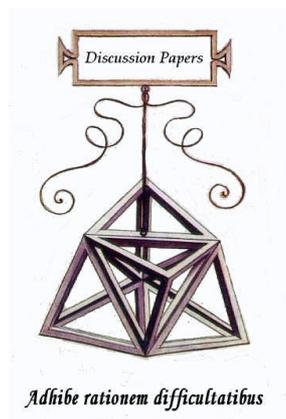




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Luciano Fanti

When do firms prefer either monopolistic unions or an efficient bargaining?

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Luciano Fanti

Department of Economics, University of Pisa

Via Cosimo Ridolfi, 10, I-56124 Pisa (PI), Italy

e-mail address: lfanti@ec.unipi.it

tel.: +39 050 22 16 369

fax: +39 050 22 16 384

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When do firms prefer either monopolistic unions or an efficient bargaining?

Luciano Fanti*

Department of Economics, University of Pisa, Via Cosimo Ridolfi, 10, I-56124 Pisa (PI), Italy

Abstract In this paper we investigate the effects of two popular labour market institutions - namely, Monopoly Union and Efficient Bargaining - on market and welfare outcomes in a Cournot duopoly. We show that depending on values of the union power, the Monopoly Union institution may be preferred by both firms and unions, in particular when the value of the union power is included between a “medium-high” range, while if Efficient Bargaining and Right-to-Manage arrangements are compared no agreement may occur. Therefore the detection of a set of levels of bargaining for which there exists an agreement on the Monopoly Union institution may be interesting also for policy purposes.

Keywords Efficient bargaining; Monopoly union; Right-to-manage; Cournot duopoly

JEL Classification J51; L13

* E-mail address: lfanti@ec.unipi.it; tel.: +39 050 22 16 369; fax: +39 050 22 16 384.

1. Introduction

As a stylised fact, labour market institutions are widespread in all economies, especially in Europe where unions¹ represent the most part of workers. Monopoly Union (MU) and Efficient Bargaining (EB) institutions have been largely observed.

In the words of Lawson (2010, p. 8) “the MU and EB models represent the two most popular alternative economic representations of the wage-employment outcome of collective bargaining, and deciding between these two models is not just an issue of curiosity; there are some clear normative implications which arise from the two models.” To summarise: MU implies inefficiently low (high) employment (wages) and from the social point of view the higher the union’s power, the lower social welfare, while under EB the employment level it is likely to be efficiently determined (i.e. if the contract curve is vertical) or at least it will be less socially inefficient than that occurring under MU.

Motivated by the popularity of such two labour market institutions as well as by their different normative implications, in this paper we investigate the following issues. Should firms leave unions set wages, while deciding by themselves on the output market or should they negotiate both wage and employment? Which labour market institution does prevail in equilibrium: monopolistic unions or an efficient bargaining?

We assume that workers form firm-specific unions. Building on the standard unionised duopoly game approach, we compare the equilibrium outcomes of both labour markets arrangements. The results point out three cases as regards the preferred choice of an institution by the two bargaining parties: (i) firms prefer Efficient Bargaining when the union bargaining power (which is defined by $0 \leq b \leq 1$) is lower, equal or a bit higher than that of firms; (ii) for a fairly high union bargaining power, namely higher than two-third, unions prefer to be monopolist; (iii) for a medium-high unions’ bargaining power, i.e. $0.555 < b < 2/3$, firms and unions agree on the Monopoly Union institution. Moreover by extending the analysis to compare the EB model with the other popular labour market institution, i.e. the right-to-manage model (RTM) (e.g. Pencavel, 1991) we show (see the Appendix) that firms and unions always prefer the opposite institution and thus no agreement about the choice of the institution may be formed. Therefore, the detection of a set of bargaining power levels for which there is agreement on the monopoly union institution may be interesting also for policy purposes.

Finally, the welfare analysis has also shown that while with the monopoly union institution, as expected, output is reduced, price is increased and both consumer surplus and social welfare are reduced, with the efficient bargaining institution output, price, consumer surplus and social welfare are equal to those of the benchmark model with “competitive” labour markets, so, restoring, in this sense, the “efficient” outcomes.

