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CHOICE THEORETICAL FOUNDATIONS OF UNION UTILITY FUNCTIONS INVOLVING DISCONTINUITIES

By

S.A. Drakopoulos
University of Athens

Abstract

Trade Union utility functions with discontinuities have started to gain popularity in the last few years. The main reason for this is the search for more embracing union utility functions. The choice of the appropriate union utility function has important implications for analysing the problem of unemployment and wages in unionized labour markets. This paper attempts to provide the choice theoretical foundations of such functions thereby widening their relevance and facilitating their application to other areas. The foundations can also be used as a basis for modeling sequential multi-objective union utility functions (JEL Classification Number: J5).

1. Introduction

The dominant specifications of union utility imply a well behaved continuous utilitarian or expected utility function. However, there is an increasing awareness among labour economists that these specifications of union utility functions are not unproblematic. For instance, Pencavel admits that "even with the focus so narrowed [mainly on wages and employment], there are serious analytical problems of specifying a well-defined union utility function" (Pencavel, 1991, p. 55). This awareness has already begun to make its impact in theoretical works on union utility with a tendency in the union literature to ar-

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gue that the established union utility functions are mis-specified, and to search for more representative ones (see Flanagan, 1993; Checchi and Lucifora, 2002). An example is found in the more embracing union utility functions suggested for dealing with issues like wage rigidity and the insiders-outsiders problem (Oswald, 1986; Carruth and Oswald, 1987; Jones and McKenna, 1989; Moene, Wallerstein and Hoel, 1993; Drakopoulos and Skatun, 1997). The main thrust of these new specifications is that they employ a semi-strict quasi-concave union utility function with a discontinuity in the marginal rate of substitution which implies kinked indifference curves. These have started to acquire new credibility, although implied in older models like Cartter's (1959) political union.[1] Furthermore, it has been shown that these new specifications have considerable implications for the microeconomic theory of the trade union (including of course, the important issues of unemployment and wages).[2]

Yet all these formulations are provided with little reference to their theoretical foundations. This is a serious deficiency since the theoretical foundations (particularly those relating to the theory of choice) are essential for the credibility of the functions, for future similar work and for drawing out their wider significance.

The aim of this paper is to suggest a general choice theoretical framework for these alternative union utility functions which will enhance their general relevance. This theoretical basis also applies to the further development of older political models of the union which explicitly or implicitly suggest kinked union indifference curves. It is also argued that these foundations are a first step in formulating more complex and representative union utility functions for analysing unions more as organisations than firms (eg Mayhew and Turnbull, 1989; Flanagan, 1993).[3] As will be seen the analysis also attempts to provide the basis for modeling a sequential multi-objective union utility such as the one implied in Reder (1952,1960).[4] Finally, by providing the foundations for a particular form of function, it is hoped that similar research on other types of union utility functions will be encouraged in a general attempt to tackle the widely acknowledged remaining analytical problems.

2. Union Utility Functions with Discontinuities

The standard union utility function which is used in the literature is basically an expected utility formulation which is equivalent to the assumption that the union is characterized by utilitarian principles (this is only true when union membership is fixed).

$$U = Nu(w) + (M-N)u(b) \quad (1)$$

where u(.) is the utility function of an individual worker, M is the membership of the union, w is the wage rate, b is unemployment benefit (or an alternative wage), and N is employment. The union is assumed to maximize (1) subject to a profit constraint usually given as:

$$\pi = pf(N) - wN$$

where π is profit, ρ is price and f(N) is a well-behaved production function (for a general discussion, see Booth,1995). This type of union utility function was first suggested by McDonald and Solow (1981) and is followed by many labour theorists (e.g. Ashenfelter and Brown, 1986; Grout, 1984). The above utility function implicitly assumes that there is continuous substitution between w and N across over the whole range of w and N.

