several key pieces of information. Note that in the subgame that starts after rejection of both initials, under complete information and

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[2]Unfortunately the complete sequence of claims and offers is not available.

[3]When the first offer is not accepted, then the agents alternate offers (without a fixed time in between offers) until an agreement is reached.

[4]In nationwide negotiations, subject to media coverage, it is customary to announce negotiation platforms (*"plataformas de negociación"*) at the beginning of the negotiation process.

[5]The deadline is analogous to a cooling off period. In words of Cramton and Tracy (2003) *"In Canada, a cooling off period follows the conclusion of the conciliation process. No strike or lockout may take place until both steps are completed. Although conciliation may have additional effects, both conciliation and cooling off periods force a period of delay on the parties before a strike can begin. Hence, conciliation and cooling off periods are analogous to an exogenous strike deadline after the expiration date."*

[6]See Jiménez-Martín et al. (1996), for an analysis of strike incidence in Spain.

uniform uncertainty about the value of the firm, the expectation of μ should be equal to 1/2, so as it coincides with the Rubinstein's (1982) wage. Departures from this focal point are reflections of asymmetries in the bargaining power of the parties. For instance, a value of μ close to one indicates that the initial wage demands are largely satisfied, thereby indicating a large union bargaining power. On the contrary, a low value of μ indicates a low union bargaining power.

In this context, we have a unique opportunity to provide evidence on some theories of wage bargaining, either naïve or sophisticated: the *split the difference hypothesis* (Hamersmesh, 1973), or, in general, a simplistic negotiation structure against a more complex one. According the split the difference hypothesis, under the assumption of bilateral monopoly and absence of bluffing (Bowlby and Schriver, 1978), the initial claim and the initial offer are proxies for the maximum and the minimum negotiated wage.[7] The agreed wage will then split the difference or divide it according to the bargaining power of the parties. Note that in this context, conflicting activity variables, strike costs and asymmetric information should play no role.

At the same time, we can check whether the key predictions from signaling models of wage bargaining are observed in the Spanish context. For example in Cramton and Tracy (1992, 1994) firms that stand the most to loose from a prolonged strike will reach agreement earlier, and with larger wage concessions. Thus μ should be negative related to the cost of a strike and, in particular to (within the firm) conflicting activity variables (length of a strike, and length of the negotiation period: being the response to the former larger than the response to the latter); and, positively related to the value of the firm as well as to the level of uncertainty in the sector. Likewise, other bargaining outcome such as the length of the negotiations should be negatively related to the value of the firm.

We dispose of a unique data set on initial bargaining offers that could help shed some light on the empirical relevance of these features of the bargaining process. The empirical work is carried out using a sample of large (private and public) firms from the "Negociación Colectiva en las Grandes Empresas" or *Collective Bargaining in Large Firms* (CBLF), a longitudinal survey on bargaining and other issues conducted by the Dirección General de Política Económica of the Spanish Ministry of Economy. It provides data on initial bargaining offers (the works council's initial claim and, when the initial claim is rejected, the firm's initial counteroffer), negotiation

[7]The Spanish case provides a unique opportunity to test this hypothesis since the bargaining procedure does not provide much incentives to reveal information at early stages of the negotiation procedure. In particular, as stated above, in a majority of cases the first offer is, after controlling for observables, non-informative. So, it should be considered a reasonable proxy of the minimum negotiated wage.

timing, strike activity, and wage increase settlements, among other economic variables.[8] Although the survey was made until 1996, only micro data for the 1985-1991 were made available.

The data availability greatly conditions the econometric model we are able to identify. This is so because of counteroffers are only observable conditional on rejection on previous offers. In order to identify the model we proceed as follows: we first estimate an initial claim equation which is not subject to any kind of censoring; second, we estimate a conditional offer equation subject to censoring due to acceptance of initial claims; and, finally, we estimate an agreement equation controlling for double censoring. In order to keep the length of the paper manageable, results for the selections equations are not reported but are available upon request.

Our empirical results suggest that the initial claim by the work council depends mildly on the expected willingness to pay of the firm, proxied (instrumented) by the expected productivity. In contrast the first offer by the firm in a majority of cases does not reveal any of the firm's information. Note that these two finding do not discard a signaling interpretation of wage bargaining. Regarding the fraction of the wage platform the workers are able to obtain, we obtain a number of interesting findings: firstly, at the sectoral sample means, we cannot reject the hypothesis that agents' split the difference in a number of sectors, which implies absence of systematic bluffing; secondly, the share of the wage platform the workers are able to obtain is positively related to the value of labor, and it is negatively related to conflicting variables, being the relationship stronger with respect to the length of the strike than to the length of the negotiations, thereby indicating that the cost associated to a conflict matters since the share has higher expectation in those sectors in which inventories are harder to sustain. Finally, we do find that the length of the negotiation period is negatively related to the value of the firm, so firms that can lose the most are quicker to settle the agreement.

The remainder of the paper is structured as follows. In section 2 we briefly describe the most relevant features of the Spanish negotiation framework and the data set. The empirical model and the econometric specifications are described in section 3. The main results from the empirical analysis are presented in section 4. Section 5 concludes.

2. The Spanish negotiation framework and data

2.1. The Spanish negotiation framework.

Collective bargaining procedures in Spain (see Izquierdo et al., 2003 for a description), as in other European countries, are quite different from those in the US or Canada. Collective bargaining

[8]See Jiménez-Martín et al. (1996), and Jiménez-Martín (1999) for empirical analyses of strike incidence and

occurs at the industry and firm levels, simultaneously.[9] The terms of the industry-wide agreements are a binding floor for all firms in the sector, i.e., the so-called *"mandatory extension"* principle. Union membership is low but union power is high because unions are responsible for negotiations at the industry-wide level.[10] System coverage is notably high. During the period 1984-91, almost 82 percent of all employees were covered by collective agreements and 20 percent of these correspond to firm-level agreements in large firms.

In the period considered, most employees have indefinite contracts, which are not linked to collective negotiations. Current working and payment conditions are settled in an additional protocol called *"convenio colectivo"* which stipulates wages, working hours and other conditions (mobility, promotions, etc.) over a number of years. However, wage increases are negotiated, or renegotiated, on near yearly basis. In those negotiations that are not ended (or started) before the beginning of the year under negotiation, workers are paid at the previous year wage rate. After the settlement, wage increases are paid retroactively. Elected works councils take the place of unions in firm-level negotiations and, unlike what happens in other European countries, can call for a strike during negotiations.

Wage negotiations at the firm-level proceed as follows. They start when the council makes a wage increase *claim*. The institutional setting is such that the firm must either accept the works council's claim or come up with a counteroffer before a predetermined deadline. As mentioned, the deadline can vary from one negotiation unit to another, but it is very often less than a fortnight. The works council is not permitted to call strike action before both the *claim* and the *offer* are made, i.e., *the wage platform* is announced. Thus, the first round of the negotiation may be understood as a *cooling-off* or *conciliation* period (similar to that in place in Canada or US contracts negotiated under the Railway Labor Act) which may help explain the moderate level of strike action taken during firm-level wage bargaining. Finally, when neither first round offer is accepted, the agents alternate, without a fixed time between offers, until agreement is reached. Meanwhile, the works council uses a latent strike threat and both agents may make strategic use of the time between offers.

Before and during negotiations both agents receive aggregate (and industry) signals. We assume that aggregate negotiations are settled before the beginning of firm level negotiations. At

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wage determination in Spain using the same data set.

[9]Collective bargaining can occur all over the year. However, aggregate bargaining (either at the national or industry level) finishes, on average, much earlier than firm level bargaining.

[10]However, as reported in Jordana (1997) in the second half of the eighties and the early nineties (precisely, our sample period) there has been an increase in labour force union membership. Membership has increased from almost 10 percent in 1986 to more than 15 percent in 1991.

the aggregate level, the employers association recommends an initial offer or range of offers to its members (reference offer, RO). Likewise, nationwide unions recommend an initial claim or range of claims (reference claim, RC) to their works council members. Again, we assume that both are known by the parties before the starting of the negotiations.

2.2. Aggregate and sample evidence

Table 1 summarizes some characteristics of the negotiation process in the CBLF and some aggregate determinants during the period 1982 to 1993.[11] From 1982 to 1986, with the exception of 1984, there were annual nationwide agreements which guided firm-level negotiations. Nationwide agreements fixed a wage change band which acted as a reference point in fixing either industry or firm level settlements. From 1987 onwards no nationwide agreement has been achieved (up to 1997). However, the nationwide employers' association and nationwide unions (CCOO and UGT) have respectively announced yearly reference offers and claims. Comparing the two periods mentioned, the existence of an aggregate agreement in a given year reduces the length of the negotiation process at the firm-level but increase the rate of concession since the agreement gets closer to the claim. Notice also that for the entire period the level of conflicting activity has been significantly low. This is a consequence of both a very low conditional duration of strikes (not in excess of five days) and a strike incidence of between 10 and 15 percent.

Figure 1 plots the observed (average) initial claim, initial offer and agreement against the inflation rate in 1982-1993. The persistent difference between both initial offers highlights the presence of some form of private information regarding the level of firm profitability. Finally, we must point out that, with one exception (1987), the inflation rate is higher than the inflation target fixed by the government.

Table 2 summarizes the key variables of the analysis according to the different combinations of first round offers and final agreements that can be identified from the panel data: when the agreement represents a compromise between the claim and the offer (column 1, 85.7 percent of the cases); when the first work council claim is accepted (column 2, 4.4 percent); when the agreement coincides with the initial claim, but after initial rejection (column 3, 1.9 percent); and, finally, when the initial offer, after an unknown number of rounds, is accepted (after one or more rounds, column 4, 7.9 percent of the cases). The latter case is the most interesting case from the point of view of signaling models, which predict that without any response deadline, a large fraction of initial firm offers would be accepted by the union. The Spanish bargaining protocol, which forces the firms to

[11]The survey runs from 1982 to 1996. However microdata are only available for the 1985-1991 period.

respond quickly to the initial claim, helps to explain the small fraction of initial offers accepted, since only the very impatient firms are likely to make an acceptable offer for the works council.