As regards the position of the paper in the current literature, we note that it contributes to the growing literature on unionised oligopoly (e.g., Horn and Wolinsky, 1988; Dorrack 1989; Bughin, 1995; Naylor 1999; Correa-López and Naylor, 2004; Pal and Saha, 2008; Fanti and Meccheri, 2011). However this vast literature has paid less attention on the effects of different labour market institutions and on their comparison with respect to market and welfare outcomes. The present paper is one of the few ones that focuses on this issue. Another exception is Petrakis and Vlassis (2000) (PV) who study the endogenous

¹ The literature as regards economics of unions as well as its historical evolution is examined, for instance by Pencavel (1991), Kaufman (2002) and McCurdy and Pencavel (1986). A very recent survey (Lawson, 2010) focus on the theme of the “efficiency” of trade-unions.

emergence of one of two types of decentralised negotiation, i.e. EB and Right-to-Manage (RTM), *ceteris paribus* as regards the bargaining power levels in both types, showing that if the unions' power is sufficiently high, then all union/firm bargaining pairs choose to negotiate over wages alone, or, otherwise, EB and RTM bargaining coexist in the same industry.

Different from PV, we consider another type of labour market institution: the monopoly union case. Moreover, while PV focus on the endogenous timing of the determination of firm/union negotiation agenda (the issues to be negotiated over), we compare the equilibrium outcomes of the two types of union/ firm game (i.e. Efficient Bargaining vs. Monopoly Union) and determine whether and how it is convenient the choice of either EB or MU arrangements for each party. Although, it must be noted the different approach, our results are in sharp contrast with those of PV: if the union's power is either fairly high or low the interests and thus the preferred choices of the two parties are in conflict between them. By contrast, if the union's power is, broadly speaking, "medium-high", then the firm-union pair agree for the same institution:² Monopoly Union. In other words, in order to have parties' agreement it needs that the union's power is higher, but not too high.

While in the game of PV there is a first stage in which firm-union bargaining units simultaneously decide the type of negotiations, and in the second stage either wage/employment or only wage, depending on the outcome of the preceding stage, are carried out, we analyse two different games, only one of which implies a negotiation. Note that, from another point of view, the difference between the object investigated by PV and by the present paper may be so resumed: while PV study two cases (i.e. bargains over both wages and employment (EB) or only over the wage (RTM)) where the union power is the same in one type or in the other type of negotiation, we compare two cases, the MU one, which is nothing else that the case of negotiation only over the wage (RTM) in which unions have all the power, with the case of EB where the unions may have from no power to full power. Therefore, we have chosen the MU case deliberately because it is the extreme one (that is, the case with the maximal union power) of the RTM case chosen by PV. Indeed, in this way the present results may seem more paradoxical to the extent that, for instance, firms prefer a situation in which unions have all the power (although only over the wage) to a bargaining situation in which the union power (although on both wage and employment) is fairly close to that of firms.

In sum, the novelties of this paper are: 1) the analyses of the equilibrium outcomes of union/firm duopoly games under two typical models of trade-union economics: the efficient bargaining and the monopoly union ones, and 2) the result of an agreement by the two parties for a picked out set of bargaining power levels (while there is always disagreement by the two parties as to the comparison of the efficient bargaining and the right-to manage institutions).

The rest of the paper is organized as follows. Section 2 presents our duopoly model. In Section 3, the sub-game perfect equilibrium outcomes of the two labour market institutions are derived. Section 4 provides the key proposition as regards the choice of the preferred type of agreement by firms and unions as well as results as to the "efficiency" issue. In Section 5, the results are briefly discussed.

² Notice that this means that if the parties have the same identical power then their preferred choices are conflicting.

2. The model

We consider a duopolistic Cournot market. There is a single homogenous product and its standard normalised linear inverse demand is given by

$$p = 1 - Q,^3 \quad (1)$$

where p denotes price and Q is the sum of the output levels q_1 and q_2 of the two firms.

