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# Unions' bargaining coordination in multi-unit firms

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## Abstract

This paper investigates the patterns of bargaining in a multi-unit firm in the presence of labor unions coordination activities. It derives the bargaining regimes arising as sub-game perfect equilibria, considering both simultaneous and sequential games where parties choose whether to coordinate wage negotiations. It shows that unions' coordination costs may attenuate the conflict of interests between bargaining parties as regards the centralization level at which negotiations should take place.

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## 1. Introduction

Wage negotiations between firms, often organized in multi-unit plants, and their workforces is a subject of key relevance in economics. In such a context, both bargaining parties, labor unions and firm's management, try to coordinate activities across different plants, in order to improve their respective positions. One main objective of labor union coordination is that of gaining better access to (and sharing) essential bargaining information such as labor costs, the share of labor costs in the companies' total costs, and company profitability, which may be useful in negotiation rounds.
The literature paying attention to various effects and features of collective bargaining is huge. Authors such as Davidson (1988), Horn and Wolinsky (1988), Bárcena-Ruiz and Garzón (2002), Petrakis and Vlassis (2004), and recently Santoni (2009) and Mukherjee (2010) examine the outcomes of different wage bargaining structures (centralization/decentralization) in oligopoly industries. The endogenous bargaining structures arising in equilibrium crucially depend on the nature of product markets (complement/substitute goods) and the presence of asymmetries in the efficiency level of firms.[1]
This work analyzes the centralization/decentralization issue at the company level. Assuming that unions coordinate bargaining activities by paying some fixed transaction costs, it investigates which bargaining structure arises as sub-game perfect equilibrium in negotiations. The bargaining regimes in equilibrium are determined through a sequential game between the multi-unit firm and the plant-level unions. The paper considers a game where the firm acts as first-mover. The main results are the following. Different bargaining regimes arise as sub-game perfect equilibria. The pattern of the bargaining is sensitive to the amount of the coordination costs, and the relative bargaining power. Full centralization, partial centralization (unions' coordination or management subsidiaries' coordination only) and full decentralization can emerge as equilibrium of the game. Coordination of wage bargaining may not always be beneficial for the parties. High transaction costs may more than offset the gains derived from coordination for unions; headquarter agents can make excessive wage offers for the firm. These effects, in part, may attenuate the conflict of interests between the firm and labor unions over the level of centralization should company-wide negotiations be conducted.
The remainder of this note is organized as follows. Section 2 describes the model and derives the equilibrium sub-game perfect bargaining regime. Finally, section 3 draws some conclusions.

## 2. The model

This section develops a bargaining game model between a multi-unit firm with plants in a country and plant level unions. In an economy, there are two sectors: a perfectly competitive and an imperfectly competitive sector. In the imperfectly competitive sector operates a multi-unit firm having two plants denoted A and B. The perfectly competitive sector acts as a numéraire, with the wage and price levels equal to 1. The firm produces goods for the entire market with no direct substitutes: that is, no interactions occur in the product market. There are some exogenous fixed costs $F$, large enough that neither the firm sets up a new production facility, nor a potential entrant enters into the industry. The firm faces a linear product demand schedule. The two plants have identical technology. Labor is the sole factor of production, with decreasing returns to scale. Labor supply is sufficiently large to avoid corner solutions. Any labor required by, or freed up from the firm is supplied or absorbed by the numéraire sector. Though, the firm hires workers at each plant from a rent-maximizing union: in the imperfectly competitive sector, workers are fully unionized.
To derive the patterns of bargaining in the multi-unit firm, the model studies a game where, in the first-stage, the firm is the first-mover and decide whether to negotiate by plant or general management; then, in the second stage, the unions chooses whether to coordinate activities across plants. After the bargaining parties' decisions, wage negotiations, modelled by the generalized Nash

[1] On sequential wage bargaining in oligopoly industries see also De Fraja (1993), Dobson (1994) and Banerji (2002).