Note that the key variables vary greatly by type of outcome, specially the conflicting outcomes (much larger in the case of initial disagreement and lower in the case of acceptance of any of the first round offers). Regarding other bargaining outcomes, note that the change in hours is very small with a median of no change (in fact, over 50 percent of the agreements end without change in hours). Finally, the share parameter is close to 0.5 (0.44, with a median of 0.5) and, by sector, the share exceeds 0.5 in sectors 4, 5 and 8, and is lower than 0.5 in the rest.

Figure 2 presents a yearly analysis of the relationship between the initial claim and offer and the nationwide reference points: that of the employers' association (vertical line) and that of nationwide unions (horizontal line). In a large number of cases they are above their respective reference offers. Note that at first sight, both initial offers are highly correlated, but once we control for a few observables the correlation between both initial offers is low.[12] Let us now turn to more specific comment on the formation of both initial offers. With respect to the firm's offers, several comments are in order. First, it seems that any initial offer must, to be credible, be as high as the RO. For instance, in 1986, 85 percent of the offers were above the RO. Second, a sizeable fraction of offers coincide with the RO (between 15 and 45 percent depending on the year). We suggest that the firm uses the RO as an initial offer to avoid revealing information about its true demand. With regard to offers below or above the RO, we believe that they simply reflect the influence of the observables (either sectoral or firm specific). Concerning works council claims, let us note, first, that there is also a sizeable fraction of claims which coincide with the RC (between 15 and 30 percent depending on the year). And second, we must point out the increase in the fraction of claims falling below the RC, which almost surely reflects a change of strategy on the part of the works council in the second half of the sample period.

Figure 3 shows the kernel density distribution of the share of the relative wage platform for all the available observations including those cases where μ takes either zero or one (left top panel), and for those observations in which $0 < \mu < 1$ (right top panel). In both cases, the mean is below 0.5, but not very far away (around 0.45). Note also that in both cases the kernel does not differs substantially from the normal density. By sector (reported in the bottom panels), it is easy to detect that μ is larger for the building+services (right bottom panel) than for the industry, may be for the different role of inventories in these two sectors. In any case, it is a matter of empirical research whether this normal distribution is due purely to random errors or mistakes during

[12]The R^2 of the regression between the offer equation residual and the claim is 0.0330 (0.0049 with fixed effects) in dynamic regressions, and, 0.0209 (0.0114 with fixed effects) in static regressions.

negotiations or, alternatively, is due systematic variations in either observables or unobservables.

3. Econometric specification.

In the Appendix A we present a version of Cramton and Tracy (1994, 2003) wage bargaining model adapted to the Spanish case. We assume that each period there is either a negotiation at the aggregate level or the industry level or both (all following similar procedures than at the firm level) which produces a signal about the state of the economy relevant to the firm. The common knowledge signal (ϑ) is multidimensional, and includes the aggregate wage increase or wage increase band and the aggregate conflicting activity.

At the firm level, following Cramton and Tracy (1994, 2003), we consider a union and a firm that are bargaining over the wage to be paid during a contract of duration *T*. The union's reservation wage is common knowledge. Let *v* be the firm's value of the current labor force working under a contract of duration *T*. It is common knowledge that *v* is drawn from the distribution *F* with positive density *f* on an interval of support [$l(\vartheta)$, $h(\vartheta)$], where ϑ denotes the aggregate signal. Prior to aggregate negotiations the firm knows the relative position of *v*. After aggregate negotiations (either economy wide or sectoral or both) have taken place, ϑ is revealed. So, at the outset of the negotiations, the firm knows the realization of $v(\vartheta)$, let us denote it by $\tilde{v}$.

Let us review the main prediction of this model regarding initial offers (see Appendix A for further details):

1. The initial claim, w^c, is a function of $\hat{v}$, the expectation of $\tilde{v}$.

2. Given the initial claim, the firm's initial offer, w^o, which has to be announced before or at the deadline τ, is formed:

a) if $\hat{v} \leq \tilde{v}$ the initial claim is accepted and the negotiation ends.

b) if $v_\tau \leq \tilde{v} < \hat{v}$, the firm makes an offer which is immediately accepted by the union.

c) if $\tilde{v} < v_\tau$ then the firm makes a non-informative (about $\tilde{v}$) before or at the deadline.

After this non-informative offer the game proceeds as in Cramton and Tracy (1994). However, since we have no data on subsequent offers, we cannot explore the formation of second round and further offers, and, hence, have to concentrate the effort on the formation of the agreement subject to rejection of the initial offers (case (c) above).

The conditional relative agreement

In greater detail, after rejection of both initial offers, the final agreement can be viewed as a compromise between them:

$$w(\tilde{v}) = \mu(\tilde{v}, s, l, z) w^c(\hat{v}) + (1 - \mu(\tilde{v}, s, l, z)) w^o(l(\vartheta)) \quad if \;\; w^c(\hat{v}) > w(\tilde{v}) > w^o(v_\tau)$$

where s denotes strike activity (including strike occurrence and duration), l denotes length of the negotiations and z denotes a set of conditioning variables. Thus, conditional on the initial offers being rejected, we can think of the problem as the choice of μ : 0< $\mu(\tilde{v}, s, l, z)$ <1. Since both w^c and w^o are both Rubinstein's (1982) type offers, in a model with uniform uncertainty, we should expect, at sample means, μ =1/2. Any departure of the expectation of μ from this point should be the reflection of asymmetries in the bargaining power of the parties. Note that the implication of OSAI models in this particular case is the same that the one obtained in more naïve models, such as the *split the difference hypothesis* which implies $diff = (w^c(\hat{v}) - w(\tilde{v})) - (w^o(v_\tau) - w(\tilde{v})) = 0$ or $\mu = 1/2$ (Hamermesh (1973) is a good reference about this hypothesis). The only possibility of distinguishing OSAI model form naïve models is the fact that in OSAI models μ should also depend on observables. For example, as implied by Cramton and Tracy (1994), $\partial\mu/\partial v > 0$; $\partial\mu/\partial dur < 0$; and $\partial\mu/\partial l < 0$, where *dur* denotes strike duration.

3.1. Empirical specification.

a) Formation of the initial offers

As described in Appendix A the initial *wage claim*, w_{it}^c is assumed to be a function of what the union (works councils in our case) considers a unit of labor is worth for the firm, E($\tilde{v}_{it}$ /Ω_{it})= $\hat{v}_{it}$, where Ω_{it} denotes the available information at the beginning of the negotiation process; and, simultaneously, other determinants, X_{it}, which captures the information known at the beginning of the negotiation period, including the alternative wage. Formally:

$$w_{it}^c = \alpha_c \hat{v}_{it} + \beta_c' X_{it} + f_i^c + u_{it}^c \qquad t = 1,...,T_i;\ i = 1,...,N \qquad [1]$$

where α_c, β_c are coefficients, f_i^c is a works council specific component that can be thought as the sum of two components: the works council specific effect $\tilde{f}_i^c$ and a component, $\rho_c \tau_i$, that depends on a time invariant firm-specific deadline, τ_i , and a coefficient, ρ_c . u_{it}^c is a serially uncorrelated error term, t denotes year, and i denotes the bargaining unit. According to signaling theories, α_c is expected to be positive.

After the claim has been announced, the firm accepts the claim ($c_{it}=1$) if it falls below some specific cut-off value that is a function of its available information. In those cases in which the initial claim is rejected, the firm announces its initial *wage offer*, w_{it}^o .

In the context of Cramton and Tracy (1994, 2003), with either multiple threats or time

varying threats and **without any deadline**, the initial offer (announced after a period of delay) is fully informative about the firm's private information and is immediately accepted by the union. This means that it is a function of the value of labor for the firm, $\tilde{v}_{it}$, and other determinants included in the vector X_{it}. In order to test the (possible) relevance of the claim in the offer equation we also include w_{it}^{c}:

$$w_{it}^{o} = \tilde{\alpha}_o \tilde{v}_{it} + \gamma_o w_{it}^{c} + \beta_o' X_{it} + \tilde{f}_i^{o} + u_{it}^{o} \qquad if\ c_{it} = 0$$

where $c_{it}=0$ denotes those cases in which the initial claim is rejected by the firm; $\tilde{f}_i^{o}$ is a firm-specific effect and u_{it}^{o} is a serially uncorrelated error term. Without any deadline, we would expect $\tilde{\alpha}_o$ >0, a key prediction of signaling models. Furthermore, after controlling for observables, γ_o cannot be significantly different from zero;[13] and, finally, β_o, the effect of common knowledge covariates, should be significantly different from β_c.

However, when a short deadline (τ_i) is introduced in the model, we have to take into account that the offer equation changes to:

$$w_{it}^{o} = \alpha_o v_{it} + \gamma_o w_{it}^{c} + \beta_o' X_{it} + f_i^{o} + u_{it}^{o} \qquad if\ c_{it} = 0 \qquad [2]$$

where $f_i^{o} = \tilde{f}_i^{o} + \rho_o \tau_i$, and ρ_o is an unknown coefficient. Note that when the firm is forced to respond before the predetermined deadline τ_i, the firm's specific information is, in a majority of cases, not revealed. Thus, α_o must be close to zero. Note, however, that the rest of the predictions remain unchanged ($\gamma_o \cong 0$ and $\beta_o \neq \beta_c$).

[13]Higher initial claims cannot lead to higher initial offers once all the relevant factors have been controlled for.

b) Specification of the conditional share of the disputed wages.

