

DISCUSSION PAPER SERIES

No. 1527

**TO BE (UNIONIZED) OR NOT TO BE? A
CASE FOR COST-RAISING STRATEGIES**

Jacques Bughin and Stefano Vannini

INDUSTRIAL ORGANIZATION



Centre for Economic Policy Research

TO BE (UNIONIZED) OR NOT TO BE? A CASE FOR COST-RAISING STRATEGIES

Jacques Bughin and Stefano Vannini

Discussion Paper No. 1527
December 1996

Centre for Economic Policy Research
25–28 Old Burlington Street
London W1X 1LB
Tel: (44 171) 878 2900
Fax: (44 171) 878 2999
Email: cepr@cepr.org

This Discussion Paper is issued under the auspices of the Centre's research programme in **Industrial Organization**. Any opinions expressed here are those of the authors and not those of the Centre for Economic Policy Research. Research disseminated by CEPR may include views on policy, but the Centre itself takes no institutional policy positions.

The Centre for Economic Policy Research was established in 1983 as a private educational charity, to promote independent analysis and public discussion of open economies and the relations among them. It is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions. Institutional (core) finance for the Centre has been provided through major grants from the Economic and Social Research Council, under which an ESRC Resource Centre operates within CEPR; the Esmée Fairbairn Charitable Trust; and the Bank of England. These organizations do not give prior review to the Centre's publications, nor do they necessarily endorse the views expressed therein.

These Discussion Papers often represent preliminary or incomplete work, circulated to encourage discussion and comment. Citation and use of such a paper should take account of its provisional character.

Copyright: Jacques Bughin and Stefano Vannini

CEPR Discussion Paper No. 1527

December 1996

ABSTRACT

To be (Unionized) or Not to be? A Case for Cost-raising Strategies*

This paper analyses the decision by a firm over whether or not to recognize unions (and therefore enter the bargaining process) in order to gain market power in unionized markets. We show that union power coupled with the nature of the union-firm bargaining process – i.e. scope and structure – are key determinants of a firm's choice to be unionized and to strategically adopt cost-raising strategies.

JEL Classification: J51, L20

Keywords: cost-raising strategies, union-firm bargaining

Jacques Bughin
McKinsey & Co.
Avenue Louise 480 B22
B-1050 Bruxelles
BELGIUM
Tel: (32 2) 645 4230
Fax: (32 2) 646 4548
Email: jacques.bughin@mckinsey.com

Stefano Vannini
Institut für
Wirtschaftswissenschaften
Universität Wien
BWZ-Brünner Strasse 72
A-1210 Wien
AUSTRIA
Tel: (43 1) 2912 8567
Fax: (43 1) 2912 8569
Email: vannini@econ.bwl.univie.ac.at

*This paper is produced as part of a CEPR research programme on *Market Structure and Competition Policy*, supported by a grant from the Commission of the European Communities under its Human Capital and Mobility Programme (no. ERBCHRXCT940653). It was presented at the 23rd EARIE meeting (Vienna, 7/10 September 1996). The authors thank Georg Kirchsteiger for very useful comments. The content of the paper should not be regarded as the views of McKinsey & Co.

Submitted 14 November 1996

NON-TECHNICAL SUMMARY

Common sense suggests that companies prefer not to face unions because they increase firm's wage bills. Evidence indeed indicates that unions get a wage premium but, paradoxically, it also casts doubt on the fact that unions have a depressive impact on company profits.

Economic reasoning explains this puzzle: so long as companies can pass on wage increases through prices charged to customers, profits will not be harmed. Indeed, companies may even justify price increases to their customers by referring to increases in their own production costs.

Antitrust policies often neglect this use of labour-management relations to distort prices, even if evidence of such cases emerges in the literature (e.g. the well-known Pennington case in the United States).

The economic literature uses the phrase 'cost-raising strategies' to define such behaviour. Theories that formalize the conditions for cost-raising strategies do exist, but do not take into account the bargaining relationship between unions and firms. This relationship has been modelled recently and contributes to a formalization of the way cost-raising strategies can be used by firms as a rational behaviour. This is an important gap because for decisions to be taken on antitrust grounds, it is necessary to show how a certain action is the result of voluntary behaviour.

This paper proposes such a model of labour-management relations. In addition, it addresses two other questions: (i) what is the effect of union power on the existence of cost-raising strategies?; and (ii) what institutional features concerning labour-management relations are more favourable for cost-raising strategies to arise? These questions are important as union power is argued to have decreased significantly in recent years, and because different countries and industries show significantly different institutional features of labour-management relations.

Our main findings are the following. First, using standard intuition, higher union power makes companies more willing to avoid unionization. Yet higher union power sometimes widens the incentives for firms to distort prices (invoking wage increases) and gain market power.

A second finding is that the widening of incentives for firms to distort prices is contingent on items contained in the agenda of union-firm negotiations. For instance, when only wages are negotiated, the firm retains the right to set the

level of output and, accordingly, employment. In this way, it reaps the benefit of higher prices charged invoking greater union power and higher wages. In contrast, when employment is in the bargaining agenda as well, the advantages for firms derived from the possibility of distorting prices can be outweighed by the disadvantage of sharing higher profits with unions. Thus, an increase in union power sometimes reduces the incentive for firms to engage in cost-raising strategies.

A third finding is that cost-raising strategies arise more frequently when union-firm negotiation takes place at an industry-wide (country-wide) level. This is because coordination among unions creates further pressure on output prices charged to customers. Moreover, when employment is also an issue in negotiations, additional favourable coordination effects arise, further justifying cost-raising strategies.