bargaining solution, take place. The wage setting occurs before the employment decisions. Thus, the firm hires workers according to its necessities (right-to-manage approach). Finally, given the bargained wages, the firm allocates production among its plants.[2] The model is solved by backward induction, and the solution concept adopted is that of the sub-game perfect equilibria. In each plant, the production function ($q_i$) has decreasing returns to scale in the single input, labor ($l_i$), $q_i = \sqrt{l_i}$, $i = A, B$, while the (inverse) linear product demand function is $p = a - Q$, where $p$ is the market price, and $Q = \sum_i q_i$ is total output. The following Stone-Geary function describes the union utility

$$\Omega_i = (w_i - w_0)l_i \,, \qquad i = A, B \,. \tag{1}$$

Each union assigns an equivalent weight to wage and employment in its preferences (neutrally oriented union). Positive utility derives from the fact that wages $w_i$ lie above the reservation wage $w_0$, or what workers receive if they are not employed by the firm. In the present model, $w_0$ is the wage in the numéraire sector which, by definition, is equal to one.[3]

*2.1 Last stage: Optimal allocation of production among plants*

The multi-unit firm maximizes profits by choosing the total quantity for the market. The two plants' respective costs determine the optimal allocation between them. From the production function, given wages, total and marginal costs at each plant are $TC_i = w_i q_i^2$ and $MC_i = 2w_i q_i$. It follows that the global marginal cost for the firm is $MC = \frac{2w_i w_j}{w_i + w_j}Q$. Total and marginal revenue are $TR = (a-Q)Q$ and $MR = a - 2Q$. Standard optimization techniques (see Borghijs and Du Caju, 1999) yield the following productive allocation at each plant

$$q_i(w_i, w_j) = \frac{aw_j}{2(w_i w_j + w_i + w_j)}, \quad i, j = A, B \; ; i \neq j \,. \tag{2}$$

Thus, the labor demands are

$$l_i(w_i, w_j) = \left[\frac{aw_j}{2(w_i w_j + w_i + w_j)}\right]^2 \; i, j = A, B \; ; i \neq j \,, \tag{3}$$

with $\partial q_i/\partial w_i < 0$, $\partial l_i/\partial w_i < 0$, $\partial q_i/\partial w_j > 0$ and $\partial l_i/\partial w_j > 0$, that is, output and employment in each plant are negatively dependent on the plant's wage level and positively related to the wage rate

[2] Notice that, when wage rates are determined at the plant level, it may theoretically occur that unions set different wages. Without transaction costs in the product market, the firm can shift production to the less expensive plant, until wage rates are equalized. However, since the production function has decreasing returns to scale, the reallocation of productive activities from the less to the more economical plant is a finite process before the non-negativity constraint is binding. Thus, wage competition is less intensive with respect to the setting characterized by a constant return to scale technology (Borghijs and Du Caju, 1999). However, given the assumptions of this model, an infinitesimal difference in wages is sufficient to shift the entire production to the less expensive plant; thus, a decreasing return to scale technology seems to be a more realistic assumption.

[3] The use of any other reservation wage $w_0 > 0$ scales up (down) the bargained wage and, therefore, the values of the union utilities and firm profits, while maintaining unchanged the qualitative results of the model.

in the other plant. This means that plant workers are in competition with each other in the labor market. Notice also that $q_i/q_j = w_j/w_i$ : the necessary condition of equalization of the marginal costs of production across plants is satisfied. Given global production, total cost is minimized, and hence the multi-unit firm maximizes profits. Finally, unit $i$'s profits can be written as $\pi_i = pq_i - w_i l_i$. Making use of the price equation and of (2) and (3), it can be shown that these are equal to $\pi_i = \left[\dfrac{a^2 w_j}{4(w_i + w_j + w_i w_j)}\right]$, with $\partial\pi_i/\partial w_i < 0$ and $\partial\pi_i/\partial w_j > 0$, as expected: an increase in subsidiary $i$'s bargained wage decreases its profits, while an increase in subsidiary $j$'s wage increases subsidiary $i$'s profits.