Upon rejection of the initial offers the final agreement, w_{it} , can be expressed as:

$$w_{it} = \mu_{it} w_{it}^{c} + (1-\mu_{it}) w_{it}^{o} \;\; for \; w_{it}^{c} > w_{it} > w_{it}^{o} \;\; ,$$

where $0 < \mu < 1$. Note that conditional on the initial offers, μ is the only potential source of uncertainty in the final agreement equation. Thus, we rewrite this expression as:

$$\frac{w_{it} - w_{it}^{o}}{w_{it}^{c} - w_{it}^{o}} = \mu_{it} \qquad for \; w_{it}^{c} > w_{it} > w_{it}^{o}$$

If we further assume that $\mu_{it} = \Lambda(.)$ where Λ denotes the logistic distribution function, by applying the log-logistic transformation in the expression above, we obtain the share or bargaining power equation,

$$\log \mu_{it} / 1-\mu_{it} = \varphi_j + \varphi_a \tilde{v}_{it} + \varphi_b \, 'V_{it} + \beta_a \, ' \tilde{X}_{it} + f_i + u_{it} \qquad for \;\; w_{it}^{c} > w_{it} > w_{it}^{o} \qquad [3]$$

where *j* denotes sector, V includes information on other potential negotiation issues and results such as strike activity, length of negotiations, negotiated hours, or cost of living allowances, and $\tilde{X}$ includes all the information known after the first round of offers as well as time effects. In particular, we allow for a non-linear dependence on the (predicted) initial offers as well as positive dependence on the value of labor and its uncertainty (proxied by the level of uncertainty in the sector the firm belongs to). In this context, if the split the difference holds for sector *j* we expect $\varphi_j = 0 \quad (or \; \mu = 1/2 \text{ for } j = 1, \ldots, J)$, and simultaneously $\varphi_a = \varphi_b = 0$. Alternatively, evidence in favor of signaling models of wage bargaining is obtained when, for instance $\varphi_a > 0$, which implies some information is revealed after the first round of offers; or, when the coefficients of the conflicting variables (either the length the strike or the length of the negotiation period) are negative. Note that in order to obtain results consistent with, for example, Cramton and Tracy (1992, 1994), the effect of the length of the strike should be more important than the effect of the length of the negotiation period. Finally, rejection of $\beta_a = 0$ implies some dependence on observables, in particular the proxies of bargaining power.

3.2. Estimation issues and procedures.

In this section we discuss the identification issues as well as the estimation procedures regarding equations [1], [2] and [3].

A first problem to note is that our claim and offer equations ([1] and [2] respectively) can be viewed as standard wage ones and, consequently, we should consider a dynamic structure for them.[14] There are several reasons to do so. For example, learning, or reputation, may influence the current outcome of the negotiation process. Furthermore, a single negotiation is embedded in an indefinite negotiation process, in which current negotiations cannot be isolated from past (or future) rounds.[15] We consider two possible sources of dynamics: the previous wages and the previous offers. The prior contract is important, since it sets the *status quo* from which subsequent contracts are negotiated (Cramton and Tracy, 2003). Likewise, prior offers, especially in the case of firms, can be relevant, since agents may use them to hide information. Furthermore, we should take into account that the claim and offer data are not expressed in levels, but as a rate of change. Taking all of this into account we have

$$\Delta w_{it}^{c} \approx \mu_c \Delta w_{it-1}^{c} + \Delta_c(L) w_{it-1} + \alpha_c \hat{v}_{it} + \beta_c' X_{it} + f_i^{c} + u_{it}^{c} \qquad [4]$$

$$\Delta w_{it}^{o} \approx \mu_o \Delta w_{it-1}^{o} + \Delta_o(L) w_{it-1} + \gamma_o \Delta w_{it}^{c} + \alpha_o \tilde{v}_{it} + \beta_o' X_{it} + f_i^{o} + u_{it}^{o}; \qquad if \quad c_{it} = 0 \qquad [5]$$

where $\Delta w^k; k = c, o$ denotes wage changes and $\Delta(L)$ denotes polynomials of first order, whose coefficients are expected, according to the theory, to be zero. Notice that, in the latter equation, the relevant sample is built by picking up at least two consecutive outcomes in which the initial claim is rejected.[16] The sample constructed in such a way will be denoted as the *offer sample*. Likewise, the original sample will be named *claim sample*.

A second problem worth to note is that the initial offer is censored from above by the initial claim so as $\mathrm{E}(u_{\mathrm{it}}^{\mathrm{o}}/\mathrm{c}_{it} = 0)$ may not be equal to zero.[17] Under normality of the errors in the model we solve this problem by estimating a (reduced form) model of the probability of accepting the initial claim ($P(c_{it} = 1) = P(\hat{v} < \tilde{v}) = p$ in our model) and then we correct the wage equations with the corresponding inverse Mill's ratio. Adding consistent estimates of the inverse Mill's ratio,[18] say

[14]See Blanchard and Katz (1999) for a discussion on wage dynamics.

[15]Gu and Kuhn (1998) look for insights not provided by existing static bargaining models. They emphasize the learning effect among different bargaining pairs in a sequential context, when the firm's profitabilities are correlated, and analyze its impact on strikes and wages. Other recent examples of dynamic bargaining models are Kennan (1995, 2001), and Vincent (1998).

[16]Similar qualitative and quantitative results are obtained regardless of the sample employed (either the offer or claim samples).

[17]Alternatively, a year-by-year Tobit can be estimated to predict censored initial offers, so as a complete set of observations is obtained. The results of this exercise are available on request.

[18]The inverse Mill's ratio or Heckman's (1976) lambda is obtained from a year-by-year model of the probability of observing a conflict in a given negotiation (see Jiménez-Martín, 1995, for details). The inverse Mill's ratio controls for the selection bias introduced by strike action as well as the effect of strike intensity if strike propensity and duration are positively correlated.

$\widehat{\lambda}_i^{a=c}$ to [5], we obtain:

$$\Delta w_{it}^{o} \approx \mu_o \Delta w_{it-1}^{o} + \delta_o(L) w_{it-1} + \gamma_o \Delta w_{it}^{c} + \alpha_o \tilde{v}_{it} + \beta_o' X_{it} + \sigma_{a=c} \widehat{\lambda}_{it}^{a=c=o} + f_i^{o} + u_{it}^{o*}; \quad if \quad c_{it} = 0 \qquad [6]$$

The estimation of the conditional agreement equation has its own difficulties since it is censored from below and above. That is (in terms of wage changes): $\Delta w_{it}^{c} > \Delta w_{it} > \Delta w_{it}^{o}$. The procedure to solve these problems implies to estimate reduced form equation for the determination of corner solutions for the above relation. In accordance with Table 2 we consider three distinct sources of censoring: (i) acceptance of the initial wage change offer $\Delta w_{it}^{c} = \Delta w_{it} = \Delta w_{it}^{o}$; (ii) acceptance of the initial claim after being initially rejected $\Delta w_{it}^{c} = \Delta w_{it} > \Delta w_{it}^{o}$; and, (iii) $\Delta w_{it} = \Delta w_{it}^{o}$. Cases (i) and (iii) have a clear interpretation in the model: they correspond to the $P(c_{it} = 1) = P(\widehat{v} < \tilde{v}) = p$ and $P(d_{it} = 1) = P(v_\tau \leq \widehat{v} < \tilde{v})$ respectively. Alternative, case (ii) cannot be fitted in the model and can only be explained by negotiation with multiple issues, such as hours of work. After the estimation of reduced form equations for the probabilities of observing these three types of outcomes, we compute the corresponding inverse mills ratios, say $\widehat{\lambda}_i^{a=c=o}$ $\widehat{\lambda}_i^{a=c>o}$ and $\widehat{\lambda}_i^{a=o}$, and correct the corresponding equation with them:

$$\log \frac{\mu_{it}}{1-\mu_{it}} = \varphi_j + \varphi_a \tilde{v}_{it} + \varphi_b V_{it} + \tilde{X}_{it}' \beta_a + \sigma_1 \widehat{\lambda}_{it}^{a=c=o} + \sigma_2 \widehat{\lambda}_{it}^{a=c>o} + \sigma_3 \widehat{\lambda}_{it}^{a=o} + f_i + u_{it} \quad for \quad \Delta w_{it}^{c} > \Delta w_{it} > \Delta w_{it}^{o}$$

[7]

Regarding the estimation of equations [4], [6] and [7] there are several important issues that must be pointed out. First, $\hat{v}_{it}$ (the union's expectation concerning how much a unit of work is worth to the firm) is unobservable. We assume that agents are rational and following McCallum (1976) and Wickens (1982), we replace $\hat{v}_{it}$ by $\tilde{v}_{it}$ and use instrumental variables to control the induced measurement error. Second, least squares may produce inconsistent estimates in both equations as long as there are variables potentially correlated with either the error term or the idiosyncratic heterogeneity component. Both problems can be accounted for by using an IV estimator over the first-differenced equations of [5] and [6]. However, in order to improve efficiency we use the *system* GMM-IV estimation method, proposed by Arellano and Bover (1995) and fully developed by Blundell and Bond (1998), which greatly improves the performance of the first-differenced method alone, and, also important in our context, provides an estimation of the time invariant parameters of the model. This method, in addition to the orthogonality restrictions implied by the first-differenced equations $\{E(\Delta u_{it} z_{is}); t > s+1; t = 3,..,T_i\}$, where z_{is} denotes the available

instruments, also exploits the orthogonality restrictions between the error in either [4], [6], or [7] with all the predetermined instruments $\{E(u_{it}^{k}\Delta z_{is}); t > s; t = 3,..,T_i\}$. A Sargan (1988) test evaluates the validity of these restrictions. Note that our estimators for equations [4], [6], or [7] belong to the class of estimators for dynamic panel data models with sample selection.[19] Additionally, we must emphasize that the relevant estimation sample for the estimation of the offer equation is constructed by picking up at least two outcomes in which the initial claim is rejected. Similarly, the relevant sample for the estimation of the share (μ) equation is constructed by picking consecutive outcomes in which the agreement lies between the claim and the offer.

4. Empirical results.

4.1. Specification of the initial offers

We distinguish three groups of variables: those which correspond to specific characteristics of the bargaining unit, those which refer to some features of the current or previous bargaining process and those which capture the available information at the time of negotiations. Summary statistics and sources of all the variables are presented in the Appendix B.

In the first group, the *expected value added per employee* is included as a proxy for the value of the firm. It is expected to push the initial claim and to have no effect over a rejected offer, given the characteristics of the Spanish bargaining framework. In addition, the *percentage of sales in the local market* is also included as an indirect measure of competitive pressure.