We assume the following production function – identical for both firms – with constant (marginal) returns to labour: $q_i = L_i$ (2)

where L_i represents the labour force employed by firm i .⁴ The i th firm faces an average and marginal cost $w_i \geq 0$ for every unit of output produced, where w_i is the wage per unit of labour. Therefore, the firm i 's cost function is linear and described by:

$$C_i(q_i) = w_i L_i = w_i q_i. \quad (3)$$

For each firm, the cost of producing one unit equals $w_i < 1$. Π_i denotes the profits of the i -th firm, as follows:

$$\Pi_i = (1 - w_i - Q)q_i \quad (4)$$

As is known, between the typical models of the trade-union economics (Booth, 1995), there exist: 1) the efficient bargaining model (EB) (McDonald and Solow, 1981, Ashenfelter and Brown, 1986; Alogoskoufis and Manning, 1991) which prescribes that the union and the firm are bargaining over both wages and employment (or, more realistically, hours of work); 2) the so-called Monopoly Union Model (MU), which argues that the monopoly union has the power to set the wage rate and the firm then chooses the level of employment. The term “efficient” seems to be proper in this context, because, as is shown below, the equilibrium of the EB game not only is more “efficient” than that of the MU game, in that, as expected, it implies a higher output (employment) and thus a higher consumer surplus as well, but it is “efficient” in the proper sense that it obtains the same consumer surplus and societal welfare of the benchmark case in which the labour market is not unionised.⁵ In the sequel, we separately analyse the two cases (MU and EB).

2.1. Monopoly Union institution

Following the standard unionised oligopoly literature above mentioned, we build a firm-union two-stage game: in the first stage firm-specific monopolistic unions simultaneously choose wages (given the output chosen by firms), and in the second stage firms simultaneously choose their output (given wages chosen by unions). We solve for the

³ Note that the standard inverse demand model $p' = a - bQ'$ can be transformed into this normalised model using $p = p'/a$ and $Q = (b/a)Q'$.

⁴ As noted by PV (p. 265) this assumption “is equivalent to a two-factor Leontief technology in which the amount of capital is fixed in the short run and is large enough not to induce zero marginal product of labor.”

⁵ By passing we note that PV (p. 262) state that “the bargaining agenda that directly, or indirectly, includes employment is sometimes referred to as “efficient bargains”... However, this term can be misleading, since it does not always lead to Pareto superior outcomes even for the parties involved in the bargain... Of course, it is not efficient in a single industry, or in the macroeconomic context, when consumer surplus is also taken into account. Furthermore, even in terms of its unemployment implications, the role of efficient bargains is not clear.” However it must be noted that PV, in contrast with the present paper, do not deal with consumer surplus and societal welfare issues. In this paper it is shown that the EB institution restores the “efficiency” features (which are, of course, lost in the MU arrangement).

equilibrium in the standard backward fashion. An equilibrium of the second stage of the game (the market game) satisfies the system of first-order conditions

$$\frac{\partial \Pi_1}{\partial q_1} = 0 \Leftrightarrow (1 - w_1 - 2q_1 - q_2) = 0, \quad (5.1)$$

$$\frac{\partial \Pi_2}{\partial q_2} = 0 \Leftrightarrow (1 - w_2 - q_1 - 2q_2) = 0. \quad (5.2)$$

Therefore, the reaction functions of firms 1 and 2 are respectively given by:

$$q_1(q_2) = \frac{1}{2}[1 - w_1 - q_2], \quad (6.1)$$

$$q_2(q_1) = \frac{1}{2}[1 - w_2 - q_1]. \quad (6.2)$$

From (6.1) and its equivalent for firm 2, (eq. 6.2) we obtain output, respectively, by firm i , for given w_i, w_j :

$$q_i(w_i, w_j) = \frac{[1 - 2w_i + w_j]}{3} \quad (7)$$

At the first stage of the game, a decentralised union unilaterally chooses the wage, according to the following utility function:⁶

$$V_i = w_i L_i \quad (8).$$

We assume that unions are identical. Therefore, by recalling that $q_i = L_i$, eq. (8) becomes:

$$V_i = w_i q_i \quad (8.1)$$

This means that unions aim to maximise the total wage bill. Maximising eq. (8.1) with respect to w , after substitution of eq. (7) in (8.1), we obtain

$$w_i(w_j) = \frac{1 + w_j}{4} \quad (9)$$

which defines the sub-game perfect best-reply function in wages of union-firm pair i under the assumption of a non-cooperative Cournot-Nash equilibrium in the product market. Solving the system composed by (9) and its counterpart for j , we obtain the sub-game perfect equilibrium wages, $w_i = w_j = w^*$:

$$w_i = w_j = w^* = \frac{1}{3} \quad (10)$$

By substituting (10) in (6) we obtain output and price:

$$q_i = q_j = q^* = \frac{2}{9} \quad (11)$$

$$p_1^* = p_2^* = p^* = \frac{5}{9} \quad (12)$$

⁶ This is a specific case of the more general Stone-Geary utility function, i.e., Pencavel (1984, 1985), Dowrick and Spencer (1994), and Petrakis and Vlassis (2000):

$$V = (w - w^\circ)^\theta L,$$

where w° is the reservation or competitive wage. A value of $\theta = 1$ gives the rent-maximising case (i.e., the union seeks to maximise the total rent); values of θ smaller (higher) than 1 imply that the union is less (more) concerned about wages and more (less) concerned about jobs (see, e.g., Mezzetti and Dinopoulos, 1991; Zhao, 2001; Fanti and Gori, 2011). Moreover, the unions aim to maximise the wage bill when $w^\circ = 0$.

Finally by substituting both eq. (10) and eq. (11) in $\Pi_i = (1 - w_i - Q)q_i$ we obtain equilibrium profits: $\Pi_1^* = \Pi_2^* = \Pi^* = \frac{4}{81}$ (13)

By using eqs. (10) and (11), the equilibrium union's utility is given by:

$$V_i = V_j = V^* = \frac{2}{27} \quad (14)$$

2.2. Efficient Bargaining institution.

Under efficient-bargaining and with the assumption that unions are identical and have the same bargaining power during the negotiations with their firms, we have that firm's manager - union bargaining unit i selects w_i and L_i , or equivalently q_i to maximize the following generalised Nash product,

$$\max_{w_i, q_i} N_i = (\Pi_i)^{1-b} (V_i)^b = [(1 - w_i - Q)q_i]^{1-b} (w_i q_i)^b \quad (15),$$

where b represents the bargaining union's power. From the system of first-order conditions of the efficient bargaining game between firms and unions, the reaction functions of firms 1 and 2 as well as unions 1 and 2 are the following:

$$q_1(q_2, w_1) = \frac{1}{2-b} [1 - w_1 - q_2], \quad (16.1)$$

$$q_2(q_1, w_2) = \frac{1}{2-b} [1 - w_2 - q_1]. \quad (16.2)$$

$$w_1(q_1, q_2) = [-b(q_1 + q_2 - 1)] \quad (16.3)$$

$$w_2(q_1, q_2) = [-b(q_1 + q_2 - 1)] \quad (16.4)$$

From eqs. (16.1) and (16.2) we obtain output, respectively, by firm i , for given w_i, w_j ($i, j=1,2; i \neq j$):

$$q_i(w_i, w_j) = \frac{[(1 - w_j) + (-1 + w_i)(2 - b)]}{(c + 2 - b)(c + b - 2)} \quad (17)$$

After substitution of eq. (17) in (16.3-16.4), we obtain

$$w_i(w_j) = \frac{b[(2 - b) - 1 + w_j]}{3 - 2b} \quad (18)$$

which defines the sub-game perfect best-reply function in wages of union-firm pair i . Solving the system composed by (18) and its counterpart for j , we obtain the sub-game perfect equilibrium wages, w_i, w_j :

$$w_i = w_j = w^* = \frac{b}{3} \quad (19)$$

By substituting (19) in (17) we obtain output and price:

$$q_i = q_j = q^* = \frac{1}{3} \quad (20)$$

$$p_1^* = p_2^* = p^* = \frac{1}{3} \quad (21)$$

Finally by substituting both eq. (19) and eq. (20) in $\Pi_i = (1 - w_i - Q)q_i$ we obtain profits:

$$\Pi_i = \Pi_j = \Pi^* = \frac{1-b}{9} \quad (22)$$

By using eqs. (19) and (20), the equilibrium union's utility is given by:

$$V_i = V_j = V^* = \frac{b}{9} \quad (23)$$

3- Which labour market institution: monopolistic unions or an efficient bargaining?

