Cooperation, Harassment, and Involuntary Unemployment: Comment

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Recently A. Lindbeck and D. Snower published an interesting paper in the *American Economic Review* where they try to show that cooperation and harassment activities of insiders toward entrants cause an underbidding failure. This means that although the utility of a job is higher than the utility of unemployment, firms and unemployed workers are not able to sign a contract which stipulates that a particular job is performed at less than the prevailing wage. Since insiders have the power to withdraw cooperation from entrants, they are able to make them less productive. By harassment activities they increase the disutility of work and the reservation wage of entrants and make them more expensive. Withdrawal of cooperation and harassment reduces the (potential) profitability of unemployed workers and may allow insiders to enforce nonmarket clearing wages.

In this comment[1] I will show (i) that they apply incompatible assumptions. As a consequence *all* insiders are replaced by outsiders if they threaten to harass entrants and if they set their wages according to the wage rule of Lindbeck and Snower. (ii) If harassment activities h_E are utility decreasing for insiders, $(\delta\Omega/\delta h_E < 0)$ $h_E > 0$ is no credible threat and in equilibrium $h_E = 0$ prevails. (iii) There exist Pareto-improving contracts which eliminate harassment and induce insiders to cooperate with entrants. Hence, in equilibrium only voluntary unemployment prevails.

If the number of insiders (m in each firm) is so large that their marginal product (Af') is below their reservation wage $R_I = 1$ (scenario 1), the work force is reduced until $Af' = R_I$ (see Figure 1). In this scenario unemployed workers are never profitable for the firm even if full cooperation and no harassment were to occur. Therefore, noncooperation and harassment do not increase the market power of insiders; the equilibrium wage is equal to R_I and only voluntary unemployment may exist. The effective equilibrium work force of each firm λ_1 is given by the equation $Af'(A\overline{m}) = Af'(\lambda_1) = 1$.

In case of an intermediate number ($\underline{m} < m < \overline{m}$) of insiders (scenario 2) their marginal product is higher than their reservation wage: $Af'(Am) > R_I$ at m. With full cooperation and no harassment, outsiders would be profitable. In scenario 2 withdrawal of cooperation and harassment activities ensure that entrants are never profitable, that is, their reservation wage R_E ($> R_I = 1$ because of harassment) is above their marginal product $a_E f'(Am) = 1f'(Am)$. Since insiders are able to make entrants unprofitable, individualistic wage setting by insiders will force the firm to pay

$$(1) \quad R_I < W_I = Af'(\lambda) = Af'(Am);$$

that is, the profit of the marginal incumbent worker is zero.

It is clear that a wage above Af' would induce the firm to fire the insider. Lindbeck and Snower denote this no-firing condition ($W_I \leq Af'$) as absolute profitability con-

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[1] The same notation as in Lindbeck and Snower is used. λ represents effective work force and Ω stands for the utility of a worker. $f(\lambda) \equiv f(a_I L_I + a_E L_E)$ denotes output, a_I is the level of cooperation among insiders, L_I (L_E) is the number of employed insiders (entrants), a_E stands for the level of cooperation between insiders and entrants, h_E is the harassment activity of an insider, H_E denotes the aggregate level of harassment against an individual entrant. There are upper and lower bounds on H_E and a_I (a_E): $0 \leq H_E \leq H$, $1 \leq a_I$, $a_E \leq A$. $R_I(R_E)$ stand for reservation wages of insiders (entrants) and R_I equals 1 whereas $R_E = 1 + H_E \leq 1 + H$. W_I (W_E) denotes insider (entrant) wages. Throughout this comment it is assumed that the potential work force in efficiency units $\tilde{s}$ is higher than labor demand; that is, there is always some voluntary or involuntary unemployment.

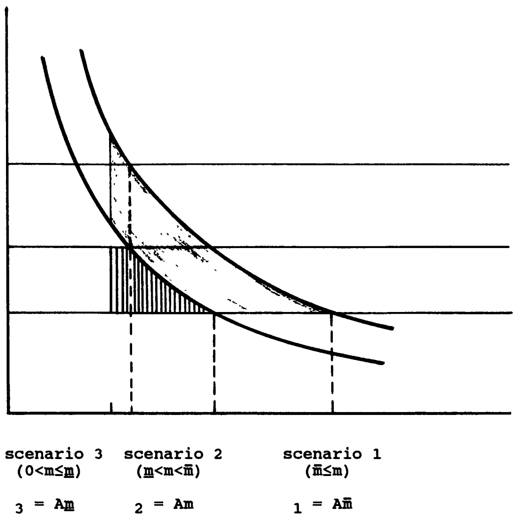

FIGURE 1

straint (APC). In this scenario the effective equilibrium work force is given by $\lambda_2 = Am$, for example $\lambda_2 = A\tilde{m}$ in Figure 1.