In the second group a set of variables is included which account for potential differences between union power: *the percentage of the workers on the council which belong to CCOO (Comisiones Obreras) and UGT* (*Unión General de Trabajadores*), to *middle sized unions, to regional unions* and *small groups of representatives* (other groups including professional unions are omitted). We also control for the presence of a *single union on the works council*. This is because if there is only one union on the works council there are no coordination problems and, as a result, negotiating power is greater. The size of the bargaining unit is controlled by the *lagged number of employees*. The concession of a *cost of living allowance clause* in the previous year's agreement is also included as a way of incorporating the effect of the other issues being negotiated apart from wages.[20] Finally, in order to capture the effect of the negotiation timing and the quality of the aggregate signal, a dummy is included if the *negotiation process starts after the expiry of the last wage agreement*.

[19]See Wooldrige (1995) for a description in a static context, and García et al. (2006) for a description of the the procedure in a dynamic context.
[20]See Jiménez-Martín (1998) for a joint analysis of wage changes and cost of living allowances in Spain.

Finally, regarding information available at the time of negotiations, we distinguish between industrial and nation-wide effects. We include *the number of days lost by strike per employee in the industry* the firm belongs to, which acts as a proxy for the aggregate bargaining pressure and is part of the aggregate signal. An increase in the *industry rate of unemployment* or a decrease in *the change of the industry employment level* can be expected to lower both the claim and the offer. The higher *the expected level of inflation at the beginning of the negotiation process*, the higher both initials are expected to be, as long as a sufficiently large number of agents think of the inflation rate as the minimum guaranteed wage increase.

Moreover, also included is *the mean negotiated wage change settlement in the local region* (or combination of regions, in the case of a multiplant bargaining unit), dated from the beginning of the negotiation process. It is a proxy of the information that agents have about other bargaining units' actions and could capture spillover effects (see McConnell, 1989, and more recently Jiménez-Martín (1998) and Gu and Khun, 1998). It should contribute to the improvement of our specification in at least two directions. First, it offers some demand information not directly observable to the econometrician at the regional levels. Second, other firms' wage settlements may enter directly into wage negotiations through the reservation wage and/or the profit function (i.e., the aggregate signal).

Finally, *nationwide unions and employers association reference offers* and *aggregate unemployment* variables (*national unemployment* and *long-term unemployment rates*) play a crucial role in our specification. They are part of the aggregate signal and are expected to closely drive firm-level initial offers. Notice that these variables, which only have time series variation, are not identified when including time dummies as regressors. A set of industry dummies (8 industries) is also included.

4.2. Specification of the share equation.

In accordance with our model, we include controls for *strike activity* (occurrence and duration), *length of negotiations* (in logs), *hours* or *cost of living allowances*. We also consider the possibility of a non-linear dependence of both outcomes on the initial offers as well as dependence on the expected value of labor, proxied by the *expected value added per employee*.

The specification also controls for the *percentage of sales in the local market*, the *size of the bargaining unit*, the potential differences between union power described in the previous section as well as industry conflicting activity and other employment controls. We finally include a proxy for *uncertainty* at the industry level. The proxy is constructed as the standard deviation difference between the claim and the offer at the industry level (44 industries). Finally, a set of dummies to control the variation of the share across time and industries is also included. Note these dummies

also control the variation of the cost of a conflict across sectors.

4.3. Results for the claim and offer equations.

Table 3 presents the results of the estimation of our preferred claim and offer specifications. All of them have been estimated using the *system* GMM-IV estimation method. The results of two different specifications are reported for each equation depending on whether time dummies (columns 1 and 3) or aggregate variables (columns 2 and 4) are used. In all cases, we found absence of the second order autocorrelation in the first differences error term (which implies that the level error is white noise). Likewise, all pass the Sargan (1988) test for instrument validity (the instrument set is reported below Table 3). For coherency, the same set of instruments – except that the lags of the offers have not been considered in the claim equation – has been employed in all the equations.

The preferred specifications are dynamic since we found small but significant coefficient for the lagged claim and offer in respectively the claim and offer equation. As we were guessing, the effect of the current claim in the offer equation is not significant. Otherwise, the works council would have incentives to announce a relatively high initial claim. Finally, notice that the correction for sample selection is relevant in the offer equation.[21]

In regard to one of the key variables of the model we find that the expected value added per employee (our proxy for the value of the firm) plays a different role depending on the equation considered. It has a positive effect on the initial claim in the sense that the unions translate increases in expected productivity into increases in their initial claims. The implicit elasticity of the wage change claim to the expected value added per employee is 0.0486 in column (1) and 0.057 in column (2). Put another way, an increase of one percent in expected firm profitability increases the wage change claim by 4.9 percent in column (1). We have carried out some sensitivity analysis. For example, we have estimated the claim assuming the union is fully informed regarding v, and have found that the coefficient of the expected value added per employed becomes insignificant. More importantly, a Hausman test comparing the estimates obtained under the null of exogeneity of the proxy of $\tilde{v}$, and the alternative, as reported in column (1) of Table 3, rejects the validity of the estimates under the null [The estimates for both the claim and offer under the null of exogeneity of the proxy of $\tilde{v}$, and also the results of the exogeneity test are available upon request].

In contrast to findings for the claim equation and in accordance with expectations given the structure of the negotiation process the effect of our profitability measure on the initial offer is

[21]The detailed results of the estimation of the sample selection correction term are available upon request from the authors.

statistically insignificant (i.e. we do not reject $\alpha_o = 0$). This result remains unchanged when we assume the firm is fully informed regarding ν. Thus, due to the short period in which the firms may make a counteroffer, their initial offers do not reveal much information regarding their true status. On the other hand, by accepting the hypothesis that $\gamma_o = 0$, we confirm that higher initial claims do not lead to higher initial offers once all the relevant factors have been controlled for.

Taking the effect of the industry and aggregate information as a whole, we find that the initial (non-informative) offer is more responsive to aggregate signaling that is the claim. For example, all the unemployment variables are significant in the offer equation and insignificant in the claim one. The long term unemployment is found significantly negative in both equations, thereby reinforcing the stabilization role of the unemployment rate in Spain, as found by Andrés and Garcia (1993) or Dolado and Bentolila (1994).

With respect to other aggregate variables, we must point out that the level of industry conflicting activity increases the difference between both initials and shifts the *bargaining platform* to the right.[22] The effect of the expected level of inflation is similar and highly significant in both equations. However, the (average) wage change negotiated at the regional level (which proxies for the available information at the start of the bargaining process) is significant in the offer equation only.

It is also important to note that many observables referring to the characteristics of the bargaining unit enter differently, in size and/or in sign, in the two equations considered. Note that when the effect of a given variable has an opposite sign in the two initial offer equations, we can jointly interpret the two coefficients in terms of the degree of disagreement (i.e., the difference between claim and offer).[23] In this sense, the degree of disagreement decreases when the negotiations start after the former agreement expires (since there is less uncertainty) and increases with the size of the bargaining unit. The joint effect of union variables seems to indicate that the degree of disagreement decreases with the importance of the powerful nationwide union groups (CCOO or UGT) on the works council. Finally, as expected, indexing previous agreements (which proxies the likelihood of getting indexation in the current negotiation) has a negative effect on both equations and is greater in absolute value in the claim equation.

4.4. Results for the share equation.

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[22]Whereas there are several studies that include a measure of aggregate strike activity in firm-level wage negotiations (Card (1990) is an example), the process of transmission from sectoral to firm level negotiations is still unclear.

[23]Note that a greater level of disagreement has strong implications in the remainder of the bargaining process. For instance, as illustrated by Jiménez-Martín et al. (1996), it increases the likelihood of a strike during negotiations.

Table 4 presents the results of the estimation of our preferred specification for the relative share of the wage platform and the length of negotiations equations. In the first case, we present three versions from a single specification: without correcting for sample selection (column 1), correcting for sample selection but without instrumented it (column 2), and, correcting for sample selection and instrumenting them (column 3). In the second case, we present a single specification without correcting for sample selection (column 4). Because of the potential endogeneity of a number of variables (expected value added per employee, conflicting activity and other variables) all the specifications have been estimated using the *system* GMM-IV estimation method. Although all specifications pass the standard test, the specification in column 3 is preferred to those in column 1 and 2, since we reject both the null that the corrections for sample selection are non-significant and the null that the corrections are exogenous.

Turning now to the main results from the analysis, we find that the share parameter (a proxy of union's bargaining power) is much greater at sample means[24] in those sectors more dependent from labor: the building (0.546), other manufactures (0.470), financial services (0.471) and commerce and restoration (0.4534) sectors. On the contrary, is lower in the Energy and Minerals (0.227), Chemical sector (0.347) and telecommunication (0.360) and the Metal (0.387) sectors. Moreover, the analysis of time dummies reveals that the share is generally larger in those years in which there is no formal nationwide agreement (from 1989 on).

At standard significance levels and conditional on covariates, we reject the null hypothesis $\varphi_j < 0$ in all the sectors considered (being rejection clearer in those sectors more dependent from labor). However, this does not automatically imply that we accept the hypothesis $\mu_j \geq 1/2$ since we reject the hypothesis that the rest of the coefficients of the model, excluding the time dummies and the coefficients of the sample selection, are jointly zero. Taking into account the effect of the rest of the variables of the model we reject $E(\mu_j \mid \varphi_j, X_j, \lambda) \geq 1/2$ for the primary, industrial, commerce and telecommunications sectors, and are unable to reject it for the rest of the sectors, specially for the building and the financial + other services sectors. Alternatively we reject the unconditional expectation of the relative agreement is one half ($E(\mu_j \mid \varphi_j, X_j) \geq 1/2$) only for the Primary, Mining and Chemical and Metal sectors.

We got a number of other important results, all of them offering support to a signaling interpretation of wage bargaining. For example, we find that the larger the initial claim and offer are the lower is μ. For example, in column (3) the elasticity of μ with respect to the claim and the

[24]In order to compute the average location parameter, we set at sample means all the regressors expect the corresponding sector dummy.

offer is 0.79 and 0.30, respectively. It is also very important the fact that the elasticity of μ with respect to the value added per employee (a proxy of the value of the firm) is significant in all the specifications and is estimated between 0.08 and 0.15, much larger than the range we found for the initial claim equation. The implicit total elasticity of the agreement to the value added per employee is estimated between 0.10 and 0.16.