This latter aspect, which we define as a 'cartel-like' effect in the paper, provides the main scope for antitrust intervention. The provision by unions of 'cartel services' to firms should be under the scrutiny of antitrust laws because, in the end, they adversely affect consumer surplus. This is more likely to happen in sectors facing industry-wide bargaining and when the agenda for negotiations contains more than the wage level.

1 Introduction

The common sense about unionization is that firms prefer not to be unionized because of the supposedly higher cost of an unionized workforce. Empirical evidence indicates indeed that union wages include a premium over non-union ones [PENCAVEL (1991)], yet the evidence on how unions offset firms' profits remains vague [CONYON and MACHIN (1991) and BUGHIN (1996)].

The objective of this paper is to update the early literature on cost-raising strategies about the possibility for firms to agree on being unionized despite higher costs [e.g., NELSON (1957) or MALONEY, Mc CORMICK and TOLLISON (1979)]. This literature often takes the example of unions to point out that this could be an optimal strategy to gain market power because unions can allow firms to reduce output and charge higher prices to customers.¹ However, to our knowledge, no explicit union model has been set up to analyse the mechanisms by which unions can lead to cost-raising strategies.

This paper adds to the heuristics of that literature, by using recent union-firm bargaining theories to scope out the magnitude, and analyse the drivers, of cost-raising strategies. An advantage of this approach is that explicit game-theoretic bargaining solutions can be derived, which are consistent with rational behaviour [see BINMORE, RUBINSTEIN and WOLINSKI (1986)].² A further advantage of using union-firm bargaining theory is that union power *per se* can be analysed as a factor eventually triggering cost-raising strategies by firms. By union power, we mean the ability by organized unions to influence the wage-bill setting, which itself depends critically on the bargaining

¹... What will happen to the incomes of owners [...] as a result of labour unionization resulting in higher labour cost?", asks NELSON (1957, p. 387). Later on the same author argues that "... an increase in variable factor costs ([such as] a new union contract) shifted forward by a cost-plus pricing policy may tend to increase the returns to the fixed (residual returns or accounting profits) by reducing the level of output" [NELSON (1957, p. 392)].

²The henceforth well-known generalized Nash solution proves for instance that union wages will depend directly on firm's output restrictions, so that the effects of higher union wages and lower oligopoly output cannot be analysed separately, as done in NELSON (1957).

structure and scope prevailing in the economy.

The bargaining *scope*, i.e. what is included in the bargaining agenda, has been vividly discussed in the labour literature. In the ‘right-to-manage’ model only wages are bargained over [NICKELL and ANDREWS (1983)], which is an institutionally fair assumption for instance with respect to Anglo-Saxon countries [LAYARD, NICKELL and JACKMAN (1991)]. On the other hand, the ‘efficient bargaining’ model supposes that employment is also a matter of bargaining [Mc DONALD and SOLOW (1981)], which is very rare in practice. Nevertheless, this model represents a very convenient approximation of institutional situations where unions and firms bargain over work conditions other than wages, such as manning ratios [CLARK (1990) and BUGHIN (1996)].³

The union power effects on firm strategies will also depend on the bargaining *structure*, i.e. whether bargaining is firm-specific or centralized, because the level of centralization affects how players eventually coordinate *ex ante* their moves in a given market [DAVIDSON (1988)]. In the Scandinavian countries, unions usually operate in a heavily centralized framework while in Canada and in the US, for instance, it is an institutional fact that bargaining takes place at the firm level.⁴

Not surprisingly, the union-duopoly model presented hereafter illustrates the standard intuition that union power generally reduces the incentive to enter the unionization process. However, one first finding, generalizing the early literature, is that union power can create strategic incentives for firms to use union wages and gain market power by distorting output prices. However, this effect is not monotonic, nor is union power always a sufficient condition for cost-raising strategies to arise.

A second finding is that this effect is contingent to the bargaining scope. For instance, under the right-to-manage assumption, the firm retains the right to set output and reaps

³JOHNSON (1990) reveals that bargaining over the crew size can be common in the US. BUGHIN (1992) shows analogous results for Belgium with reference to the early 1980’s, when the manufacturing sector experienced a huge employment loss.

⁴For a comparative study of different countries, see LAYARD et al. (1991).

the benefit of higher prices due to higher union power. In contrast, under the efficient bargaining scope, any increase in union power translates, among other things, into lower profits which *ceteris paribus* reduce the incentive for firms to engage in cost-raising strategies.

Last, but not least, a third finding is that cost-raising strategies arise more frequently under centralized bargaining, because coordination among unions creates further pressure on output prices charged to customers. In addition, under efficient bargaining, wage *and* output coordination creates attractive ‘cartel-like’ market power, further justifying cost-raising strategies.

Thus, the main message of this paper is that unionization can create interesting vertical links with product market competition, which vary significantly based on the institutional features of the bargaining process. The fact that such features are considerably different across countries [see LAYARD et al. (1991) for empirical evidence] might explain why their unionization rates diverge so widely and why the unionization rate is positively correlated with unions’ (as well as employers’) coordination in setting the bargaining agreement.⁵ Finally, a normative implication of our findings is that unions can provide cartel services which should be under scrutiny of antitrust laws. This was also conjectured in MALONEY et al. (1979) and nicely illustrated in ULMAN (1955).⁶ However, our paper emphasizes the role of centralizations and scope of negotiations for cost-raising strategies to be welcome by profit-maximizing firms.