If the number of insiders is very low ($m \le \underline{m}$, scenario 3) the marginal product of entrants is high enough to render them profitable despite withdrawal of cooperation and harassment activities. The marginal insider must make himself at least as profitable as the marginal entrant; otherwise he will be replaced. Lindbeck and Snower denote this requirement the relative profitability constraint (RPC). The insider wage according to the RPC is lower than Af' but higher than R_I:

$$(2) \quad R_I < W_I = A(1+H_E) \le Af'(Am).$$

It is obvious that the higher H_E the higher W_I. Therefore, $H_E = H$. Entrants receive a compensation equal to

$$(3) \quad W_E = R_E = R_I + H_E = 1 + H.$$

Equation (3) implies that outsiders are hired up to the point where $f'(\lambda) = f'(\lambda_3) = 1 + H$. Thus, $\lambda_3 = A\underline{m}$. In case of $m < \underline{m}$ the number of entrants employed is given as $A\underline{m} - Am = a_E L_E = L_E$ because insiders do not cooperate with entrants. In scenarios 2 and 3 unemployment is involuntary because if outsiders received full cooperation ($a_E = a_I = A$) and no harassment occurred (i.e., identical conditions of employment, ICE), they would be willing to work for less than the prevailing wage:

$$(4a) \quad R_E(H_E = 0) = 1 < W_I \quad \text{(scenario 2)}$$

$$(4b) \quad R_E(H_E = 0) = 1 < W_E \quad \text{(scenario 3)}$$

I. The Total Profitability Constraint (TPC)

The TPC requires that it is not profitable to replace *all* insiders. Lindbeck and Snower deal with this possibility in fns. 12, 15, and 17. Henceforth I call this scenario zero. They assume in fn. 17 that the upper bound on H_E is itself constrained to be below H^C: $0 \le H_E \le H \le H^C$. The value of H^C is given by the requirement that the maximized profit in scenario 3, π_3^*, is equal to the maximized profit in scenario 0, π_0^*. From the fact that $\delta\pi_3^*/\delta H_E < 0$ and $\pi_3^*(H^C) = \pi_0^*$ they derive the "no-replacement condition" $H_E \le H^C$. In this section it will be shown that $\pi_3^* = \pi_0^*$ only holds if $H_E = H^C = 0$; that is, in the case of $H_E > 0$ it is profitable to replace *all* insiders.

According to the assumptions of Lindbeck and Snower, entrants are unable to raise their productivity through cooperation and always receive R_E. Therefore, if only entrants are employed, $a_E = 1$, $H_E = 0$, $W_E = R_E = 1$. Profits are maximized at $\lambda_0 = g(1)$ with $g \equiv (f')^{-1}$. From this, π_0^* is given by

$$(5) \quad \pi_0^* = f[g(1)] - g(1).$$

Notice that λ_0 is in the range of an intermediate incumbent work force: $A\underline{m} < \lambda_0 < A\bar{m}$ (see Figure 1). From (2) and (3), it follows that $\lambda_3 = A\underline{m} = g(1+H)$ and $L_E = A\underline{m} - Am$. Therefore, π_3^* can be written as

$$(6) \quad \pi_3^* = f(A\underline{m}) - W_I m - W_E L_E$$
$$= f[g(1+H)] - A(1+H)m$$
$$- (1+H)(A\underline{m} - Am)$$
$$= f(A\underline{m}) - (1+H)A\underline{m}$$
$$= f[g(1+H)] - (1+H)g(1+H).$$

Differentiation of π_3^* with respect to H shows that maximized profit is a decreasing function of H:

$$(7)\quad \delta\pi_3^*/\delta H = g'\cdot[f'-(1+H)] - g(1+H) = -g(1+H) < 0.$$

From (5), (6), and (7), it follows that $\pi_0^* > \pi_3^*$ if $H > 0$. Therefore, in scenario 3 all insiders will be replaced if they set their wages according to the rule derived by Lindbeck and Snower and if $H_E = H > 0$. Or put differently: The assumption of $H_E = H = H^C > 0$ (together with monopolistic wage setting by insiders) is not compatible with the assumption of $\pi_3^* \geq \pi_0^*$.

The same conclusion emerges for scenario 2 if the incumbent work force is small enough to ensure $Am < \lambda_0 = g(1)$. Since π_2^* is given by

$$(8)\quad \pi_2^* = f(Am) - Af'(Am)m = f(\lambda_2) - f'(\lambda_2)\lambda_2,$$

it is increasing in λ_2. If $\lambda_2 = g(1)$, $\pi_2^* = \pi_0^*$, but for $\lambda_2 < g(1)$, π_2^* is lower than π_0^*.

One way out of this dilemma would be the formulation of a different wage determination process. Suppose for example that the wage is determined in a Rubinstein-bargaining process (Rubinstein, 1982) between *individual* workers and the firm. The outcome of such a process can be approximated by the asymmetric Nash-Solution if the time period between offers and counteroffers becomes small. (See Binmore 1987; Binmore, Rubinstein, and Wolinski, 1986; Hoel, 1986.)