We find also very interesting results regarding conflicting activities. The joint effect of the strike variables goes in line with the results in Jiménez-Martín (1999) who studied the unconditional sample: it is positive for short strikes and negative for average and larger strikes.[25] For example, after one day strike the increase in μ is 0.035 in column 3. After five days, the increase is 0.012. After a fortnight strike the reduction is -0.049, and -0.14 after one month. As expected we find that the effect of the length of the negotiations is negative (and less significant) but smaller than the effect of a strike: while the elasticity of μ to the length of negotiations is 0.04, the corresponding figure for the elasticity to the length of the strike is 0.07. As regards the effect of other potential negotiation issues, we find that the share parameter decreases with the change in the number of agreed hours and is little affected by the negotiation of a cost of living allowance clause. Regarding the effect of industry variables, we find the more uncertainty (or conflicting activity) there is at the industry level the greater the fraction of the wage platform the union's is able to capture.

Note that none of these pieces of evidence are against a signaling interpretation of wage bargaining in Spain. To further reinforce our argument as complementary evidence we present in Table 4 GMM-IV estimates of an equation explaining the length of the negotiation period. The result regarding the value added per employee is specially revealing since an increase in the expected value added per employee by one percent decreases the duration of the negotiation by 0.18 percent. Other results are in line with expectations, since the claim and the offer have both the expected signs (positive and negative respectively, implying a positive effect of the size of the initial disagreement), and the length of a strike and the existence of a cost of living clause both increase the duration of the conflict.

5. Summary of findings and main conclusions

In this paper we have analyzed the determination of the initial claim and offer, as well as the share of the disputed wage the workers are able to get using Spanish CBLF data from the 1985-

[25] If long-run strike costs are higher than short-run strike costs, then wages can increase in the short-run, and decrease in the long-run (Cramton and Tracy (1994)).

1991 period. We have assessed the formation of the initial union claim and firm offer in a signaling context and conditional to an unknown (to the econometrician) but short deadline. In addition, we have analyzed, conditional to disagreement in the first round of offers, the fraction of the wage platform the workers are able to get. By doing so, we are able to evaluate a number of predictions from signaling models against a more simplified bargaining procedure, such as the "split the difference" hypothesis. The analysis has carefully considered the econometric methods and testing procedures required by the model and the panel structure of the data.

As predicted in bargaining models, we found that the works council claim is positively related to both the reference claim and the expected value of the firm or firm's profitability, although the implicit elasticity is small. Additionally, we found that the firm's offer is closely related to the (aggregate) reference offer and unrelated to actual profitability and to the initial claim. Thus, consistently with Cramton and Tracy's (1994) model with the addition (specific to the Spanish case) of a predetermined deadline, the initial claim screens the value of the firm, while a majority of offers, because they must be announced before a predetermined deadline, do not reveal, as a rule, any of the firm information (except in those cases where the claim is accepted immediately). The results mentioned are robust to various specification exercises. Jointly, these findings imply that the time between initial offers crucially influences the negotiation process and, indirectly, they offer some support to signaling models of wage negotiations.

In addition, employers and employees incorporate common knowledge variables into their respective offers in very different ways (and thus $\beta_c \neq \beta_o$). For example, if the bargaining process starts after the expiration of the former agreement, the gap between the claim and the offer (that is, the level of uncertainty in the negotiation process) is significantly reduced. Furthermore, both the initial claim and the initial offer are relatively more closely related to aggregate wage setting than to the firm's profitability. This illustrates the fact that the Spanish system of wage bargaining leads to an inflationary bias, as indicated by Blanchard et al. (1995). This constitutes clear evidence in favor of the existence of some sort of wage rigidity caused, among other factors, by the structure of the Spanish collective bargaining system.

In relation to findings with respect to the fraction of the wage platform the works council gets, we confirm a number of the predictions of standard signaling models: in particular, the share responds to other negotiation subjects, it responds (negatively) to conflicting activity (confirming the negative slope of the wage concession curve), to the length of negotiations, to the expected value of the firm, to the level of uncertainty, and also to a variety of firm and industry determinants. Complementary, results for the length of negotiations go in the same direction, since firms that can lose the most are quicker to settle the agreement.

It is also important to note that, once we control for observables, the fraction of the relative

wage platform the workers get varies largely by sector as a reflection of the differences in bargaining power (as well as implicit cost of a conflict) between sectors. If we believe in a one-to-one relationship between this fraction or share parameter and bargaining power, we can conclude that the latter it is much greater in the Building sector, the Other Manufactures sector and the Financial + Other Services sector than in other sectors, being the extreme case the Energy and Utilities sector.

Note that, at the same time, we are unable to reject the null hypothesis $\varphi_j \geq 0$ in any of the eight sectors considered, although rejection is clearer in those sectors with greater dependence from labor. However, acceptance of this hypothesis does not imply the rejection of more sophisticated bargaining models (such as signaling or related wage bargaining models) since we have found that the fraction of the pie the union gets depends on a number of known and unknown variables at the time of the negotiation. More precisely, we reject $E(\mu_j \mid \varphi_j, X_j, \lambda_j) \geq 1/2$ for primary, industrial, commerce and telecommunications sectors, and are unable to reject it for the building and the financial + other services sector. Alternatively, we reject (but not by a large amount) the unconditional expectation of the relative agreement is one half ($E(\mu_j \mid \varphi_j, X_j) \geq 1/2$) only for the primary, Mining and Chemical and Metal sectors. Note that by accepting that $E(\mu_j \mid \varphi_j, X_j)$ =½ or close to this value, we are rejecting the possibility of systematic bluffing in Spanish wage negotiations.

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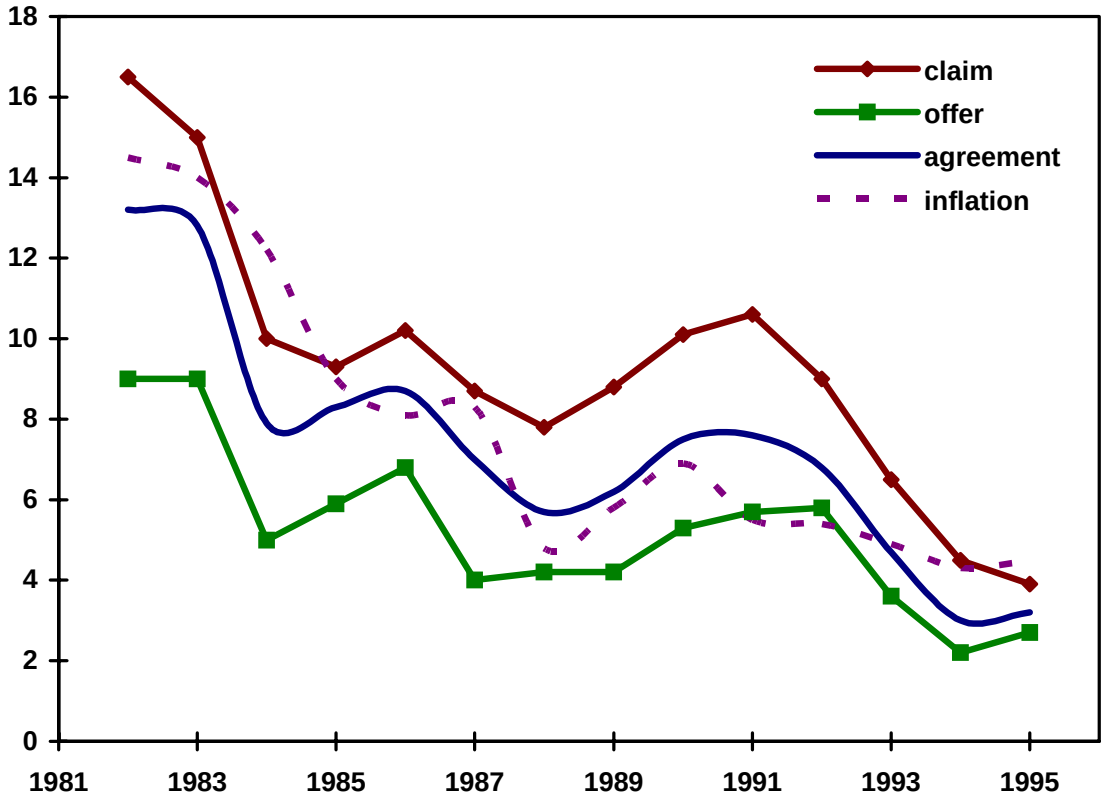
Figure 1. Initial claim and offer, agreement and inflation.



Sources: CBLF survey annual reports and Bank of Spain statistical bulletin for annual inflation.

Table 1. Bargaining determinants and outcomes: 1982-1995.

	AGGREGATE BARGAINING			CBLF SAMPLE BARGAINING OUTCOMES						INFLATION		
year	*Nationwide agreement*	*RC %*	*RO %*	*claim %*	*offer %*	*agree %*	*A-O / C-O*	*l_neg days*	*strike hours*	*Target %*	*CPI %*	*Gdp %*
1982	Yes	11	9	13.0	9.0	11.0	0.51	73	4.6	12.5	14.0	1.2
1983	Yes	12.5	9.5	15.0	9.0	11.5	0.42	65	4.2	12.0	12.2	1.8
1984	No	10	6.5 to 8	10.0	5.0	7.9	0.48	87	10.2	8.0	9.0	1.8
1985	Yes	7.5	5.5	9.3	5.9	8.3	0.71	75	3.0	7.0	8.1	2.3
1986	Yes	8.5	5.2	10.2	6.8	8.7	0.56	117	2.0	8.0	8.3	3.2
1987	No	8.0	5.0	8.7	4.9	7.0	0.55	96	6.0	5.0	4.8	5.6
1988	No	6	3 to 5	7.8	4.2	5.7	0.42	150	2.0	3.0	5.8	5.2
1989	No	7	3 to 6	8.8	4.2	6.2	0.45	157	4.7	3.0	6.9	4.7
1990	No	9	5	10.1	5.3	7.5	0.46	131	2.7	5.7	6.5	3.7
1991	No	9	5 to 7	10.6	5.7	7.6	0.39	121	6.7	5.0	5.5	2.3
1992	No	8	3 to 5	9.0	5.8	6.8	0.31	133	3.7	5.0	5.3	0.9
1993	No	5+	2 to 5	6.5	3.6	4.7	0.38	262	1.2	4.5	4.9	-1.0
1994	No	1-1.5	4-5	4.5	2.2	3.0	0.35	213	2.4	3.5	4.3	2.4
1995	No	1.9	4	3.9	2.7	3.2	0.42	172	2.1	3.5	4.5	2.8