### *2.2 Second-to-last stage: Bargaining outcomes*

The present model assumes that coordination of bargaining activities implies fixed costs for the unions involved. Following Santoni (2009), let us assume that, for each union, bargaining coordination is associated with symmetric, non-negative, exogenous fixed organizational costs $H \geq 0$. These costs might represent higher transaction costs (i.e. decision-making costs), administrative costs (i.e. the cost of hiring new bureaucratic and legal staff), costs of "lobbying" for union employment protection legislation, etc. These coordination costs $H$ are measured in terms of the numéraire. It can be argued that the management of the firm may also incur transaction costs in coordinating wage negotiations among plants. However, it is assumed that coordination for the firm is not costly. The reasons are as follows. Firstly, to access, recover, gather, process and share all the relevant information needed during bargaining (e.g., the structure of labor costs) is easier for the management of the firm than for union delegates. Secondly, the effects of coordination costs on the firm's profits may be realistically assumed to be negligible or, at least, extremely low with respect to the effects that coordination costs may have on the unions' budgets.

Suppose that the firm and the unions choose to manage negotiations without coordinating their activities at each plant (full decentralization: NN regime, i.e. plant level negotiations). Under this regime, maximization of the following Nash Product determines the wage rate at each subsidiary

$$w_i = \arg\max_{w_i} \left\{ NP_i = (\Omega_i)^{\alpha} (\pi_i)^{1-\alpha} \right\} \qquad i = A, B \tag{4}$$

where $\alpha \in (0;1)$ is the exogenous relative bargaining power of the union, assumed to be symmetric across plants. In case of breakdown of negotiations, the outside option of both parties equals zero. Similarly to Horn and Wolinsky (1988), in this case each unit of the firm is in a bilateral monopoly relation with the plant level labor union. Therefore, the wage rate at subsidiary $j$ affects union $i$'s objective function due only to its indirect effect on $l_i$. The first-order condition for wage maximization is

$$\alpha\pi_i \left[ l_i + \frac{\partial l_i}{\partial w_i}(w_i - 1) \right] = -(1-\alpha)\left[(w_i - 1) l_i\right]\left(\frac{\partial \pi_i}{\partial w_i}\right) \qquad i = A, B . \tag{5}$$

Given symmetry, the equilibrium wage under NN is

$$w_{NN} = 1 + \left[\sqrt{\alpha^2 + \alpha + 1} - (1-\alpha)\right]. \tag{6}$$

The term in brackets is the rent over the reservation wage. As expected, $\partial w_{NN}/\partial\alpha > 0$: higher bargaining power of the union increases the equilibrium wage because unions capture a higher share of the firm's rents. Substituting (6) into (3), the labor demand at each plant in equilibrium is

$$l_{i,NN} = \left[\frac{a}{2(2+\alpha+\sqrt{\alpha^2+\alpha+1})}\right]^2, \tag{7}$$

with $\partial l_{i,NN}/\partial\alpha < 0$. Further substitutions in to the relevant expressions allow computation of the firm's profits and global union utility, reported in Table 1.
Assume now that the firm participates in negotiations with general management. Negotiations occur separately but simultaneously at each plant. This is denoted as the NC regime. In this regime, maximization of the following expression leads to the wage rate for the *i*th unit

$$w_i = \arg\max_{w_i}\left\{NP_i = (\Omega_i)^\alpha(\pi_i+\pi_j-2G-Z)^{1-\alpha}\right\} \quad i,j = A,B\ ;\ i \neq j, \tag{8}$$

where $Z = \pi_j^* - 2G$ is the firm's outside option in case of failure of the negotiations. Union *i*'s outside option is equal to zero. The firm's disagreement utility might have different specifications. In the present context, $Z$ (alternatively seen as lock-out funds) could be defined either as the net anticipated equilibrium profits of this regime for the firm at the plant $j$, or as the net firm profits when the plant $j$ is the unique plant producing. However, in developing the analysis, this alternative specification leads to extremely complex solutions. Thus, the former choice relative to the outside option is preferred because of its computational convenience. The first-order condition for wage maximization is