⁵BUGHIN (1992) shows for instance that the unionization rate decreased in Belgium in the 1980’s, while the level of bargaining significantly shifted from centralized to rather firm-specific. Also, Anglo-Saxon countries provide evidence of low bargaining coordination and low unionization rate [LAYARD et al. (1991), especially table 6 at page 52].

⁶“In window glass, industry-wide bargaining was but part of a larger arrangement under which the union was to police the operation of output and sales cartels.” [ULMAN (1955, p. 526)] “Since attempts by the manufacturers themselves to restrict output failed to achieve enduring success [...] the contribution of the Union was a crucial one.” [ULMAN (1955, p. 528)]

2 The model

The model is made as simple as possible, for it aims at isolating the effect of the vertical dimension of inter-firm competition through wage bargaining as a possible way for the firm to adopt a cost-raising strategy and gain market power.

A Cournot-Nash duopoly is considered, with two profit-maximizing firms producing the same homogeneous commodity.⁷ Firm ‘1’ is supposed to be unionized while the other firm (labelled as ‘2’) is considering whether to recognize or not unions, and possibly engage in cost-raising strategies.

This setting is consistent with the two following facts. First, entrants in an unionized industry often face the decision whether to enter and step unionized. Multinationals for example use to face that choice and can in some instances impose their view to join or not the cohort of unionized firms in their target industry (e.g., BMW in North Carolina). Second, incumbent unionized firms are often engaged in long-term contractual relationships with unions, so that the union process is sunk, contrary to entrants facing the *ex ante* decision to be unionized.

The only variable input is labour l , priced at the wage rate w . Each firm produces under constant returns to scale, and one normalizes the technology as $q_i = l_i$, where q_i denotes i th firm’s output. The wage firm 2 pays to workers if not unionized is denoted by \tilde{w}_2 and is exogenous. The product demand in the domestic market is linear:⁸

$$p(q_1, q_2) = a - q \tag{1}$$

where p is the output price in the domestic market, a a shift parameter and $q = q_1 + q_2$.

⁷The Cournot assumption is consistent with the hypothesis of substitutable goods, see SINGH and VIVES (1984).

⁸A linear demand is used in order to derive explicit solutions to the total game. This is the common approach taken in models on union-oligopoly bargaining [see, e.g., DOBSON (1994)] and is empirically relevant [see, e.g., BRACK (1987)].

Workers, when organized into unions, bargain over firms' surplus in the product market [see e.g. DOWRICK (1989) and STEWART (1983)]. Unionized firms face a rent maximizing union, which puts the same weight on employment and unit wage. Labour mobility is considered nil among firms.⁹

Various types of bargaining organizational forms are considered. With respect to the *bargaining agenda*, it is assumed that firms and unions are engaged either into a 'right to manage' (RTM) bargaining or an 'efficient bargaining' (EB) game. The RTM agenda stipulates that the wage is the only variable bargained upon by firm(s) and union(s), while the firm retains its own management right over the level of employment [NICKELL and ANDREWS (1983)]. On the contrary, under the EB agenda, both wages and employment are simultaneously bargained [Mc DONALD and SOLOW (1981)].

Concerning the *bargaining structure*, one distinguishes the following cases. First, full unionization, in which both firms are unionized. Here we further distinguish between full unionization with decentralized bargaining (simply 'decentralized bargaining', from now on), where bargaining takes place at the firm level, and full unionization with centralized bargaining (simply 'centralized bargaining', from now on), where the union-firm bargaining process is centralized and gains are distributed among union's members and between the two firms.¹⁰ On the other hand, 'partial unionization' defines the case in which firm 2 decides not to be unionized and pays the wage \tilde{w}_2 .

The following sequential game is investigated. At the first stage, firm 2 chooses its wage policy based on the profitability of each strategy. At the second stage, bargaining takes place. Both wages and output are negotiated simultaneously in the case of EB while, in the RTM case, wages are negotiated first and output (and thus employment)

⁹This assumption is standard in models of union-firm bargaining. In BUGHIN and VANNINI (1994) the case is considered where labour can be mobile among firms. While mobility affects the labour market equilibrium outcome, the issues on which we focus in this paper are not affected by assuming no labour mobility.

¹⁰Recall that decentralized bargaining at the firm level characterizes for instance Anglo-Saxon countries, while industry-wide bargaining is common e.g. in Scandinavian countries.

is set subsequently by the firm(s). The model is solved by backward induction in order to derive subgame perfect equilibrium.¹¹

Given the pair (w_1, w_2) –and $w_2 = \tilde{w}_2$ under partial unionization–, each firm i maximizes its profit Π_i :

$$\Pi_i(q_i, q_j) = [p(q_i, q_j) - w_i] \cdot q_i, \quad i \neq j \quad (2)$$

while union's objective function is:¹²

$$U_i(w_i, w_j) = w_i \cdot q_i(w_i, w_j), \quad i \neq j. \quad (3)$$

The Cournot solution is used for variables not subject to bargaining, while for variables under bargaining, the generalized Nash solution is used. The latter corresponds to maximizing the weighted product of unions' rents U_i and unionized firms' profits Π_i , which can be expressed as follows. Under centralized bargaining,

$$\Gamma(w_i, w_j) = \left[\sum_{i=1}^2 U_i(w_i, w_j) \right]^\alpha \cdot \left[\sum_{i=1}^2 \Pi_i(w_i, w_j) \right]^{1-\alpha}, \quad i \neq j, \quad (4)$$

while under decentralized bargaining

$$\Gamma_i(w_i, \bar{w}_j) = [U_i(w_i, \bar{w}_j)]^\alpha \cdot [\Pi_i(w_i, \bar{w}_j)]^{1-\alpha}, \quad i \neq j, \quad (5)$$

where α ($0 \leq \alpha \leq 1$) is the union relative bargaining power and both Nash bargaining