The first and the basic formulation of a union utility function which explicitly involves discontinuities was used by Oswald in 1986 in the process of explaining wage rigidity. Oswald utilizes some work in psychology to suggest two ideas: a) that there is an asymmetry between responses to "over-pay" and "under pay" and b) that there is an aspiration wage which is the level of pay which is seen as the fair amount or the norm, and which depends on past achievements or comparisons with the wage of other workers. Once this aspiration wage has been achieved, extra increases of wages provide less utility. The individual worker utility function is

$$U = \begin{cases} w & \forall \quad w \geq w^* \\ \sigma(w-w^*) + w^* & \forall \quad w < w^* \end{cases} \quad (2)$$

where w* is the aspiration wage and $1 > \sigma > 0$. The next step is to incorporate these ideas into a union utility function, assuming a utilitarian union as a basis.

$$U = N[\min(0,(1-\sigma)(w^*-w)) + w] + (M-N)u(b) \quad (3)$$

This produces union indifference curves with a non-differentiable kink at $w = w^*$. In an efficient bargain with an isoprofit contour as a constraint, there will be equilibria in which product price changes leave $w = w^*$

A similar formulation but in relation to the insiders-outsiders problem, was suggested by Carruth and Oswald (1987). In particular, they maintain that the standard utilitarian function ignores the distinction between insiders and outsiders. Although the standard utilitarian function can account for the insiders-outsiders scenario, insiders have much more influence on union behaviour than outsiders, and this calls for a utility function which will be valid for the whole range of employment levels not just levels below or equal to the current membership. In other words equation 1 is mis-specified when employment is greater than membership (The impact of their critique is gaining influence e.g. Moene, Wallenstein and Hoel,1993). Thus they write (1) in a general form as

$$U = Mu(w) + [u(b) - u(w)] \max[0, M-N] \qquad (4)$$

Writing the above in the form of equation 2, gives

$$U = \begin{cases} Nu(w) + (M-N)u(b) & \forall \quad M \geq N \\ Mu(w) & \forall \quad M < N \end{cases} \qquad (5)$$

Union indifference curves will have a kink when M = N.

Jones and McKenna (1989) have expanded the above formulation to incorporate the idea that the union is more likely to care about employed outsiders, than about unemployed outsiders. This overcomes the difficulty with the original Carruth-Oswald formulation which produces an employment level that is at most equal to membership, and allows equilibrium above M when there is a rise in demand. Jones and McKenna use a formulation similar to (5) by adding to the second part the term

$$Mu(w) + (N-M)qu(w) \qquad \forall \quad M < N \qquad (6)$$

q is the employed outsiders' probability of job retention. The union indifference curves here are still kinked but with a negative (rather than a horizontal) slope for $M < N$

Apart from the above, there are other examples which implicitly favour discontinuous substitution among union objectives. One case is Cartter's view that there might be very limited substitutability between wages and employment

due to the internal political structures of the union (Cartter, 1959 and for a modern version Mayhew and Turnbull, 1989; Drakopoulos and Skatun, 1997).

3. Choice Theory Foundations

It has been shown that all of the above formulations have important comparative static properties (see Jones and McKenna, 1989 Drakopoulos, 1996). However, the presence of choice theory foundations would probably provide additional theoretical validity, incorporate all the above variants, add generality and supply the basis for future applications.

The basic idea of the above utility functions is that certain levels of variables are more important than, or have priority over other variables. In terms of choice theory this idea can be captured by a hierarchical system of preferences. There are two main types of hierarchical preferences: a) lexicographic and b) target setting (Drakopoulos, 1992). The target setting type is more relevant here because, unlike lexicography, it allows for degrees of substitution among union objectives. Target setting hierarchical choice involves the setting of targets in the sense that agents must reach a target (or threshold) of a variable before starting to consider alternatives. The basic formulation of this type of choice as applied to union behaviour is the following (for a general axiomatic discussion of hierarchical choice, see Georgescu-Roegen, 1966; Day, 1971; Encarnacion, 1983; Falkinger, 1990).

Taking the general case that there are a number of objectives, assume that each objective i has a variable z_i which corresponds to it. It is also assumed that the numbering

$$z_1, z_2, \ldots z_n$$

is such that the problem of choice is the following

$$\max z_n$$

s.t.

$$Z_i \geq z_i^* \ (i = 1, 2, \ldots, n\text{-}1)$$

where z*i is a constant and represents satisfactory levels of corresponding variables. In the case that the above has no solution, then the problem becomes:

$$\max z_{n\text{-}1}$$

s.t.