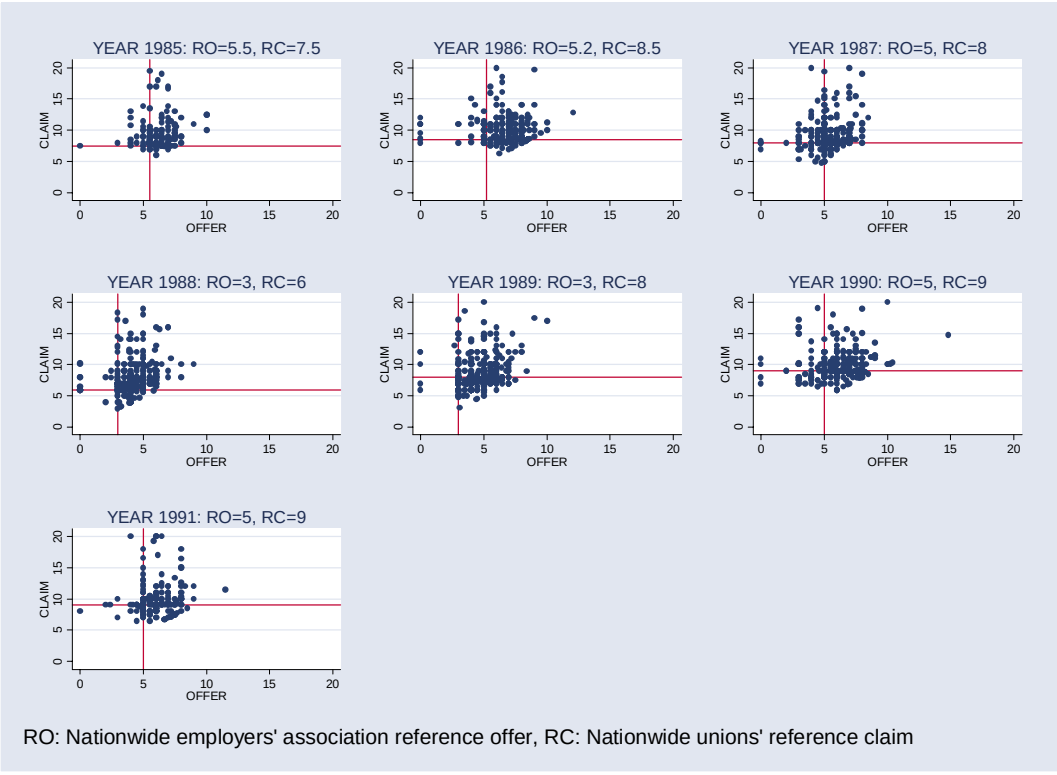
Notes:
-RO (RC): From 1982 to 1986 [except 1984], lower (upper) bound of the nationwide recommended agreement band. Since 1987, nationwide employer's (union) recommended reference offer (claim).
-l_neg: average length of negotiations.
-strike hours: Unconditional average number of hours lost by strikes.
-Target: Government's inflation target.
-CPI: December to December increase in the Consumer Price Index.
Sources: CBLF and *Circular para la Negociación Colectiva*, Employers Association, Madrid, 1994.

Table 2. Descriptive statistics for different types of agreement. 1985-1991 (sample period).

	Regular outcome Claim > Agreement > Offer (1)		*First union claim accepted (2)*		*First union claim accepted after a counteroffer (3)*		*First firms' offer accepted (4)*	
	mean	*median*	*mean*	*median*	*mean*	*median*	*Mean*	*median*
Results of the negotiation process								
Initial claim (%)	10.1	9.0	7.1	7.5	7.4	7.5	9.4	8.8
Agreement (%)	7.0	7.0	7.1	7.5	7.4	7.5	6.5	7
Initial offer (%)	5.2	5.0	7.1	7.5	5.8	5.7	6.5	7
(A-O)/(C-O)%	0.44	5	100.0	100.0	100.0	100.0	0.0	0.0
Change in hours (%)	-0.43	0.0	-0.15	0.0	-0.31	0.0	-0.49	0.0
Cost of Living protection (%)	77.3	--	74.2	--	76.2	---	65.5	---
Strike incidence (%)	17.0	-	3.1	-	12.1	-	6.4	-
Length of negotiations (days)	100.7	80	47.5	19	95.7	61	74.6	49
Conditional strike duration	4.61	2.00	0.78	0.80	3.68	1.71	4.02	1.12
Firm information								
Δ value added per employee	8.3	8.0	9.4	7.8	7.3	11.1	8.2	6.8
Δ employment in the firm	-0.1	0.0	-0.2	0.0	2.3	1.1	-0.4	-0.5
Observations (%)	1859	(85.7)	96	(4.4)	41	(1.9)	171	(7.9)
Share parameter by sector	1	2	3	4	5	6	7	8
Mean %	38.1	40.1	43.2	44.6	51.1	47.8	41.6	50.3
Median %	36.0	40.0	42.8	44.0	51.0	50.0	40.0	50.0

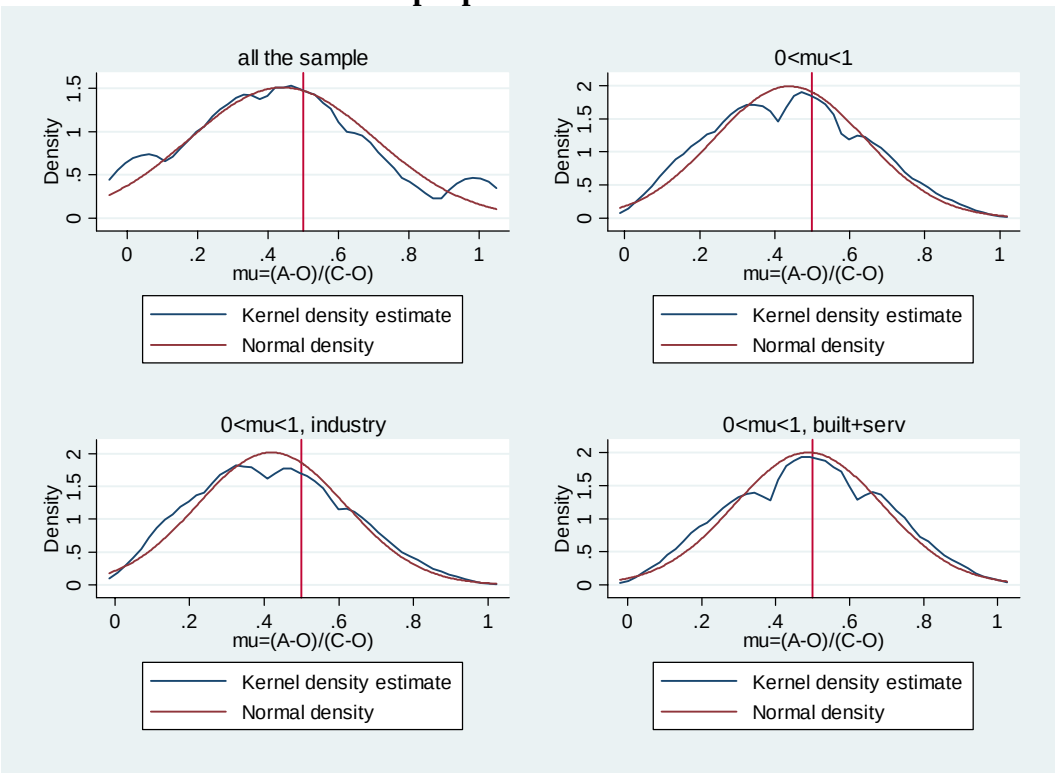
Notes: See notes to Table 1. Sectors: 1 Primary and Utilities; 2 Mining and Chemical; 3 Metal, Electronics, Mechanical industries; 4 Other Manufacturing industries; 5 Building; 6 Commerce; 7 Transport and Telecommunications; 8 Financial + other services.

Figure 2. Claim, Offer and aggregate initials in 1985–1991 (sample period).



Notes: RO: Nationwide employers' association reference offer (midpoints).
RC: Nationwide unions' reference claim (midpoints).

Figure 3. Kernel density of μ or share parameter [A-O)/(C-O)]. Sample period 1985-1991.



Notes: A=agreement, C=initial claim; O= initial offer.
All the sample does not excludes any agreement form the sample

Table 3. Initial claim and offer determination.
Estimation method: GMM-system estimator