$$\alpha\pi_i\left[l_i + \frac{\partial l_i}{\partial w_i}(w_i-1)\right] = -(1-\alpha)\left[(w_i-1)l_i\right]\left(\frac{\partial\pi_i}{\partial w_i}+\frac{\partial\pi_j}{\partial w_i}\right) \quad i,j = A,B\ ;\ i \neq j, \tag{9}$$

because, in equilibrium, given the assumption of coordination no costly for firms ($G=0$), $\partial Z/\partial w_i = 0$ (Davidson's conjecture) and, $\pi_j = \pi_j^*$. Given symmetry, equilibrium wages are

$$w_{NC} = 1 + \left[\frac{\sqrt{\alpha^2+10\alpha+1}-(1-\alpha)}{2}\right], \tag{10}$$

where the term in brackets is the rent over the reservation wage, with $\partial w_{NC}/\partial\alpha > 0$. Nevertheless, comparing equations (6) and (10), it occurs that $w_{NC} > w_{NN}\ \forall\alpha\in(0;1)$. The rationale for this result may be found by inspection of the first-order conditions in equations (5) and (9). In the NN regime, each subsidiary management takes into account only the negative effect of the negotiated wage during bargaining on its subsidiary profit (the term $\partial\pi_i/\partial w_i$). Additionally, in the NC bargaining regime the firm's headquarter agents also internalize the positive effect of the wage increase on the other subsidiary (the term $\partial\pi_j/\partial w_i$). In other words, the general management of the firm considers the aggregate profits of both plants when bargaining with the union of plant *i*, whereas decentralized bargaining at plant level implies that each plant takes into account only its own profits. This implies that unit *i*'s position is weaker during negotiations while, through recognizing this internalization effect by the headquarter agents of the firm, the bargaining position of each union at the respective plant improves, leading to negotiated wage rates higher than in the NN case: the firm will accept

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payment of higher wages than in the case of decentralization. Putting the expression in (10) into (3), unit $i$'s labor demand in equilibrium is

$$l_{i,NC} = \left( \frac{a}{5+\alpha+\sqrt{\alpha^2+10\alpha+1}} \right)^2, \tag{11}$$

with $\partial l_{i,NC} / \partial \alpha < 0$. Comparing equations (7) and (11), it results that $l_{i,NN} > l_{i,NC}$ $\forall \alpha \in (0;1)$: higher bargained wages in the NC regime reduce the labor demand at each plant for the firm. Finally, after subsequent substitutions, the firm profits and global union utility are obtained, reported in Table 1. In the case of coordination among unions, when the firm chooses to conduct wage negotiations with plant management (denoted as the CN regime), the wage for the $i$th unit is determined by the maximization of the following Nash product

$$w_i = \arg\max_{w_i} \left\{ NP_i = \left[ (w_i-1)l_i + (w_j-1)l_j - 2H - V \right]^{\alpha} (\pi_i)^{1-\alpha} \right\} \qquad i, j = A, B \; ; \; i \neq j \tag{12}$$

where $V = D_i - 2H$ is union $i$'s outside option in the case of negotiation failure; unit $i$'s outside option of the firm is equal to zero. Now, $V$ can be interpreted as strike funds, with $D_i$ as the utility that coordinated unions obtain from plant $j$ at the anticipated equilibrium output of this regime. The first-order condition for wage maximization is

$$\alpha\pi_i \left[ l_i + \frac{\partial l_i}{\partial w_i}(w_i-1) + \frac{\partial l_j}{\partial w_i}(w_j-1) \right] = -(1-\alpha)\left[ (w_i-1)l_i \right] \left( \frac{\partial \pi_i}{\partial w_i} \right) \qquad i, j = A, B \; ; \; i \neq j \tag{13}$$

because, in equilibrium, $D_i = (w_j-1)l_j$. Given symmetry, from (13) equilibrium wages are

$$w_{CN} = 1 + \left[ \sqrt{4\alpha^2-\alpha+1} + (2\alpha-1) \right]. \tag{14}$$

The labor demand in equilibrium at subsidiary $i$ is

$$l_{i,CN} = \left[ \frac{a}{2(\sqrt{4\alpha^2-\alpha+1}+2\alpha+2)} \right]^2 \tag{15}$$