Armed with the equilibrium outcomes under both labour market arrangements, we are in position to answer the basic question tackled in this paper: firms and unions may agree as regards the establishment of one labour market institution? Therefore the following proposition holds:

Prop. 1- *i) For a unions' bargaining power less, equal or a bit higher than that of firms, the latter prefer efficient bargaining; ii) for a unions' bargaining power relatively high (i.e. higher than two-third), unions prefer to be monopolist; iii) for a medium-high unions' bargaining power (i.e. $0.555 < b < 2/3$), firms and unions agree on the monopoly union institution.*

Proof: It straightforwardly follows by the study of the following inequalities:

$$\Pi^{EB} = \left(\frac{1-b}{9} \right) \begin{matrix} > \\ < \end{matrix} \Pi^{MU} = \left(\frac{4}{81} \right) \Leftrightarrow b \begin{matrix} < \\ > \end{matrix} 0.55\bar{5}; \quad V^{EB} = \left(\frac{b}{9} \right) \begin{matrix} > \\ < \end{matrix} V^{MU} = \left(\frac{2}{27} \right) \Leftrightarrow b \begin{matrix} < \\ > \end{matrix} 0.66\bar{6};$$

Q.E.D.

Fig. 1 illustrates the preceding proposition. For values of b lower than $b=0.555$ firms prefer an efficient bargain (because their profits under efficient bargaining are over those under monopolistic union until to be exactly equal to $b=0.555$), while unions would prefer to be monopolist (because their utility under EB is below that under MU). For values of b higher than $b=0.555$ firms become monopoly union-preferring (because their profits under MU are surmounted by those under EB), while unions continues to prefer to be monopolist (because their utility under BE is still below that under MU). Therefore they agree on a relationship union-firm in which unions are wage-makers and firms decide on employment (output). However, while firms always remain monopoly-union preferring for further increases in the unions' power (because their profits under EB are more and more lower with increasing b), unions would switch to an efficient bargaining when their power's parameter is larger than $2/3$ (because beyond such a value utility under BE surmounts that under MU and the difference is always increasing with further increases of b).

Therefore, for values of b either higher than $2/3$ or lower than 0.55 unions and firms are again opposed to each other as regards the choice of type of labour market institution.

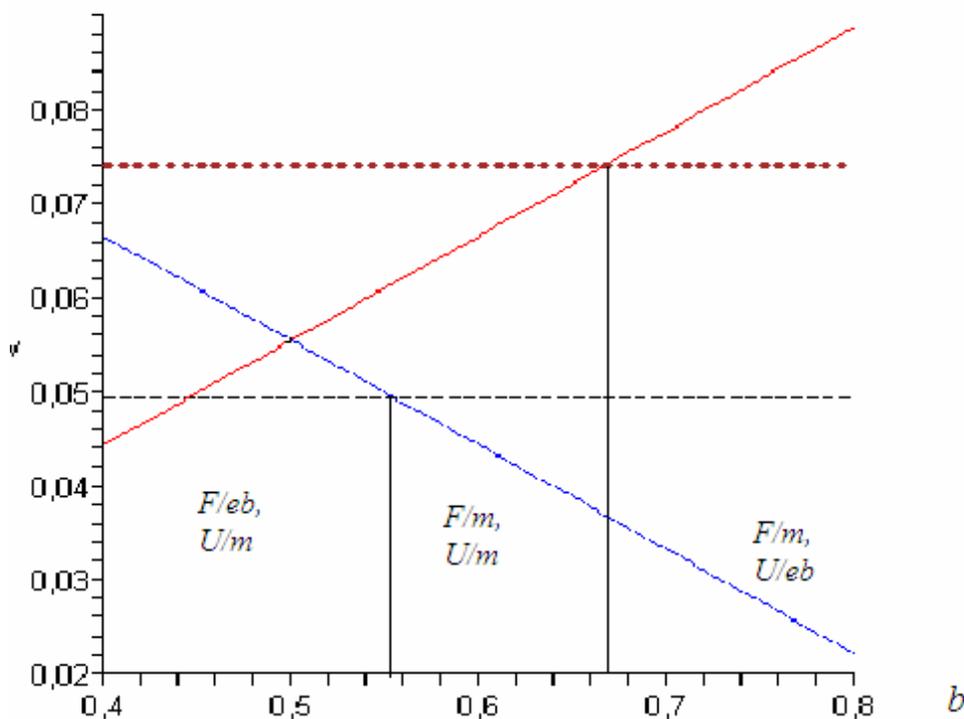


Fig. 1. Plot of: profits under EB (dashed-dotted blue line), profits under MU (dashed grey line), union's utility under EB (solid red line) and union's utility under MU (dotted brown line) for varying b (zoomed in the interval (0.4-0.8)).