	CLAIM ***(1)*** ***coef. t-st.***	***CLAIM*** ***(2)*** ***coef. t-st.***	***OFFER*** ***(3)*** ***coef. t-st.***	***OFFER*** ***(4)*** ***coef. t-st.***
Constant	6.679 (2.28)	4.610 (1.23)	-1.876 (1.29)	3.290 (1.49)
Lagged claim⌘‡	0.113 (5.81)	0.085 (4.72)		
lagged offer⌘‡			0.199 (8.75)	0.075 (3.50)
current claim⌘‡			0.010 (0.79)	0.014 (1.05)
lagged wage‡	0.094 (0.33)	-0.077 (0.28)	0.447 (2.48)	-0.352 (1.77)
lagged (twice) wage‡	-0.482 (4.32)	-0.493 (4.38)	0.081 (2.02)	0.081 (2.25)
$\hat{\lambda}_{it}^{a=c=o}$ ‡			-2.846 (7.07)	-2.691 (6.82)
value added per employee‡	0.457 (2.92)	0.533 (3.38)	0.035 (0.63)	0.119 (2.05)
% of sales in the domestic market	-0.332 (1.06)	-0.166 (0.52)	0.304 (2.35)	0.237 (1.76)
a single union on the works council (wc)	-0.478 (2.17)	-0.409 (1.86)	0.050 (0.50)	0.061 (0.63)
% of rep. Of CCOO on the wc	-0.041 (0.09)	-0.072 (0.16)	0.494 (2.59)	0.539 (2.37)
% of rep of regional unions on the wc	-0.443 (0.73)	-0.655 (1.09)	0.603 (2.63)	0.811 (3.15)
% of rep of UGT on the wc	-0.855 (1.85)	-0.825 (1.78)	0.449 (2.10)	0.320 (1.29)
% of small groups on the wc	-0.444 (0.97)	-0.409 (0.90)	0.437 (2.27)	0.523 (2.32)
lagged strike duration	-0.001 (0.07)	0.003 (0.37)	-0.005 (2.32)	-0.005 (2.47)
Bargaining started with delay	-0.187 (1.49)	-0.224 (1.79)	0.341 (6.20)	0.368 (6.67)
COLA signed in the last agreement	-0.426 (3.04)	-0.467 (3.34)	-0.176 (3.05)	-0.159 (2.64)
lagged employment‡	0.043 (0.48)	0.100 (1.15)	-0.100 (3.93)	-0.081 (2.99)
industry strike conflicting activity	0.372 (4.01)	0.387 (4.14)	0.052 (2.95)	0.022 (1.18)
industry unemployment rate	-0.028 (0.16)	0.012 (0.07)	0.149 (2.67)	0.185 (3.00)
change in industry employment	-0.566 (0.80)	-0.054 (0.08)	0.002 (0.01)	0.357 (0.95)
Expected level of inflation⌘	0.191 (3.02)	0.190 (3.00)	0.295 (9.48)	0.272 (9.02)
regional wage change signal⌘	0.072 (1.76)	0.062 (1.53)	0.064 (3.80)	0.075 (4.46)
Nationwide employers reference offer⌘	—	0.363 (4.46)	—	0.201 (4.50)
Nationwide union's reference claim⌘	—	0.063 (0.64)	—	0.064 (1.56)
Nationwide unemployment rate	—	-1.723 (1.41)	—	-1.619 (2.27)
lagged nationwide long term unemployment		-5.677 (2.20)		-7.631 (5.17)
Sample	*claim sample*	*claim sample*	*offer sample*	*offer sample*
Number of firms (observations)	*369 (1146)*	*369 (1146)*	*347(1045)*	*347(1045)*
Specification tests				
industry dummies (df)	Yes	Yes	Yes	Yes
time dummies (df)	Yes	No	Yes	No
Wald (df)	708.19(24)	687.01(23)	2277.82(26)	1796.47(25)
Sargan (df)	87.26(77)	100.14(77)	101.00(109)	123.93(109)
Fosc	-2.09	-2.05	-5.49	-5.32
Sosc	0.05	-0.03	-1.44	-1.74

Notes: Absolute value t-statistics in brackets; The variables (x) marked ⌘ have been transformed by $log(1+x/100)* 100$.
-*claim sample*: Full (unrestricted sample). [See Table A.1 for a description of the sample employed].
-*offer sample*: Restricted sample, i.e., excluding those observations in which the firm accepts the initial union's claim.
The variables marked ‡ have been instrumented. Instruments: $z_{t-1}..z_{t-4}$ for first differences equations and Δz_{t-1} for level equations. Further instruments: Lagged values of the level of profits per employee. The rest of the variables are assumed exogenous.
Wald: Wald test of the null that the vector of coefficients (excluding time and industry dummies) is zero.
Sargan: Test of the validity of the set of instruments used. Under the null of adequacy, the test is distributed as a χ^2_r, where r is the number of overidentifying restrictions.
fosc(sosc): Test of the absence of first (second) order serial correlation in the error term (Arellano & Bond, 1991).

Table 4. Outcome variables: share of the wage platform (μ) and length of negotiations (dur). Estimation method: GMM-system estimator.

	log(μ /(1- μ))			*Log(dur)*
	(1)	***(2)***	***(3)***	***(4)***
	coef. T-st.	***coef. t-st.***	***coef. t-st.***	***coef. t-st***
Constant	-0.803 (1.26)	-1.044 (1.68)	-0.477 (0.92)	6.072 (10.8)
Claim	-0.128 (19.3)	-0.116 (18.0)	-0.142 (19.4)	0.014 (3.37)
Offer	-0.244 (13.2)	-0.225 (8.42)	-0.112 (3.80)	-0.060 (4.06)
$\hat{\lambda}^{a=c=o}$		-0.136 (0.40)	-1.392 (3.96)	
$\hat{\lambda}^{c>a=o}$		1.188 (4.50)	0.966 (4.56)	
$\hat{\lambda}^{c=a>o}$		0.340 (0.56)	-2.409 (5.34)	
Strike indicator‡	0.213 (2.06)	0.293 (2.86)	0.173 (2.35)	-0.043 (0.47)
Strike length‡	-0.043 (3.01)	-0.047 (3.44)	-0.025 (2.52)	0.051 (4.75)
Length of negotiations	-0.139 (2.37)	-0.123 (2.08)	-0.076 (1.89)	----
Cost of living clause‡	0.243 (2.22)	0.153 (1.35)	0.012 (0.17)	0.495 (4.47)
Change in agreed annual hours‡	-0.026 (4.35)	-0.026 (4.47)	-0.027 (5.35)	-0.022 (4.16)
value added per employee‡	0.220 (3.75)	0.207 (3.60)	0.134 (2.96)	-0.184 (3.32)
% of sales in the domestic market	-0.067 (0.54)	-0.104 (0.80)	-0.023 (0.22)	-0.071 (0.72)
Uncertainty at the industry level	0.057 (3.93)	0.052 (3.78)	0.051 (4.67)	-0.021 (2.01)
a single union on the works council (wc)	-0.001 (0.01)	-0.033 (0.35)	0.019 (0.25)	-0.063 (0.73)
% of rep. Of CCOO on the wc	0.396 (3.04)	0.422 (3.41)	0.364 (3.64)	0.097 (0.70)
% of rep of regional unions on the wc	0.218 (1.18)	0.113 (0.59)	0.503 (3.62)	0.460 (2.11)
% of rep of UGT on the wc	0.503 (2.99)	0.492 (2.83)	0.588 (4.45)	0.110 (0.75)
% of small groups on the wc	0.117 (0.73)	0.140 (0.91)	0.178 (1.60)	-0.399 (2.70)
Bargaining started with delay	-0.119 (1.37)	-0.103 (1.18)	-0.091 (1.59)	-----
Lagged employment	-0.083 (2.95)	-0.078 (2.64)	-0.031 (1.38)	0.021 (0.85)
industry strike conflicting activity	0.122 (6.45)	0.117 (6.56)	0.106 (8.87)	-0.036 (3.21)
industry unemployment rate	-0.187 (2.96)	-0.190 (3.07)	-0.122 (2.56)	0.048 (0.83)
change in industry employment	-0.534 (1.70)	-0.797 (2.52)	-0.397 (1.78)	-0.255 (1.22)
S2 Mining and Chemical	0.734 (5.33)	0.667 (4.76)	0.587 (5.75)	-0.629 (4.49)
S3 Metal, Electronics, Mechanical ind.	1.027 (7.08)	1.011 (6.94)	0.711 (6.16)	-0.601 (4.11)
S4 Other Manufacturing industries	1.171 (7.40)	1.183 (7.45)	1.039 (8.56)	-0.645 (4.12)
S5 Building Sector	1.589 (6.38)	1.633 (6.67)	1.279 (6.06)	-0.508 (2.28)
S6 Commerce	1.074 (5.23)	1.034 (5.05)	0.990 (5.83)	-0.426 (2.11)
S7 Transport and Telecommunications	0.705 (4.34)	0.681 (3.95)	0.688 (5.22)	-0.212 (1.41)
S8 Financial + other services	1.095 (7.78)	1.137 (8.20)	1.057(10.13)	-0.027 (0.21)
Year 1987	-0.478 (6.97)	-0.338 (4.75)	-0.517 (9.13)	-0.031 (0.66)
Year 1988	-0.681 (9.05)	-0.519 (6.50)	-0.518 (8.17)	0.052 (0.91)
Year 1989	-0.240 (3.52)	-0.118 (1.73)	-0.168 (2.91)	0.081 (1.42)
Year 1990	0.189 (2.75)	0.302 (4.36)	0.081 (1.31)	0.286 (5.36)
Year 1991	0.004 (0.05)	0.045 (0.55)	-0.073 (1.09)	0.264 (3.97)
Number of firms (observations)	320/1255	320/1255	320/1255	320/1255
Specification tests				
Wald1 (all the variables)	2121.71(33)	2016.59(36)	3639.55(36)	496.35(30)
Wald2 (excluding sectoral and year dummies)	928.88(20)	278.60(20)	902.73(20)	215(18)
Sargan (df)	109.65 (121)	114.85 (121)	163.99 (169)	101.11(99)
Fosc	-5.15	-4.95	-5.52	-4.18
Sosc	0.49	0.58	0.26	-0.50

Notes: log(dur)= log of duration in weeks. Other notes: see below Table 3.

Appendix A. A sketch of Cramton and Tracy (1999) signaling model with two-phase threats in the presence of a predetermined firm-specific deadline and aggregate bargaining.

We assume that each period there is either a negotiation at the aggregate level or the industry level or both (all following similar procedures than at the firm level) which produces a signal about the state of the economy relevant to the firm. The common knowledge signal (ϑ) is multidimensional, and includes the aggregate wage increase or wage increase band, the aggregate conflicting activity, etc. In what follows we present a sketch of the solution of the firm problem conditional to this upper level bargaining.

a) Bargaining between the firm and the union

In line with Cramton and Tracy (1994, 2003) we consider a union and a firm that are bargaining over the wage to be paid during a contract of duration T. The union's reservation wage is common knowledge. Let v be the firm's value of the current labor force working under a contract of duration T. It is common knowledge that v is drawn from the distribution F with positive density f on an interval of support $[l(\vartheta), h(\vartheta)]$, where ϑ denotes the aggregate signal. Prior to aggregate negotiations the firm knows the relative position of v. After aggregate negotiations (either economy wide or sectoral or both) have taken place, ϑ is revealed. So, at the outset of the negotiations, the firm knows the realization of $v(\vartheta)$, let us denote it by $\tilde{v}$.