**Table 1: Not coordinated/coordinated bargaining outcomes, fixed union coordination costs**

| **MNE's subsidiaries** → <br> **Unions** ↓ | Not coordinate | Coordinate |
|---|---|---|
| Not coordinate | $\Omega_{NN} = \sum_i \Omega_{i,NN} = \frac{a^2\left[\sqrt{\alpha^2+\alpha+1}-(1-\alpha)\right]}{2\left(2+\alpha+\sqrt{\alpha^2+\alpha+1}\right)^2}$; <br> $\pi_{NN} = \sum_i \pi_{i,NN} = \frac{a^2}{2\left(2+\alpha+\sqrt{\alpha^2+\alpha+1}\right)}$ | $\Omega_{NC} = \sum_i \Omega_{i,NC} = \frac{a^2(\alpha+1+\sqrt{\alpha^2+10\alpha+1})^2(\alpha-1+\sqrt{\alpha^2+10\alpha+1})}{4\left[(3+\alpha)\sqrt{\alpha^2+10\alpha+1}+8\alpha+3+\alpha^2\right]^2}$; <br> $\pi_{NC} = \sum_i \pi_{i,NC} = \frac{a^2}{5+\alpha+\sqrt{\alpha^2+10\alpha+1}}$ |
| Coordinate | $\Omega_{CN} = \sum_i \Omega_{i,CN} = \frac{a^2\left(\sqrt{4\alpha^2+1-\alpha}+2\alpha-1\right)}{2\left(\sqrt{4\alpha^2-\alpha+1}+2\alpha+2\right)^2} - 2H$; <br> $\pi_{CN} = \sum_i \pi_{i,CN} = \frac{a^2}{2\left(\sqrt{4\alpha^2+1-\alpha}+2\alpha+2\right)}$ | $\Omega_{CC} = \sum_i \Omega_{i,CC} = \frac{\alpha a^2}{6(1+\alpha)^2} - 2H$; <br> $\pi_{CC} = \sum_i \pi_{i,CC} = \frac{a^2}{6(1+\alpha)}$ |

larger than in the presence of per member fees due to the lower negotiated wage, attenuating the wage/employment trade-off. Substituting equations (14) and (15) into profit and union expressions, it is possible to derive the outcomes reported in Table 1.
In the case of full coordination in wage negotiations (denoted as CC regime), the bargaining parties maximize at the *i*th unit the following Nash product

$$w_i = \arg\max_{w_i} \left\{ NP_i = \left[ (w_i - 1)l_i + (w_j - 1)l_j - 2H - V \right]^{\alpha} (\pi_i + \pi_j - 2G - Z)^{1-\alpha} \right\} \quad i, j = A, B\,;\, i \neq j. \quad (16)$$

where $V = -2H$, because, in case of breakdown of negotiations, $D_i = 0$ (no output is produced), and $Z = -2G = 0$, because, in case of breakdown of negotiations, $\pi_j^* = 0$. The first-order condition for wage maximization is, for $i, j = A, B$ ; $i \neq j$

$$\alpha(\pi_i + \pi_j)\left[ l_i + \frac{\partial l_i}{\partial w_i}(w_i - 1) + \frac{\partial l_j}{\partial w_i}(w_j - 1) \right] = -(1-\alpha)\left[ (w_i - 1)l_i + (w_j - 1)l_j \right]\left( \frac{\partial \pi_i}{\partial w_i} + \frac{\partial \pi_j}{\partial w_i} \right) \quad (17)$$

Given the hypothesis of symmetry, the wage rate in equilibrium is

$$w_{CC} = 1 + \left[ (3\alpha) \right] \quad (18)$$

where the term in brackets is the rent over the reservation wage. Substituting the wage in (18) into (3), the labor demand in equilibrium at subsidiary *i* is

$$l_{i,CC} = \left[ \frac{a}{6(1+\alpha)} \right]^2 . \quad (19)$$

It is noteworthy that, contrary to the case of per member fees, in the presence of fixed coordination costs for unions, $w_{CC} \geq w_{CN}$ and $l_{i,CN} \geq l_{i,CC}$ $\forall \alpha \in (0,1)$, as it is possible to see from equations (14) and (18), and equations (15) and (19). That is, with fixed costs of coordination for unions, the coordination effect on wage negotiations conducted by headquarters for the firm does not offsets the internalization of employment and profit externalities, despite the fact that the outside option for unions is now negative. This result implies that the firm has no incentive to negotiate wages with general management: the internalization of unit profit externalities always puts unions in a stronger bargaining position. Using equations (18) and (19), it is possible to evaluate the expressions for the firm profits and total union utility reported in Table 1.

