Union–firm bargaining: Order of play and efficiency

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A B S T R A C T

This paper shows that a modified alternating offers Rubinstein model can provide a Pareto superior outcome in the context of the right-to-manage union–firm bargaining. Two examples of bargaining protocols that yield a superior outcome are provided. In the first example, the parties engage in a game in which the order of play is determined as part of the bargaining. We show that the game has a unique subgame perfect equilibrium in which the firm always moves first in the wage bargaining game. The equilibrium wage is, therefore, unique. In the second example, we examine a two-part-tariff alternating offers bargaining protocol, where the parties bargain over the wage and transfer payments. We show that this bargaining protocol has a Pareto efficient, unique subgame perfect equilibrium. Thus, although the parties do not bargain over the level of employment, the outcome under this protocol is, nevertheless, socially optimal.

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1. Introduction

Union–firm bargaining has been studied within two alternative approaches: the axiomatic approach and the game theoretic approach.[1] The standard framework of the game theoretic approach is the Rubinstein (1982) alternating offers model (referred to, in the following, as the RAO model). Several features make the RAO model particularly attractive for studying union–firm bargaining. First, under reasonable conditions, it gives rise to a unique subgame perfect equilibrium. Second, it provides an explanation for bargaining power. Third, under certain conditions, it provides the same solution as the generalised Nash bargaining solution.

By its nature, however, the RAO model cannot explain the order of the play. For example, in a two-party bargaining game, it provides two possible outcomes: when Party 1 moves first and when Party 2 moves first. Which of these outcomes actually occurs is beyond the scope of the standard RAO model. The RAO model's inability to determine the order of play is not a major issue if the size of the "pie" is fixed[2] since, under this condition, the order of play affects only the distribution of the pie, but not its size.[3]

In many bargaining situations, however, the size of the pie is not fixed because the parties may be able to make additional post-bargaining decisions that depend on the outcome of the bargaining game.[4] In such cases, since the order of play affects these additional decisions, it will also affect the size of the pie. This is clearly the case in the context of the standard right-to-manage (hereafter RTM) model, where the firm makes its employment decision after wage bargaining is completed.

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[1] For a good discussion of these two union–firm bargaining models see Booth (1995a, 1995b). See also Bean (1984).

[2] Which is, indeed, the case for most bargaining models discussed in the literature; see for example Muthoo (1999).

[3] An example of a paper in which the size of the pie is affected by the players' actions is Frankel (1998) where "creative ideas" can affect the size of the pie (but not its distribution).

[4] Or alternatively, because the parties may be able to make strategic pre-bargaining commitments whose implications depend (credibly) on the outcome of the bargaining game.

The RTM model is, indeed, the most commonly used framework in the labour union literature for studying union–firm bargaining. While an alternative, where the parties bargain over both the wage and level of employment (known in the literature as the 'efficient bargaining model'), has also been studied,[5] empirical evidence suggests that it is, in fact, rare for the union and firm to engage in such bargaining.[6] In view of the empirical evidence, this paper examines union–firm bargaining within the context of the RTM model.[7]

Given that within the RTM model the firm's post-bargaining choice of employment (and hence output) depends on the wage, and the wage in turn depends on the order of play, it is clear that the order of play affects the size of the pie. This suggests that, even if we remain within the framework of the RTM model, an improved bargaining protocol that takes into account potential gains from a welfare improving order of play is possible (and hence may emerge in equilibrium).

The objective of this paper is to show that the standard RAO bargaining model can be modified to provide a Pareto superior outcome, while still remaining within the RTM framework. To do this, we first show that, within the RTM framework, the standard RAO model implies that inefficiency is always greater when the union moves first in the wage bargaining game. We then provide two examples of bargaining protocols that yield superior outcomes.

In the first example, potential gains from an inefficiency reducing, and hence Pareto improving, order of play are captured by a protocol that allows the order of play itself to be part of the bargaining. Specifically, we consider the following three stage bargaining game. In stage 1, the union and the firm use transfer payments to negotiate a mutually agreeable order of play that determines who will make the first offer in the forthcoming wage bargaining game. In stage 2, the wage is determined in an alternating offers bargaining game, given the agreed upon order of play. Finally, in stage 3 (in line with the RTM model), the firm makes its employment decision. We show that, in equilibrium, the firm will always move first in the bargaining game. Since inefficiency is smaller when the firm moves first in the wage bargaining game, the equilibrium order of play implies that the outcome is Pareto superior. Moreover, since in equilibrium the firm always moves first, it also follows that, unlike in the standard RAO model, here there is only one equilibrium wage.

While in the first example the bargaining game leads to greater efficiency than the standard RAO game, it still does not yield a Pareto efficient outcome because the level of employment is usually not "socially optimal". This is the result of the fact that we are within the RTM framework (using the wage as the single bargaining instrument) and not because we are using the RAO model. If we are willing to consider an additional bargaining instrument, the above protocol can be improved even further. Thus, in the second example, we consider an "even better" protocol (which is also modelled as a Rubinstein alternating offers game) under which the parties bargain over two instruments: the wage and a lump sum transfer which partitions the surplus. That is, bargaining is over a "two-part-tariff",[8] which can be interpreted as a package consisting of a wage and fringe benefits. There is, in fact, evidence to suggest that fringe benefits (for example, pension plans, life, accident and health insurance, vacation pay, etc.) may indeed be important in union contracts (see Freeman, 1981; Freeman and Medoff, 1984; Lewis, 1986; Kornfeld, 1993 and Akyeampong, 2002, for estimates of the magnitude and importance of fringe benefits in union contracts in the US, Australia and Canada).[9]

We show that this two-part-tariff bargaining game has a Pareto efficient, unique subgame perfect equilibrium. Thus, although the parties do not bargain over the level of employment, the outcome is nevertheless socially optimal in that it maximises the total surplus. Efficiency is achieved here since the subgame perfect equilibrium wage is, in fact, the socially optimal one, which in turn implies that the choice of the optimal level of employment is incentive compatible. This result is reminiscent of Booth (1995a, 1995b) where efficiency is achieved in Nash bargaining over wages and severance pay.[10]

2. The standard alternating offers bargaining model

Consider the relationship between a firm and its workers. Workers are represented by a union whose objective is to maximise the (expected) utility of the membership. The workers' union consists of $\bar{n}$ members. An employed worker receives a wage rate of w, whereas an unemployed worker receives the opportunity cost wage, w^0. We assume that the firm employs only union workers. Thus, if we denote the number of employed workers by n, then this is also the number of employed *union* members.[11] Following the literature, we take the union's utility function to be given by[12]:

$$\widetilde{U}(n, w; \bar{n}, u^0) \equiv n\widetilde{u}(w) + (\bar{n} - n)\widetilde{u}(w^0) \tag{1}$$