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TRADE UNION MEMBERSHIP FEES: SOME THEORETICAL CONSIDERATIONS

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ABSTRACT

This paper analyses the relationships between trade-union's fees, unemployment and members' income and prospects of employment and the implications of these relationships for the optimal membership fee with an emphasis on the role of membership level as a determinant of the trade-union bargaining power.

1. INTRODUCTION

Membership fees are a key factor in workers' decision to join or leave trade unions. The purpose of this paper is to analyse the relationships between trade-union membership fees and factors such as unemployment and members' income and prospects of being employed. By focusing on the roles of the trade-union's bargaining power and workers' inclination to withdraw their membership when union's fee rises the paper demonstrates that the relationships between unemployment and membership fee, members' income and membership fee, and members' employment prospects and membership fee can be depicted by inverted U-shaped curves. These relationships can be incorporated into an expected utility maximisation framework to determine the optimal fee for a membership in a trade union. The analysis' building stones are presented in section 2.

They are used in section 3 to construct the paper's main proposition about the relationships between unemployment, members' income and probability of being employed and membership fee, which are subsequently incorporated into the determination of the optimal membership fee in section 4. The paper is concluded in section 5 with a brief summary.

2. BUILDING STONES

The analysis of the relationships between unemployment, members' income and employment prospects and membership fee employs the following definitions and assumptions:

L = the labour force;

U = the level of unemployment, $U \leq L$;

M = the number of trade-union members;

- BP = the trade-union's bargaining power;
m = the trade union's membership fee;
 μ = the membership-withdrawal coefficient — a positive scalar indicating workers' inclination to withdraw their trade-union membership when the membership-fee rises;
p = the workers' subjective probability of being unemployed, $0 < p < 1$;
W = the workers' income if employed; and
S = the unemployment payment.

Assumption 1: workers' income rises with the trade union's bargaining power but in diminishing additions as formulated below:

$$W = W_0 - \beta / BP \quad (1)$$

where β is a positive scalar and W_0 is the income's upper bound.¹

Assumption 2: Membership in a trade union enhances workers ability to retain jobs proportionally to the trade union's bargaining power:

$$p = 1 - \alpha BP \quad (2)$$

where α is a positive scalar indicating the degree of protection against layoff provided by the trade union for its members.

Assumption 3: The trade-union's bargaining power is proportional to the membership-unemployment ratio and the membership fee:

$$BP = m \frac{M}{U} . \quad (3)$$

This specification indicates that BP can also be interpreted as the ratio between the trade-union's budget (mM) and the unemployment level. It suggests that the larger the trade-union's membership and budget and the lower the unemployment level the higher the potential strike costs for employers and hence the greater the trade-union bargaining power.²

Assumption 4: The demand for labour is downward sloping and hence a rise in workers' income increases the unemployment level in the following manner

$$U = U_0 - \delta(W_0 - W) \quad (4)$$

where U_0 is the unemployment level associated with W_0 and δ is a positive scalar.

Assumption 5: The number of trade-union members declines with the membership fee as described by the following equation:

$$M = L - \mu m. \quad (5)$$

The underlying rationale for this assumption is that the higher the membership fee the lower the wage differential, or more broadly the utility differential, between being a trade-union member and not being a member.³

3. MEMBERSHIP FEE, UNEMPLOYMENT, AND MEMBERS' INCOME AND EMPLOYMENT PROSPECTS

The above assumptions lead to the following proposition about the relationships between unemployment, members' income and employment prospects and membership fee.

Proposition 1: Up to a critical membership fee, unemployment level and members' income and probability of being employed rise with the

trade-union membership fee. This critical membership fee is equal to the ratio of the labour force to twice the membership-withdrawal coefficient ($L/2\mu$). Beyond this critical fee unemployment level and members' income and probability of being employed decline.

The underlying rationale for this proposition is that up to a membership fee of $L/2\mu$, the trade-union's budget rises despite the decline in membership and more rapidly than the unemployment level. Consequently, the trade-union's bargaining power for securing employment and higher income level for members increases. Beyond this critical membership fee members' income and employment probability decline as the trade-union's budget and bargaining power decrease with the shrinking membership. Given that the demand for labour is downwardly sloping, the unemployment level rises initially with the membership fee and then declines. Interestingly, the larger the labour force (i.e., the membership's potential upper bound) and the smaller the membership-withdrawal coefficient, the higher the critical membership fee.