### *2.3 First-stages*

Let us consider the first stages of the game, with the firm first-mover. In principle, the coordination of wage bargaining across plants should be profitable for unions; however, the scale of the fixed costs determines whether coordination is advantageous.

**Proposition 1.** *An inverse U-shaped relation between coordination costs and unions' bargaining power exists. For low and high union strength, relatively small transaction costs makes coordination not advantageous, while it is beneficial for intermediate values. The firm generally prefers not to coordinate wage negotiations. Hence, the predominant bargaining regimes are NN and CN . However, if the unions are strong enough and the transaction costs not very low, there is an area in the $(\alpha, H)$-plane where the NC regime arise in equilibrium.*

In the second stage, unions decide whether to coordinate negotiations depending on relative bargaining power and amount of fixed costs. If the firm does not coordinate, the unions' best response is the $N$ strategy if $\Omega_{NN} \geq \Omega_{CN}$, and this occurs when $H \geq H^*$, where

$$H^* = \frac{(-9-\alpha-4\alpha^2)(\sqrt{\alpha^2+\alpha+1})+7\alpha+9\alpha^2-4\alpha^3+(-2\alpha^2-2\alpha\sqrt{\alpha^2+\alpha+1}+9+5\alpha)\sqrt{4\alpha^2+1-\alpha}}{64[(1/2)(\alpha+1)\sqrt{4\alpha^2+1-\alpha})+\alpha^2+(7/8)\alpha+(5/8)][(\alpha+2)\sqrt{\alpha^2+\alpha+1}+\alpha^2+(5/2)\alpha+(5/2)]}$$

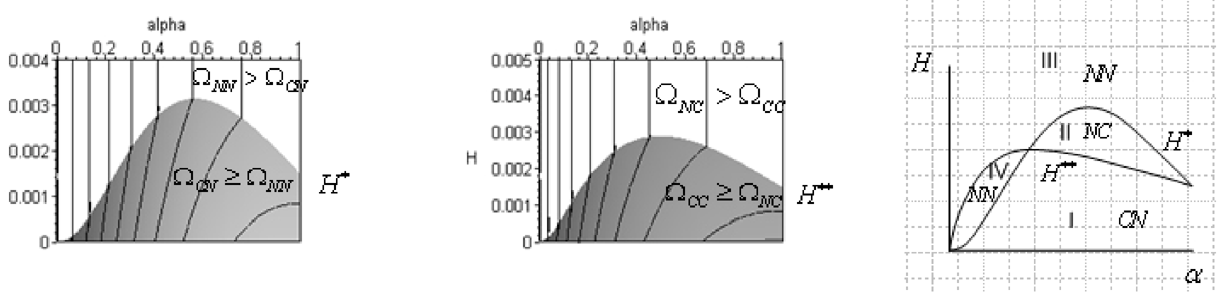
and the $C$ strategy when $\Omega_{CN} > \Omega_{NN}$, occurring when $H < H^*$. On the other hand, if the firm negotiates with general management agents, unions do not coordinate if $\Omega_{NC} \geq \Omega_{CC}$, namely if $H \geq H^{**}$, whereas they coordinate bargaining when $\Omega_{CC} > \Omega_{NC}$, and this is when $H < H^{**}$, where

$$H^{**} = \frac{\alpha^2[15+5\alpha-7\alpha^2-\alpha^3-(\alpha^2+2\alpha-3)(\sqrt{\alpha^2+10\alpha+1})]}{6(\alpha+1)^2[(\alpha^3+11\alpha^2+27\alpha+9)(\sqrt{\alpha^2+10\alpha+1})+\alpha^4+16\alpha^3+70\alpha^2+72\alpha+9)}.$$

In the first stage of the game, the firm chooses whether to coordinate wage bargaining by comparing the profits associated with every regime: $\pi_{CC}$, $\pi_{CN}$, $\pi_{NN}$, $\pi_{NC}$. These outcomes generate four different regions in the $(\alpha, H)$-plane, as Figure 1 shows.