Legend: F/eb (U/eb), F/m (U/m) denote that firms (unions) prefer either efficient bargaining or monopoly union, respectively.

Finally, we note that, of course, we abstracted from which labour-firm institution should be considered the benchmark one (i.e. that prevailing in the case of conflicting interests between parties), which is not pertinent for our results⁷. Instead we offer the general result that in a basic model without more specific assumptions about the benchmark institution and veto's rules for the change of the benchmark (as in PV) the possibility of an agreement on MU when the union's power is, loosely speaking, medium-high does exist, while both for other levels of the union's power and for different labour market institutions such as EB and RTM (see the Appendix) any agreement is prevented.

3. Welfare analysis

In this section we perform a welfare analysis and we compare the results between the two cases (MU and EB), also considering those of the benchmark model without unions.

3.1. Consumer's welfare

⁷ By contrast the model developed by PV (p. 267) "reflects the idea that right-to-manage bargaining is the benchmark labor market institution. While switching to wage-employment bargaining requires an agreement between *both* parties involved (the firm and its own union), the veto of one of them (*either* the firm *or* its union) over the inclusion of employment on the negotiations agenda is sufficient for right-to-manage bargaining to be sustained."

In equilibrium consumer's surplus ($CS^* = \frac{(q_1^* + q_2^*)^2}{2}$) in the MU and EB cases is, respectively:

$$CS^{MU} = \frac{(q_1^* + q_2^*)^2}{2} = \frac{8}{81} \quad (24)$$

$$CS^{EB} = \frac{2}{9} \quad (25)$$

3.2. Social welfare

Social welfare (SW) is defined as $SW^* = CS + 2\Pi^* + 2V^*$, and in equilibrium in the MU and EB cases is given by, respectively:

$$SW^{*MU} = \frac{28}{81} \quad (26)$$

$$SW^{*EB} = \frac{4}{9} \quad (27)$$

Therefore, by comparing the equilibrium outcomes of the duopoly model in the various cases (i.e. the benchmark case with "competitive" labour market and those emerged in the present model), displayed in summary in the Table 1 below, the following result is derived:

Result 1. *While output is reduced, price are increased and both consumer surplus and societal welfare are reduced with the monopoly union institution, with the efficient bargaining institution output, price, consumer surplus and societal welfare are those of the benchmark model with "competitive" labour market. In this sense the "efficiency" is restored.*

Finally a summary of the analysis so far is presented in table 1, which illustrates all the equilibrium outcomes of both union-firm games above analysed as well as of the "benchmark" model with "competitive" labour markets.

Table 1. *A comparison of the equilibrium outcomes of the duopoly model*

Equilibrium outcomes	EB	MU	Duopoly without unions
	q^*	1/3	2/9
p^*	1/3	5/9	1/3
w^*	b/3	1/3	0
Π^*	(1-b)/9	4/81	1/9
V^*	b/9	2/27	0
CS^*	2/9	8/81	2/9
SW^*	4/9	28/81	4/9

3.3. Some comments about the efficiency implications of the above results.

In this partial equilibrium framework, we are also able to clarify the impact of union power on the “efficiency” properties of wage and employment outcomes in unionized labour markets. If we measure the relative efficiency of institutional arrangements in terms of their industry employment, output, consumer surplus and societal welfare implications for the industry, then MU is clearly less “efficient” than EB. However the most important comparison is with the benchmark situation in which labour markets are “competitive” (i.e. without unionisation of labourers). As displayed in tab.1 when unions efficiently bargains with firms the “efficiency” of the benchmark model is restored.

Then as the union power increases only wages are affected, while employment is independent of such a power and is always the same of the case in which the labour market is competitive.

Therefore, from the point of view of “efficiency” the result emerged by the present analysis - that is that for a sizable region of the relative bargaining power there is accord between parties on a Monopoly Union arrangement - might be scarcely encouraging. A more encouraging result is that the party which has the higher power always prefers to efficiently bargain (as shown in Prop.1 and Fig. 1) and, very loosely, it could be conjectured that having such a high power in bargaining it may also have the power to impose its own preferred choice. Therefore, the more “inefficient” situation would occur when the union’s power is relatively “medium-high”, that causes the convergence of both parties to the “inefficient” monopoly union institution.