¹¹Note that an interesting feature of the rent-maximizing union assumption stated before is that the contract curve in the EB model is vertical, i.e. union wages are *independent* of employment [see e.g. ABOWD (1989)]. In fact, it can be shown that the level of employment on the contract curve does not depend on the bargained wage, but on the wage threat-point. This allows to model the output and wage game as if there were two different stages also in the EB model, and not only in the RTM model where unions act as Stackelberg and firms react by setting employment on their labour demand curve.

¹²More generally, the union's utility function corresponds to $U_i(w_i, l_i, b) = l_i \cdot w_i + (1 - l_i) \cdot b$, where b represents the fall-back wage, i.e., the wage paid to union during temporary disagreement [see BIN-MORE et al. (1986)]. Normalizing $U_0 = 0$ and recalling that $l_i = q_i$, we obtain the objective function expressed in equation (3).

solutions should be constrained by wages being not lower than the non-unionized wage,

\tilde{w}_2 .¹³

	RTM			EB		
	FUc ^a	FUd	PU	FUc ^b	FUd	PU
w_1^*	$\frac{a\alpha}{2}$	$\frac{a\alpha}{4-\alpha}$	$\frac{(a+\tilde{w}_2)\alpha}{4}$	$\frac{a\alpha}{2}$	$\frac{a\alpha}{3}$	$\frac{(a+\tilde{w}_2)\alpha}{3}$
w_2^*	$\frac{a\alpha}{2}$	$\frac{a\alpha}{4-\alpha}$	\tilde{w}_2	$\frac{a\alpha}{2}$	$\frac{a\alpha}{3}$	\tilde{w}_2
q_1^*	$\frac{a(2-\alpha)}{6}$	$\frac{2a(2-\alpha)}{3(4-\alpha)}$	$\frac{(2-\alpha)(a+\tilde{w}_2)}{6}$	$\frac{a}{4}$	$\frac{a}{3}$	$\frac{a+\tilde{w}_2}{3}$
q_2^*	$\frac{a(2-\alpha)}{6}$	$\frac{2a(2-\alpha)}{3(4-\alpha)}$	$\frac{a(4+\alpha)-(8-\alpha)\tilde{w}_2}{12}$	$\frac{a}{4}$	$\frac{a}{3}$	$\frac{a-2\tilde{w}_2}{3}$
q^*	$\frac{a(2-\alpha)}{3}$	$\frac{4a(2-\alpha)}{3(4-\alpha)}$	$\frac{a(8-\alpha)-(4+\alpha)\tilde{w}_2}{12}$	$\frac{a}{2}$	$\frac{2a}{3}$	$\frac{2a-\tilde{w}_2}{3}$
p^*	$\frac{a(1+\alpha)}{3}$	$\frac{a(4+\alpha)}{3(4-\alpha)}$	$\frac{(4+\alpha)(a+\tilde{w}_2)}{12}$	$\frac{a}{2}$	$\frac{a}{3}$	$\frac{a+\tilde{w}_2}{3}$
Π_1^*	$(q_1^*)^2$	$(q_1^*)^2$	$(q_1^*)^2$	$\frac{1-\alpha}{2}(q^*)^2$	$(1-\alpha)(q_1^*)^2$	$(1-\alpha)(q_1^*)^2$
Π_2^*	$(q_2^*)^2$	$(q_2^*)^2$	$(q_2^*)^2$	$\frac{1-\alpha}{2}(q^*)^2$	$(1-\alpha)(q_2^*)^2$	$(q_2^*)^2$

^aPU identifies a duopoly with partial unionization; alternatively, FUd (resp., FUc) stands for (full and) decentralized (resp., centralized) bargaining. Recall that, under partial unionization, firm 2 pays the exogenous non-unionized wage \tilde{w}_2 .

^bUnder FUc, firms internalize their rivalry, set the monopolistic output and share the corresponding profits.

Table 1: Reduced-form solutions for the wage and output stages of the game.

Equations (4) and (5) are also maximized with respect to wage(s) under the additional constraint that firms are on their labour demand curve (i.e., for each firm i , $q_i = q_i^*$), when

¹³For simplicity, we assume that, if firms are both unionized, their bargaining power is the same. Moreover, we can observe that $\alpha = 1$ stands for the case of monopoly union and $\alpha = 0$ means that unions have no power during the bargaining process. In addition, under centralized bargaining a single wage is negotiated which applies to both firms, while employment duties are split under EB between the two (hence symmetric) firms.

RTM bargaining is considered, while the same equations are maximized simultaneously over wages and labour under EB. The reduced-form solutions for the wage and output stages of the game are summarized in table 1, where the first part is referred to RTM and the second to EB.¹⁴

Concerning the wage outcomes, the following remarks are in order. First note that, under full unionization, decentralized bargaining makes firm-specific unions *not* internalize the cross-wage elasticities of labour demand, so that the competition among unions results in *lower* wage claims. Secondly, note that the EB wages are (equal or) *higher* than the RTM wages, e.g. because under RTM the firms exploit the Stackelberg structure of the union-firm bargaining game by unilaterally changing the employment level *after* wages have been agreed upon.¹⁵

3 Unionization choice

Using table 1, this section analyses the unionization choice by firm 2 in terms of the exogenous variables \tilde{w}_2 , α and a .