In Region I, unions choose to coordinate wage negotiations irrespective of whether the firm coordinates or not: coordination in this region is the dominant strategy. As a consequence, the firm chooses its strategy comparing $\pi_{CN}$ and $\pi_{CC}$, and since $\pi_{CN} > \pi_{CC}$, the firm does not negotiate via headquarter agents: the CN regime arises in equilibrium (partial centralization by unions). In region II, delimited by $H^* \leq H(\alpha) \leq H^{**}$, coordination costs are such that, if the firm coordinates, the unions benefit from bargaining autonomously at each plant, while if the firm does not coordinate, unions prefer to coordinate negotiations. Therefore, the firm selects its strategy comparing $\pi_{NC}$ and $\pi_{CN}$. Given that profits are such that $\pi_{NC} > \pi_{CN}$, the NC regime arises in equilibrium (firm partial centralization). In region III, unions negotiate wages at plant level independently of the strategic choice of the firm: not to coordinate is their dominant strategy. The firm chooses its strategy comparing $\pi_{NN}$ and $\pi_{NC}$. Since $\pi_{NN} > \pi_{NC}$, full decentralization is the equilibrium of the game. Finally, in region IV, defined by $H^{**} \leq H(\alpha) \leq H^*$, if the firm coordinates, unions do the same, while if the firm does not coordinate, unions also do not. Thus, the firm compares the profit levels $\pi_{NN}$ and $\pi_{CC}$, and a direct comparison of payoffs shows that $\pi_{NN} > \pi_{CC}$: the NN regime arises as equilibrium of the game. The analysis has shown that, in the presence of fixed costs for union coordination, if the firm is first-mover and unions are relatively strong, there is a region in the $(\alpha, H)$-plane where the firm prefers to centralize negotiations.[4]

**Figure 1:first stages, firm first-mover. Bargaining regimes in equilibrium**




[4] If the simultaneous moves and the sequential game with unions first movers are studied, similar patterns of bargaining arise. Only the NC regime is no longer an equilibrium of the game. Details are available upon request from the author.

### 3. Conclusions

This paper has investigated the patterns of wage bargaining arising in equilibrium between a multi-unit firm and plant-level unionized workforce in the presence of unions' coordination costs. In the first stages of the game, the bargaining parties decide whether to coordinate wage negotiations. It has been considered a sequential move games where the firm acts as a first-mover player. After the bargaining parties have chosen the coordinate/not to coordinate strategy, wage negotiations take place; then, given the bargained wages, the firm determines the optimal allocation of production among plants. The main point of the paper is the following. Different bargaining regimes arise as sub-game perfect equilibria in the presence of workers' perfect substitutes in production, absence of asymmetries among the firm's plants, and labor unions paying transaction costs to coordinate their activities. Depending on the size of unions' fixed transaction costs, and the relative bargaining power of the parties, fully centralized, partially centralized (union coordination or firm coordination only) and fully decentralized bargaining regimes emerge in equilibrium. Therefore, bargaining coordination is not always beneficial for unions: high coordination costs more than offset gains from coordination in wage negotiations. This, in part, moderates the conflict of interests between the firm and labor unions over the level of coordination during wage negotiations.
The results of this work are restricted to the case of perfect symmetry: differences in labor unions' transaction costs across companies and labor productivity among plants may affect the pattern of the bargaining. That is, coordination activities taking place in one company will not necessarily appear in another. Furthermore, it has been not considered strategic interactions in the product market. These are extensions of the model which may help in understanding the pattern of bargaining in multi-unit firms, where plants are eventually located in different countries.

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