4. Conclusions

Motivated by the popularity of the MU and EB models as typical firm-union institutions in the labour market, in this paper we have investigated the effects of these different labour market institutions and compared them with respect to market and welfare outcomes, with the aim to evidence whether and how one institution may prevail as preferred by both firms and unions.

Our results have shown that, depending on values of the union’s power, the Monopoly Union institution may be preferred by both parties, in particular when the value of the union’s power is included in a namely “medium-high” range, while if EB and RTM arrangements are compared no agreement may occur. This is a rather interesting result because it implies that firms prefer to leave unions monopolistically set wages rather than to bargain with them on both wages and employment even when the union’s power in the efficient bargaining is not too high. Moreover the comparison between the EB and RTM arrangements has revealed that the interest of both parties with respect to the scope of bargaining is always conflicting and thus, in contrast with the case of the comparison between MU and EB, no agreement on the choice of one of these institutions may occur.

Our results in this respect challenge conventional wisdom and suggest that monopoly union institution may deserve more attention, despite the implications of relative “inefficiency”, than is currently the case.

Needless to say, our model is simple. However, it is based on the standard industrial organization literature approach. The results obtained from a simple duopoly framework can enhance our understanding of basic labour market institutions.

In order to test the robustness of these results, other real-world features, for instance, on the one side, different union's objectives such as the rent-maximising or the wage (employment)-oriented ones, and on the other side industries with differentiated products should also be considered. We believe that those are subjects for future research.

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Appendix

In this appendix we compare two institutions - Efficient Bargaining and Right-to-Manage - under the usual assumption of identical union power in both institutions. We show that there is never agreement between firms and unions as regards the scope of bargaining.

As in the main text, the output function for given wages chosen by firms in the second stage is given by eq. 7 (which we report here for comparison purposes):

$$q_i(w_i, w_j) = \frac{[1 - 2w_i + w_j]}{3} \quad (\text{A.1})$$

Under Right-to Manage, firm's manager - union bargaining unit i selects w_i , to maximize the following generalized Nash product,

$$\max_{w_i} N_i = (\Pi_i)^{1-b} (V_i)^b = [(1 - w_i - Q)q_i]^{1-b} (w_i q_i)^b \quad (\text{A.2}),$$

After the usual algebra,⁸ the equilibrium values of wage, output, profit and union's utility are derived:

$$w_i = w_j = w^* = \frac{b}{(4 - b)} \quad (\text{A.3})$$

$$q_i = q_j = q^* = \frac{2(2 - b)}{3(4 - b)} \quad (\text{A.4})$$

$$\Pi_i = \Pi_j = \Pi^* = \frac{4(2 - b)^2}{9(4 - b)^2} \quad (\text{A.5})$$

$$V_i = V_j = V^* = \frac{2b(2 - b)}{3(4 - b)^2} \quad (\text{A.6})$$

Now, we compare both profits and union's utility in the case of right-to-manage institution with the case of efficient bargaining institution. Therefore the following results hold:

Result A.1. *Firms always prefer the right-to-manage institution.*

Proof: From (22) and (A.5) we derive the difference between profits in both cases:

$\Pi^{*EB} - \Pi^{*RTM} = \frac{b(-b^2 + 5b - 8)}{9(4 - b)^2} < 0$, which shows that profits are always higher under the right-to-manage institution.

Result A.2. *Unions always prefer the efficient bargaining institution.*

⁸ The algebraic passages are standard and similar to those in the main text and thus are omitted here for brevity.

Proof: From (23) and (A.6) we derive the difference between union's welfares in both cases:

$$V^{*EB} - V^{*RTM} = \frac{b(b^2 - 2b + 4)}{9(4 - b)^2} > 0, \text{ which shows that union's welfare is always higher}$$

under the efficient bargaining institution. Therefore an agreement between parties on the scope of bargaining is always prevented.⁹

⁹ In this appendix we have compared two exogenously given equilibrium situations for the two different institutions. However, it must be noted that the result (i.e. no agreement between parties on the scope of bargaining) would also be robust to the endogenous determination of the scope of bargaining (the proof is omitted here for brevity and is disposable on request).