As shown in the following equations (6)–(9), the sufficient conditions for firm 2 *not* to be unionized are of the form $\tilde{w}_2 < f(\alpha, a)$, with $\partial f/\partial\alpha \geq 0$ and $\partial f/\partial a \geq 0$. This means that the lower the union power and the tighter the market, the more likely firm 2 is willing to recognize unions. In particular, the function $f(\alpha, a)$, which is derived by comparing Π_2 under partial unionization with Π_2 under full unionization, corresponds

¹⁴Observing table 1, the minimal constraints on \tilde{w}_2 for firm 2 to be active under partial unionization, respectively under RTM and EB, are: $\tilde{w}_2 \leq \frac{a(4+\alpha)}{8-\alpha}$ and $\tilde{w}_2 \leq \frac{a}{2}$ are always met under the Nash bargaining constraint that $w_2^* \geq \tilde{w}_2$.

¹⁵One can also see here that union power does not affect EB outputs, which reflects our previous observation that the labour contract curve is vertical in the wage-output space under the assumption of rent maximizing unions.

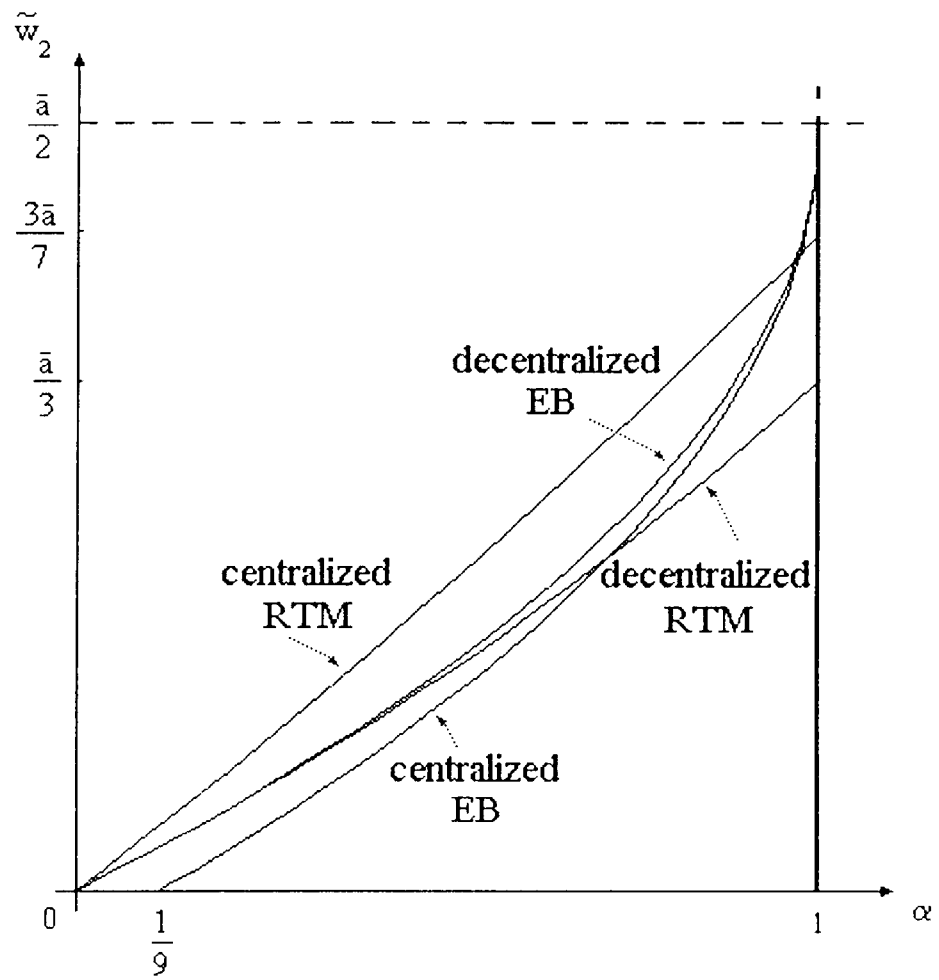


Figure 1: Indifference locus and unionization choice.

to

$$f(\alpha, a) = \frac{3a\alpha}{8 - \alpha} \quad \text{if bargaining is centralized and} \quad (6)$$

$$f(\alpha, a) = \frac{a\alpha}{4 - \alpha} \quad \text{if bargaining is decentralized,} \quad (7)$$

under RTM, while under EB we have

$$f(\alpha, a) = \frac{a}{2} \left(1 - \frac{3\sqrt{1-\alpha}}{2\sqrt{2}}\right) \quad \text{if bargaining is centralized and} \quad (8)$$

$$f(\alpha, a) = \frac{a}{2} (1 - \sqrt{1-\alpha}) \quad \text{if bargaining is decentralized.} \quad (9)$$

Proposition 1 is derived using equations (6)–(9), and is represented in figure 1 for a given market size, a .

Proposition 1 .