$z_i \geq z_i^*$ (i = 1,2, ..., n-2)

The least important objective is dropped. The same procedure is followed until a feasible problem is determined. In order to express these in utility terms, we need a utility function which will be a function that is defined over the z's and which would express union preferences. Corresponding to each objective i, a real-valued function is assumed $u_i = u_i(z_i)$ such that $u_i(x_i) > u_i(x_i')$ means that χ is preferred to x' on the basis of that objective. It is also assumed that there exist particular values $u_i^* = u_i(z_i^*)$ where i = 1,2,... The z_i^* is a particular constraint level of z_i. Thus the union utility vector is

$$u = (\min[u_1(z_1), u_1^*], \min[u_2(z_2), u_2^*], \ldots) \quad (7)$$

In terms of preference theory, assume we have two vectors

$x = (x_1, x_2, \ldots x_n)$

$x' = (x_1', x_2', \ldots x_n')$

then x P x' if

either 1) $x^* > x_1 > x_1'$

or 2) $x_1 = x_1' < x_1^*; x_2 > x_2'$

or 3) $x_1' < x_1^* < x_1$

or 4) $x_1^* < x_1, x_1'; x_2^* > x_2 > x_2'$

: : :

$x_{n-1}^* < x_{n-1}; x_{n-1}'; x_n > x_n'$

With the above as a basis, it is desirable to give an example by taking a situation where the union has only two objectives, wages and employment (w,N). Following the basic formulation of the discontinuous approach (equations 2 and 3), w is set to be the dominant or the most important objective. Any situation can be represented by the vector

v = (w, N)

We symbolize the satisfactory level of wages with w*. This level could also be taken to be the "fair" wage (Akerlof and Yellen, 1990) or in a Keynesian framework, the relative wage (e.g. Summers, 1988, Frank, 1997). Now let us compare two situations

$v' = (w', N')$ and $v'' = (w'', N'')$

v' P v'' if

either 1) $w'' < w' < w^*$

or 2) $w'' = w' \leq w^*$; $N'' < N'$

or 3) $w'' < w^* < w'$

or 4) $w^* < w'', w'$; $N'' < N'$

The above system of choice is a very simple but basic example. The general union utility function which is implied is two-part function given as

$$U(w,w^*,N) = \{U_1(w) \ , \ U_2(w^*,N)\} \text{ where}$$

$$U(w,w^*,N) = \begin{cases} U_1 \text{ for } w < w^* \\ U_2 \text{ for } w \geq w^* \end{cases} \quad \textbf{(8)}$$

It is clear that the above is not very realistic since the union places no emphasis on employment before the wage reaches the target level (The derived union indifference curves will be L shaped with a kink at w*). One can construct more realistic general hierarchical union utility functions which are nevertheless based on the above basic system. For instance, it can be argued that the union cares about employment even before the target wage has been reached. The utility function implied in this case is the following

$$U(w,w^*,N) = \{U_1(w,N) \ , \ U_2(w^*,N)\} \text{ where}$$

$$U(w,w^*,N) = \begin{cases} U_1 \text{ for } w < w^* \\ U_2 \text{ for } w \geq w^* \end{cases} \quad (9)$$

The derived union indifference curves will be as follows (see Figure 1). Furthermore an example of the difference of this kind of indifference curves to the optimization problem of the union can be found in Drakopoulos, 1996.

The same conceptual framework can be used to capture the formulations in the insiders-outiders theme. The insiders-outsiders idea as presented by Carruth and Oswald and Jones and McKenna, assumes that the most important objective is full employment of all union members. The basic choice system can capture the relatively simpler approach of Carruth and Oswald by substituting M (membership) in place of w*. This modification can be easily incorporated in the basic choice system. In our framework, the basic utility function in the insiders-outsiders theme is the following

$$U(M,N,w) = \{U_1(M,N,w) \ , \ U_2(M,w)\} \text{ where}$$

$$U(w,M,N) = \begin{cases} U_1 \text{ for } M \geq N \\ U_2 \text{ for } M < N \end{cases} \qquad (10)$$