For ease of exposition, we follow Cramton and Tracy (1994) and consider a threat that consists of two phases indexed by $\theta \in \{1,2\}$, a short-run or *platform* phase (1) and a long-run or *conflict* phase (2) with different payoffs in each phase.[1] During the phase θ, the union receives a payoff of x_θ and the firm receives a payoff of $y_\theta(\tilde{v}) = a_\theta \tilde{v} - b_\theta$, where $a_\theta < 1$. The dispute cost $1-a_\theta$ represents the fraction of v that is lost during a dispute. The inefficiency from dispute is $(1-a_\theta)\tilde{v} + b_\theta - x_\theta = (1-a_\theta)(\tilde{v}) + c_\theta)$, were $c_\theta = (b_\theta - x_\theta)/(1-a_\theta)$. We assume that the inefficiency is positive (but small) for all $\tilde{v} \in [l(\vartheta), h(\vartheta)]$, which implies $c_\theta > -l(\vartheta)$.

Assume that the platform phase of the threat lasts until a predetermined time $\tau \in [0,T]$,[2] after which the threat shifts to the second phase for the remainder of the contract period. Note that τ can be understood as an exogenous deadline, which forces the firm to announce its initial offer to form the *wage platform*.[3] The deadline can vary by sector but is short and fixed by negotiation standards, with general guidelines described in the Workers Statute. During this pseudo cooling-off period the inefficiency, a_1, is small and workers are paid the previous year wage rate (w_0), that is, $b_1 = w_0$.

Given the deadline, τ, the union makes an initial wage claim. The firm can either accept of reject it. If it is rejected, it must announce a counteroffer before the deadline time τ. In case of further rejection, the parties alternate wage offers until an agreement is reached. Offers can occur at any time after the minimum time between offers has passed.[4]

An outcome of the bargaining, $\{t, w\}$, specifies the time of agreement $t \in [0, T]$ and the contract wage w at time t. The discounted fraction of the pie remaining at time τ is defined as

[1]The model can be generalized to multiple phases of a single threat or a combination of threats.

[2] In some cases, the switch time τ may be predetermined by the firm or the union, and, in other cases, it may be pre-specified by labor policy. In all circumstances, the deadline is short.

[3]Cramton and Tracy (1994, 2003) stated: "…*Our basic model applies if we associate the conciliation and cooling off periods with the first phase of the strike threat. In this case, we have a threat with a small inefficiency in the short-run and a high inefficiency in the long-run. From the prior section, this implies that dispute durations are increased by the cooling off period, since the settlement rate in the cooling off period is much less than the settlement rate once a strike has begun. Strike incidence falls, since some would-be strikes settle during the cooling off period. Although the cooling off period restricts the union's ability to call a strike, for cooling off periods that are short relative to the contract length, this constraint has little effect on the union's payoff. The delayed strike threat remains effective, since both parties anticipate its use after the cooling off period. Hence, the negotiated wage is based largely on the strike threat, even if a settlement is reached*".

[4]In fact neither the alternating offers or the minimum time between offers assumptions are needed for the results to hold.

$\delta = d(\tau) = (e^{-r\tau} - e^{-rT})/(1-e^{-rT})$. Given the outcome, each side's payoffs are the present value of the payoff flows over *[0, T]*. Hence, the union's payoff is,

- $U(t,w,\tau) = \begin{cases} (1-d(t))x_1 + d(t)w & if\ t \le \tau \\ (1-\delta)x_1 + (\delta - d(t))x_2 + d(t)w & if\ t > \tau \end{cases}$

and the firm's payoff is

- $V(t,w,\tau) = \begin{cases} (1-d(t))(a\nu_1 - b_1) + d(t)(\tilde{\nu} - w) & if\ t \le \tau \\ (1-\delta)(a\nu_1 - b_1) + (\delta - d(t))(a\nu_2 - b_2) + d(t)(\tilde{\nu} - w) & if\ t > \tau \end{cases}$

In this context, the initial claim $w^c(\hat{\nu})$ is formed as:

- $w^c(\hat{\nu}) = (1-\delta)w_1(\hat{\nu}) + \delta w_2(\hat{\nu})$

where $\hat{\nu}$ is expectation of $\nu(\vartheta)$, and $w_j(\hat{\nu});\ j = 1,2$ are the full information or Rubinstein wage for threat *j*. Given the initial claim, the firm's initial offer, which has to be announced before or at the deadline τ, is formed:

d) if $\hat{\nu} \le \tilde{\nu}$ the initial claim is accepted and the negotiation ends.

e) If $\nu_\tau \le \tilde{\nu} < \hat{\nu}$; where $\nu_\tau = \hat{\nu} - (1-\delta)(\hat{\nu} + c_1)/\alpha$ and $\alpha = 1 + \delta(a_1 - a_2)/(1-a_1)$, the firm waits until $D(\nu(\vartheta)) = \alpha(\hat{\nu} - \tilde{\nu})/(\hat{\nu} + c_1) < \tau$ and offers:

- $w^o(\nu(\vartheta),\tau) = (1-\gamma(\nu(\vartheta)))w_1(\nu) + \gamma(\nu(\vartheta))w_2(\nu)$

f) If $\nu < \nu_\tau$ then the firm makes the following non-informative offer before the deadline has passed:

- $w^o(\tilde{\nu},\tau) = w^o(l(\vartheta)) = (1-\delta)w_1(l(\vartheta)) + \delta w_2(l(\vartheta))$

where *l(ϑ)* is a function of the information available at the beginning of the negotiation process and $\delta = d(\tau)$. That is, when $\tilde{\nu} < \nu_\tau$ the firm offers the minimum offer, which is non-informative on the value of $\tilde{\nu}$. After this non-informative offer the game proceeds as in Cramton and Tracy (1994).[5] Note, that in the subgame that starts after option (c), there is less uncertainty in the problem since now $l(\vartheta) \le \tilde{\nu} < \nu_\tau < m$ is common knowledge. However, since we have no data on subsequent offers (we only have information about final settlements), we cannot explore the formation of second round and further offers.

[5]Strictly speaking we do not need any minimum time between offers. Note also that the negotiation ends at time $D(\nu) = 1 - \delta(\nu + c_2)/(\nu_\tau + c_2)$, when the firm makes an offer $w_2(\nu)$ which is immediately accepted by the union.

Appendix B. ***Definition and summary statistics of the variables employed.***

The data used in this study comes from the CBLF, an annual survey of bargaining in large Spanish firms (more than 200 employees). Each wave provides information about main firm results (sales, value added and profits), employment structure and negotiation by bargaining unit. The survey started in 1978 and stopped in 1995. However, publicly released files are only available for the period 1985-1991. From the original database, we have excluded those firms that do not report information for certain key variables such as, value added, employment, wage increase agreement, initial positions and length of negotiation. In Table A.1 we present the summary statistics, the definition and the source of the variables employed and, the structure of the initial claim and initial offer samples.

Table A.1. Variables: descriptive statistics, definition and source.

	Claim sample (2171 obs.)		*Offer Sample*[a] (1996 obs.)		
Variables	*Mean*	*st dev*	*Mean*	*st dev*	*Definition (when necessary)*
Initial offers and agreement					
Agreement	6.970	1.378	6.95	1.336	Final wage increase agreement
Claim	9.835	4.588	10.00	4.690	works council first wage increase claim(%)
Offer	5.423	1.633	5.333	1.500	firm's first wage increase offer (%)
μ = (A-O)/(C-0)	0.441	0.264	0.415	0.238	Relative agreement
Firm variables.					
Value added per employee	8.563	0.757	8.562	0.750	(in logs)
% of sales in the domestic market	86.6	20.8	86.3	21.1	in percentage
Bargaining unit variables					
A single union on the works council	10.90	31.20	10.20	30.2	dummy (1=single union at the works council)
% of rep. of CCOO on the wc	36.40	25.10	36.80	24.90	in percentage
% of rep of regional unions on wc	5.50	14.20	5.70	14.40	in percentage
% of UGT on the wc	30.60	22.40	30.50	22.10	in percentage
% of small groups on the wc	21.20	27.70	20.50	26.90	in percentage
Lagged strike duration	0.157	0.364	0.163	0.369	lagged strike days per employee
Length of negotiations	4.085	1.187	4.156	1.094	Log of the number of days of negotiation.
Bargaining started with delay	24.5	43.0	23.0	42.1	1 if negotiation starts after expiry of last agreement
COLA signed	0.762	0.426	0.761	0.426	
Lagged COLA signed	74.90	43.40	74.80	43.40	COLA: 1 if the last agreement has a COLA
Change in agreed hours	-0.416	1.812	-0.432	1.867	Change in the # of annual agreed hours.
Lagged employment level	6.418	1.128	6.434	1.100	number of employees in the BU (in logs)
Lagged wage	8.298	0.39	8.300	0.39	wage bill per employee (in logs)
Other variables.					
Working days lost per employee	0.445	1.026	0.458	1.063	industry averages (44 industries, source: BEL)
Uncertainty	4.326	1.840	4.294	1.847	Industry (44) standard deviation of claim-offer
Industry unemployment rate	13.45	7.930	13.55	8.050	in percentage (44 industries, source: EPA)
Change in industry employment	0.025	0.066	0.025	0.065	44 industries (source: EPA)
Expected level of inflation	5.465	1.821	5.407	1.786	ARIMA price increase forecast at the start of negotiation process
Regional wage increase signal	7.351	1.380	7.348	1.382	signed in the month preceding the start of negotiation (%). (source: BEL)
Employers' reference offer	4.342	1.011	4.316	1.013	employers association's yearly prescription
Unions' reference claim	7.99	0.994	7.986	0.999	nationwide union's yearly prescription
National unemployment rate	18.70	2.001	18.60	1.990	in percentage (source: EPA)
Long term (+2 yr) unemployment	38.40	3.990	38.50	4.040	in percentage (source: EPA)

Observations per BU	***2***	***3***	***4***	***5***	***6***	***7***
Claim sample: BU	321	188	77	53	39	22
Offer sample: BU	298	169	71	53	36	18

Notes:

a. The selection criterion is that the firm rejects the initial claim and makes a (counter)offer.

Sources: CBLF: Ministerio de Economía y Hacienda. BEL: Boletín de Estadísticas Laborales, Ministerio de Trabajo y Asuntos Sociales. EPA: Encuesta de Población Activa, Instituto Nacional de Estadística.