- a) *Union power reduces the incentives for the firm to be unionized;*
- b) *Bargaining centralization makes union power a stronger (respectively, weaker) deterrent to unionization under RTM (resp., EB);*
- c) *The largest deterrence effect by union power occurs under centralized RTM, except for very high level of union power.*

Part a) of this proposition reflects $\partial f/\partial\alpha$ being positive. In turn, such a derivative is positive because high union power increases wage claims and represents an incentive for firm 2 not to be unionized. Part b) highlights the importance of the bargaining scope to assess the effect of union power. Recall that, under RTM, wage centralization makes unions internalize their wage rivalry, so that union power has more effect on wage claims; under EB, however, output rivalry is eliminated under centralized bargaining

and the increase of profits due to output collusion outweighs the effect of wage rivalry internalization.¹⁶ Part c) states which bargaining structure most probably deters unionization, for a given level of union power. The fact that EB becomes less favourable than RTM to wage decentralization when union power is high, is the consequence of profit sharing under EB (which is evident in the bottom of table 1).

4 Cost-raising strategies

The above conditions (6)–(9) provide little guidance on the existence of cost-raising strategies, i.e. the possibility that firm 2 adopts a wage policy giving rise to a wage higher than the one arising under the alternative wage process.

In order to investigate whether the entrant firm will prefer to join the unionization process despite higher costs, the locus of equal wages $\hat{w}_2 = w_2^*$, is defined, where w_2^* (taken from table 1) is the wage faced by firm 2 should it choose to take part in the bargaining process. This locus is expressed, under RTM, by

$$\tilde{w}_2 = \frac{a\alpha}{2} \quad \text{if bargaining is centralized and} \quad (10)$$

$$\tilde{w}_2 = \frac{a\alpha}{4-\alpha} \quad \text{if bargaining is decentralized,} \quad (11)$$

while, under EB, it corresponds to

$$\tilde{w}_2 = \frac{a\alpha}{2} \quad \text{if bargaining is centralized and} \quad (12)$$

$$\tilde{w}_2 = \frac{a\alpha}{3} \quad \text{if bargaining is decentralized.} \quad (13)$$

¹⁶To see why the wage effect is lower than the output effect, remember that wages are tied to profits in the product market through the generalized Nash solution; the wage effect is thus only of a second-order one.

and $f(\alpha, a) < \hat{w}_2 < w_2^*$ is synonymous of the existence of union cost-raising strategies.¹⁷

Given that the Nash bargaining solution ensures that $\hat{w}_2 < w_2^*$, a sufficient condition for cost-raising strategies to arise is $f(\alpha, a) < \hat{w}_2$. Using equations (6)–(9) and (10)–(13), it can be recasted as $g(\alpha, a) > 0$, where:

$$g(\alpha, a) = \frac{a\alpha(2-\alpha)}{2(8-\alpha)} \quad \text{if bargaining is centralized and} \quad (14)$$

$$g(\alpha, a) = 0 \quad \text{if bargaining is decentralized} \quad (15)$$

under RTM, while under EB we have

$$g(\alpha, a) = \frac{a[3\sqrt{2(1-\alpha)} - 4(1-\alpha)]}{8} \quad \text{if bargaining is centralized and} \quad (16)$$

$$g(\alpha, a) = \frac{a[3\sqrt{1-\alpha} + 2\alpha - 3]}{6} \quad \text{if bargaining is decentralized.} \quad (17)$$

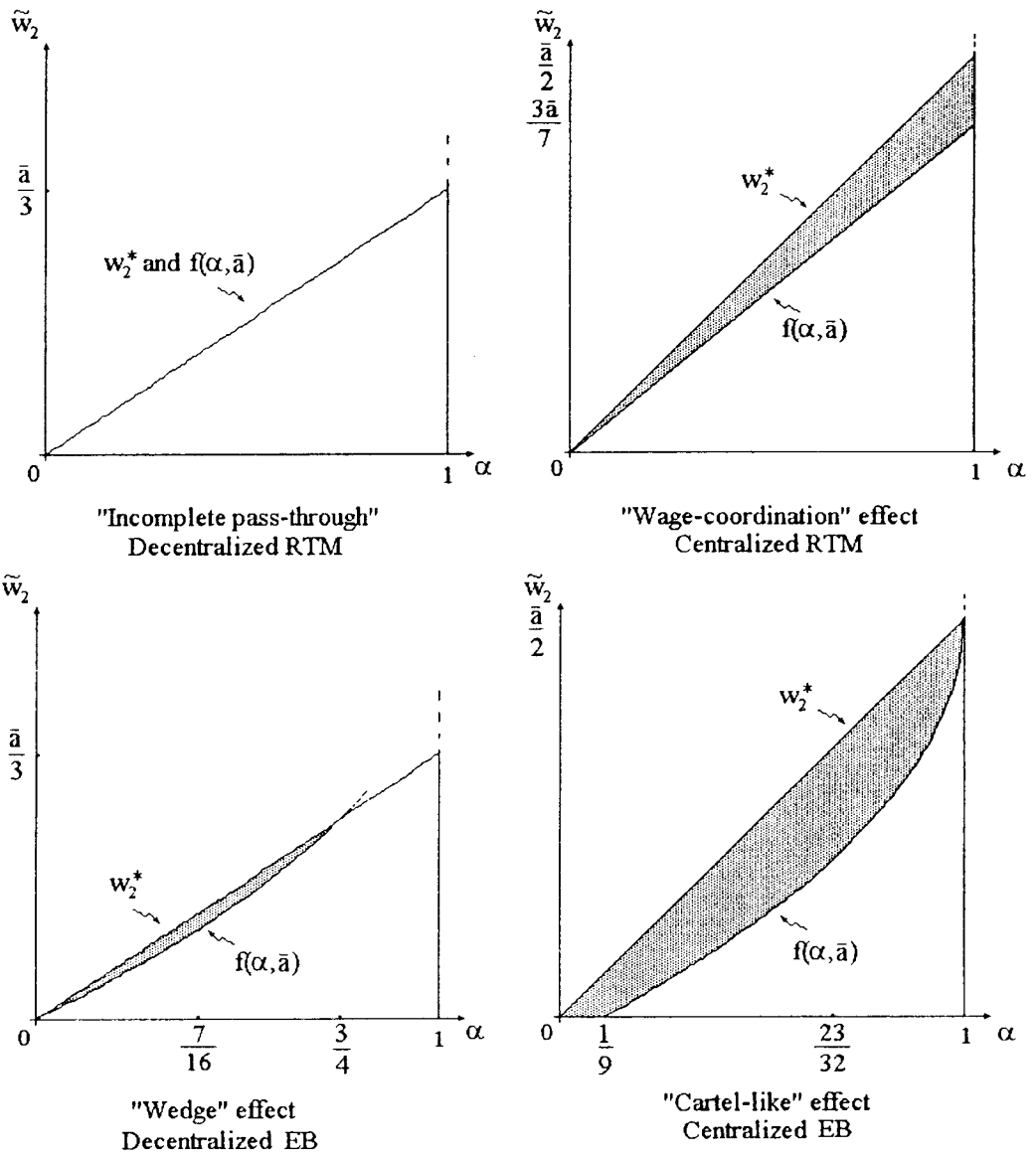
Considering a given $a = a$, these conditions are represented by the shaded areas in figure 2 for the various bargaining cases, and support the following proposition:

Proposition 2 . *Under unionized Cournot oligopoly, cost-raising strategies arise under any organizational form of union-firm bargaining, except for decentralized RTM.*

PROOF: Straightforward by inspection of equations (14)–(17).

This proposition, derived under the Nash bargaining framework, is consistent with the usual claim that cost-raising strategies can arise under oligopoly. Interestingly, proposition 2 also states that cost-raising strategies are not to be found in the decentralised RTM case because wage premia cannot be compensated under linear Cournot oligopoly by sufficiently higher revenue in the product market. In other words, cost increases

¹⁷Cost-raising strategies (i.e. $\hat{w}_2 < w_2^*$) arise in which firm 2 chooses to be unionized (i.e. $\hat{w}_2 > f(\alpha, a)$).



Legenda:

Only the region below the w_2^* schedule is relevant, because union wages (w_2^*) include a premium over non-union wages (\tilde{w}_2), i.e. $w_2^* \geq \tilde{w}_2$.

Above (resp. below) the $f(\alpha, \bar{a})$ schedule, firm 2 recognizes (resp. does not recognize) unions.

The shaded region identifies the cases in which cost-raising strategies arise.

Figure 2: Cost-raising strategies.

improve union rents but, by acting as an incomplete 'pass-through' to customers, they never increase firm's profitability.

Taking the derivatives of $g(\alpha, a)$ with respect to α , the effect of union power on the emergence of cost-raising strategies is summarized in the following proposition:

Proposition 3 . *Union power affects the emergence of cost-raising strategies. Under centralized RTM (and for feasible values of α), higher union power makes cost-raising strategies more likely to arise. Under EB (both centralized and decentralized), union power increases the likelihood of cost-raising strategies up to a certain threshold, above which further union power makes cost-raising strategies less likely to emerge.*

PROOF: $\frac{\partial g}{\partial \alpha} > 0$ for $\forall \alpha$ only in the centralized RTM case. In both EB cases, $g(\alpha, a)$ reaches a maximum in the interval of the feasible values of α , at $\alpha = 7/16$ for decentralized EB and at $\alpha = 23/32$ for centralized EB.

Now, consider the relationship between centralized and decentralized bargaining. Again, using equations (14)-(17), one proves the following proposition:

Proposition 4 . *Under unionized Cournot oligopoly, cost-raising strategies are more likely to arise under centralized than decentralized bargaining.*

PROOF: $\int_0^1 g(\alpha, a) d\alpha > 0$ in all cases but decentralized RTM (of course). It is higher in both centralized cases with respect to the corresponding decentralized ones.

Take first the RTM case. Under centralized bargaining, 'wage coordination' makes easier for unions to gain wage premia. Otherwise stated, less union power is needed to attain the same *ex post* wage (say, $\tilde{w}_2 = w_2^*$). Lower union power means lower pressure on firm's profit and therefore lower willingness to avoid unionization. In contrast, and as revealed in the previous proposition 2, competition under decentralized RTM bargaining

across wage claims reduces this effect, and so much that any incentive for the firm to be unionized disappears.

Now, take the EB case. Under decentralized EB, and comparing (13) with (9), one sees that there exists a level of union power (i.e. $\alpha = \frac{3}{4}$) above which $f(\alpha, \bar{a}) > w_2^*$, i.e. cost-raising strategies do not arise when union power is too high. The intuitive reason for this is that an EB firm acts as if it passed a profit-sharing agreement with its workforce. As with profit-sharing schemes, the firm creates a ‘wedge’ and competes on the output market with lower variable costs than its contractual wage to grab more market share at the expense of Cournot rivalry. Provided that the profit arrangement is sufficiently beneficial for the firm (i.e. that union power is low), there is a strategic incentive for the non-unionized entrant to become unionized.¹⁸ Under centralized EB, in contrast, firms do not compete anymore on the output market, because unionization allows for better output (‘cartel-like’) coordination and thus better exercise of oligopoly power. The effect of this implicit brand of collusion is in fact so strong that it prevails over the cost of the profit-sharing agreement.