Proof: Equations 1, 3, 4, and 5 imply that the relationship between unemployment level and membership fee can be displayed as

$$U = \frac{U_0}{1 + \delta\beta / (Lm - \mu m^2)} \quad (6)$$

and hence the marginal effect of membership fee on the unemployment level is:

$$\frac{\partial U}{\partial m} = \frac{\delta\beta U_0}{(B + \delta\beta)^2} (L - 2\mu m) \stackrel{>}{<} 0 \text{ as } m \stackrel{<}{>} \frac{L}{2\mu}.$$

Furthermore, equations 1, 3, 5 and 6 imply that the relationship between members' income and membership fee can be rendered as

$$W = W_0 - \frac{\beta U_0}{Lm - \mu m^2 + \delta \beta} \quad (7)$$

and therefore

$$\frac{\partial W}{\partial m} = \frac{\beta U_0}{(Lm - \mu m^2 + \delta \beta)^2} (L - 2\mu m) \stackrel{>}{<} 0 \text{ as } m \stackrel{<}{>} \frac{L}{2\mu}.$$

Finally, equations 2, 3, 5 and 6 imply that the relationship between the probability of members' employment and membership fee can be portrayed as

$$1 - p = \frac{\alpha(Lm - \mu m^2 + \delta \beta)}{U_0} \quad (8)$$

and consequently

$$\frac{\partial(1-p)}{\partial m} = \frac{\alpha(L - 2\mu m)}{U_0} \stackrel{>}{<} 0 \text{ as } m \stackrel{<}{>} \frac{L}{2\mu}. \text{ QED}$$

4. IMPLICATIONS FOR OPTIMAL MEMBERSHIP FEE

Let us now incorporate the relationships obtained in the previous section into the determination of the optimal membership fee within an expected-utility maximisation framework. Let us postulate that trade-union members are risk averse and maximise expected utility from disposable income and that the utility function (u) of the representative member has the following concave form

$$u = y^\gamma, \quad 0 < \gamma < 1. \quad (9)$$

Let us ignore, for sake of simplicity, the issues of income tax and part-time employment. In which case, workers' income after deduction of membership fee can be perceived as a random

variable having a *poisson* distribution:

$$y = \begin{cases} W-m & 1-p \\ S-m & p. \end{cases} \quad (10)$$

The optimal fee for a membership in the trade union is that level of m which maximises the members' expected utility

$$E[u(y)] = p(S-m)^\gamma + (1-p)(W-m)^\gamma \quad (11)$$

subject to the income equation 7 and the employment-probability equation 8. This membership fee, m^o , should satisfy the first-order condition for maximum expected utility

$$\begin{aligned} \frac{\partial E(u(y))}{\partial m} &= \frac{\partial p(m^o, \Phi)}{\partial m} \{(S-m^o)^\gamma - [W(m^o, \Phi) - m^o]^\gamma\} \\ &\quad - p(m^o, \Phi) \gamma (S-m^o)^{\gamma-1} \\ &\quad + [1 - p(m^o, \Phi)] \gamma [W(m^o, \Phi) - m^o]^{\gamma-1} \left[\frac{\partial W(m^o, \Phi)}{\partial m} - 1 \right] = 0 \end{aligned} \quad (12)$$

where is the set of the model's parameters ($\gamma, S, W_0, U_0, L, \alpha, \beta, \delta$, and μ) and the explicit forms of W and p are given by equations 7 and 8, respectively.

The complexity of the above expression implies that there is no closed-form solution for m^o and that it is also impossible to assess analytically the effects of changes in the model's parameters on the optimal membership fee. Moreover, numerical-simulations' results are most likely to be very sensitive to the choice of the initial-parameter set. Analytically, it can only be argued that it is optimal that the direction of the effect of a change in any of the model's parameter on the optimal membership fee coincides with the direction of its effect on the marginal expected utility from membership fee as suggested by

the following proposition.

Proposition 2: $Sign\{\frac{dm^o}{d\phi}\} = Sign\{\frac{\partial^2 E(u(y))}{\partial m \partial \phi}\}$ for any parameter $\phi \in \Phi$.

Proof: The total differentiation of the necessary condition for maximum implies

$$\frac{dm^o}{d\phi} = -\frac{\partial^2 E(u(y)) / \partial m \partial \phi}{\partial^2 E(u(y)) / \partial m^2} \quad (13)$$

for any $\phi \in \Phi$. By virtue of the second-order condition for maximum the denominator of the ratio on the right-hand side of equation 13 is negative and hence the direction of the marginal effect of on m^o is determined by the sign of the numerator of that ratio. *QED*

5. CONCLUSION

By incorporating the adverse effect of trade-union fees on the level of membership it has been demonstrated that unemployment level and members' income and probability of being employed rise initially with the trade-union's membership fee and then decline as the bargaining power of the trade union diminishes with the shrinking membership level. This property has been incorporated into an expected-utility-maximisation framework for determining the trade-union's membership fee. The complexity of the resultant relationship between the representative member's expected utility and membership fee reveals the difficulty in assessing the properties of the optimal membership fee analytically.

FOOTNOTES

1. The notion of bounded labour-income is compatible with the assertion that the high unemployment levels associated with income levels that are higher than W_0 lead to social unrest and, in turn, to the collapse of the political and economic system. For an elaborate analysis of wage-bargaining outcomes associated with various models of wage determination and systems of industrial relations see Creedy and McDonald (1991) and Dowrick (1993).
2. This assumption is consistent with McDonald and Suen's (1992) findings with Australian data that union power is negatively related to unemployment rate and positively related to union density.
3. An explicit incorporation of the wage differential and utility differential arguments into membership decision has been provided by Christie (1992) and Jones and McKenna (1994).

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