The resulting union indifference curves will differ from those in figure 1 in the sense that the kink will be where $N = M$ and there will be a horizontal segment for $N > M$

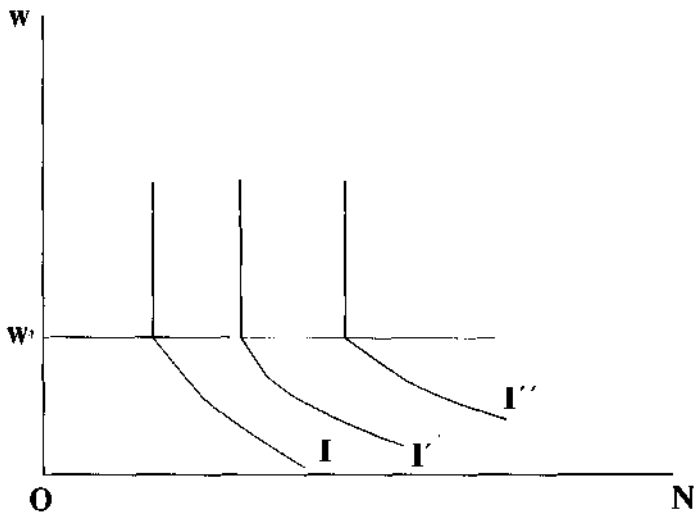
Thus all of the above formulations can be basically derived from equation (7). The important point of (7) and of the previous formulations is that the utility index U_1 is higher than the utility index U_2 up to the target level. It should be clear that the suggested two-part functions are of a general form. One could use any specific form (e.g. utilitarian, wage bill etc) as long as the hierarchical element is preserved.

Furthermore the choice system suggested can easily be adopted to represent and further develop explicit sequential or satisficing approaches to union utility (e.g Reder, 1960). For instance, the starred variables can be viewed as the satisficing levels for the union. Our choice system can also provide the starting point for a sequential multi-objective union utility function. Wages and employment could be the most important variables and the rest (hours of work, conditions of work etc) would become important after satisfactory levels of these have been achieved. Clearly, this establishes a connection with the industrial relations literature, which some labour theorists regard as a desirable development (e.g. Mayhew and Turnbull, 1989).

4. Concluding Remarks

There is a growing interest in the nature and specification of union utility functions among union theorists. This has become more apparent in the last few years when an increasing number of economists have started to appreciate the complex nature of union objectives. A direct result of this is the appearance of alternative union utility functions such as those implying kinked union indifference curves. These specifications were mainly drawn from an insiders-outsiders framework. This paper attempts to provide the choice theoretic foundations of such functions thereby widening their relevance and facilitating their application to other areas. Furthermore, it was argued that these choice theoretic foundations could be used as a basis for exploring and developing alternative views on union behaviour. For instance, the suggested choice system could be the starting point for modeling a sequential multi-objective union utility function in the tradition of Reder or the further development of the political union model such as that of Cartter. Finally, one can see these foundations as a useful starting point for those who view the union from an organizational perspective. In general the proposed system might provide a more realistic approach to understanding union utility functions and capturing the complex aspects of trade union behaviour.

The derived union indifference curves will be as follows



FIGURE

Notes

1. Cartter thought that there is very little substitution between wages and employment mainly because of the internal political pressures of the union. Cartter's view and generally the view that union indifference curves are kinked has been strengthened by a number of empirical studies on the elasticity of substitution between wages and employment. As Pencavel observes these studies "are consistent with Cartter's conjecture". For a review see Pencavel, 1991.

2. The results include wage rigidity and employment phases in a boom period (see Oswald, 1986; Carruth and Oswald, 1987; Drakopoulos and Skatun, 1997).

3. The advocates of this view do not see the union primarily as a profit maximizing firm. Instead they emphasize the institutional framework and the collective choice process (Flanagan, 1993).

4. Reder suggested that unions rarely exploit their full bargaining power in a boom time, thus keeping a margin of reserve power for future bad periods. This is close to Simon's sequential satisficing approach (see also Simon, 1982 and King, 1990).

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