5 Conclusions

Using Nash union-oligopoly bargaining theory, this paper has extended the previous literature on cost-raising strategies by analysing the incentives by a firm to choose to be unionized as a way to increase its market power.

The existence of union power reveals that cost-raising strategies can arise, whose effect largely depends on the type of contractual agreement and on the organizational forms of labour-management bargaining.

¹⁸Note in passing that this strategic effect of stealing market share to competitors by creating a wedge between actual marginal and average costs does not exist under decentralized RTM and explains the lack thereof of cost-raising strategies opportunities.

The findings in this paper stress again the necessity to reconsider the role of unions under oligopoly for antitrust matters [see e.g. WILLIAMSON (1968) and BUGHIN and VANNINI (1994)]. Here, it has been suggested that unionization can be an *optimal choice by a firm* (and not necessarily imposed to her), despite the usual higher cost of unionized workforce. This is because unionized firms can leverage their workers during negotiations to distort product markets and impose price premia to their customers, using the possible vacuum of antitrust laws targeting labour unions.

Also, an important prediction of this paper is that the necessity to consider in antitrust laws such an adverse effect of unions on the consumer surplus will be even more important in sectors facing industry-wide bargaining over more than simply the wage level.

Of course, the model has been derived with a specific set of assumptions, such as Cournot-Nash behaviour, homogeneous goods and linear demands. A more general model, while complicating the solution, would however not qualitatively change our results. In fact, what is crucial here is the vertical linkage between firm competition and union power, which would remain to affect agents' (unions and firms) ability to appropriate oligopoly rents. Thus, our main message is that unionization can be an interesting strategic commitment device for firm to exert market power and that, despite higher unionized labour costs, the firm can be better off undergoing an unionized workforce.

References

- ABOWD, J. (1989), "The effects of wage bargains on the stock market value of the firm", *American Economic Review*, **79**(4), pp. 774-800.
- BINMORE, K., RUBINSTEIN, A. and WOLINSKI, A. (1986), "The Nash bargaining solution in economic modelling", *Rand Journal of Economics*, **17**, pp. 176-188.

- BRACK, J. (1987), "Price adjustment within a framework of symmetric oligopoly. An analysis of pricing in 380 U.S. manufacturing industries, 1958-71", *International Journal of Industrial Organization*, **5**, pp. 289-301.
- BUGHIN, J. (1992), "Union-firm bargaining and imperfect product competition in Belgian manufacturing", Ph.D. Thesis, Université Catholique de Louvain, Louvain la Neuve (Belgium).
- BUGHIN, J. (1996), "Trade unions and product market power", *Journal of Industrial Economics*, forthcoming.
- BUGHIN, J. and VANNINI, S. (1994), "Union-firm bargaining scope and structure under strategic foreign direct investment", *IRES discussion paper n. 9426*, Université Catholique de Louvain, Louvain la Neuve (Belgium).
- CLARK, A. (1990), "Efficient bargains and the McDonald-Solow conjecture", *Journal of Labor Economics*, **8**(4), pp. 502-528.
- CONYON, M. and MACHIN, S. (1991), "The determination of profit margins in UK manufacturing", *Journal of Industrial Economics*, **9**(4), pp. 369-382.
- DAVIDSON, C. (1988), "Multiunit bargaining in oligopolistic industries", *Journal of Labor Economics*, **6**(3), pp. 397-422.
- DOBSON, P. (1994), "Multifirm unions and the incentive to adopt pattern bargaining in oligopoly", *European Economic Review*, **38**(1), pp. 87-100.
- DOWRICK, S. (1989), "Union-oligopoly bargaining", *Economic Journal*, **99**, pp. 1123-1142.
- JOHNSON, G. (1990), "Work rules, featherbedding and Pareto optimal union-management bargaining", *Journal of Labor Economics*, **8**(1,suppl. 2), pp. 237-259.
- LAYARD, R., NICKELL, S. and JACKMAN, R. (1991), *Unemployment: macroeconomic performance and the labour market*, Oxford University Press, Oxford.
- MALONEY, M.T., Mc CORMICK, R.E. and TOLLISON, R. (1979), "Achieving cartel profits through unionization", *Southern Economic Journal*, **46**, pp. 628-634.
- Mc DONALD, I. and SOLOW, R. (1981), "Wage bargaining and employment", *American Economic Review*, **71**, pp. 896-908.
- NELSON, R. (1957), "Increased rents from increased costs. a paradox of value theory", *Journal of Political Economy*, **65**, pp. 387-393.

- NICKELL, S. and ANDREWS, M. (1983), "Unions, real wages and employment in Britain 1951-79", *Oxford Economic Papers*, **35**(supplement), pp. 183-206.
- PENCARVEL, J. (1991), *Labor markets under trade unionism: employment, wages and hours*, Basil Blackwell, Oxford.
- SINGH, N. and VIVES, X. (1984), "Price and quantity competition in a differentiated duopoly", *Rand Journal of Economics*, **15**, pp. 546-554.
- STEWART, M. (1983), "Relative earnings and individual union membership in the United Kingdom", *Economica*, **50**, pp. 111-125.
- ULMAN, L. (1955), *The rise of the national trade union*, Harvard University Press, Cambridge (MA).
- WILLIAMSON, O. (1968), "Wage rates as a barrier to entry: the Pennington case in perspective", *Quarterly Journal of Economics*, **82**, pp. 85-116.