In scenario 3, $f'(Am) \geq 1 + H = W_E$; that is, in general it is profitable to employ entrants. Therefore, in equilibrium (with $L_I > 0$) the marginal product of insiders is equal to $Af'(A\underline{m})$. According to the asymmetric Nash-Bargaining Solution, the division of this cake results from

$$(9)\quad W_I^{\alpha}\cdot[Af'(A\underline{m}) - W_I]^{1-\alpha} \to \max W_I \quad \text{s.t. } W_I \geq R_I = 1.$$

Insiders want to maximize W_I whereas employers maximize the marginal profit of an insider, but both are constrained by their respective bargaining powers [$0 < \alpha < 1$ resp. $(1-\alpha)$].[2] The outside-option principle (Sutton, 1986) requires that the reservation wage R_I is not considered as status quo-point but as a lower bound on W_I.

According to (9) W_I is given by

$$(10)\quad W_I = \begin{cases} 1 \text{ if } \alpha Af'(A\underline{m}) < 1 \\ \alpha Af'(A\underline{m}) \text{ otherwise.} \end{cases}$$

It is obvious that the RPC is met because $\alpha Af'(A\underline{m}) < Af'(A\underline{m}) = A(1+H)$. If the TPC is also met, Am insiders and $(A\underline{m} - Am) = L_E$ entrants are employed.

Applying the asymmetric Nash-Bargaining Solution to scenario 2, $(m > \underline{m})$ generates

$$(10')\quad W_I = \begin{cases} 1 \text{ if } \alpha Af'(Am) < 1 \\ \alpha Af'(Am) \text{ otherwise.} \end{cases}$$

The APC is always met; that is, W_I is below $Af'(Am)$ and if the TPC holds, all insiders but no entrants are employed.

If insiders differ with respect to their bargaining power α, (10) or (10′) determines a different wage for each of them. For simplicity I assume now that α is the same for all insiders. It is, however, important to keep in mind that there is no coordination among them and that each bargains individually with his employer. This bargaining structure which underlies the analysis of Lindbeck and Snower may lead to a violation of the TPC. In scenario 3 the TPC requires

$$f(A\underline{m}) - W_I m - (1+H)(A\underline{m} - Am) \geq \pi_0^*.$$

Using the third line of (6), (10) and $f'(A\underline{m}) = 1 + H$ yields

$$(11)\quad (1-\alpha)Af'(A\underline{m})m \geq (\pi_0^* - \pi_3^*).$$

[2]The value of α (resp. $(1-\alpha)$) may be derived from the time preferences of the bargaining parties or from asymmetries in the bargaining procedure. (See Binmore, 1987 and Binmore, Rubinstein, Wolinski, 1986 or Hoel, 1986.)

If (11) is violated the firm replaces all insiders. Since $(\pi_0^* - \pi_3^*)$ is positive it is easy to see that for sufficiently large values of α (11) does not hold. The same argument applies to scenario 2 if $Am < \lambda_0$.[3]

II. Disutility of Harassment Activities

According to Lindbeck and Snower, "it is usually safe to assume that harassment activities are disagreeable to the harassers" (p. 171, fn. 7). Nevertheless they assume that harassment does not affect the well-being of insiders because this assumption "has self-evident implications" for their results. I think it would have been better to describe these self-evident consequences in detail in order to enable the reader to make a better judgment of the relevance of their results.

If harassment vis-à-vis entrants decreases the utility of insiders ($\delta\Omega^i/\delta h_E^i < 0$) employment and wage decisions change for two reasons: (i) Since the contribution of each harasser (h_E^i) to the aggregate level of harassment (H_E) is likely to be small, it is in general not utility maximizing to choose the upper bound value $h_{E,\max}$. Even $h_E^i = 0$ may be an individually rational outcome. (ii) If workers cannot commit themselves to $h_E^i > 0$, they will not threaten to harass entrants because they (and their employers) know that it would not be in their interest to carry out the threat.

Suppose that $\Omega^i = \Omega^i(W_I^i, h_E^i)$ is the utility function of an insider and that $\Omega_1^i = \delta\Omega^i/\delta W_I^i > 0$, $\Omega_2^i = \delta\Omega^i/\delta h_E^i < 0$.[4] The aggregate level of harassment H_E is given as $H_E = \Sigma_{i=1}^m h_E^i$.

Assuming that the wage is determined by (10) or (10′) and that $\alpha^i = \alpha$, all i W_I^i can be written as $W_I = \alpha A f'(Am + L_E)$.[5] The level of L_E is derived from $f'(Am + L_E) = 1 + H_E$. Therefore, L_E is a function of H_E and $\delta L_E/\delta H_E = (1/f'')$. From the maximization of $\Omega^i[\alpha A f'(Am + L_E(H_E)), h_E^i]$ with respect to h_E^i follows

$$\Omega_1^i \alpha A + \Omega_2^i = 0, \tag{12}$$

in case of an interior solution for h_E^i. It is obvious that the assumption of $\Omega_2^i = 0$ implies $h_E^i = h_{E,\max}^i$. In general, however, $h_E^i < h_{E,\max}^i$ holds and if Ω_2^i is large enough, even $h_E^i = 0$ may be an individually rational outcome.

If we allow for binding threats, (12) determines the optimal threat level of h_E^i. But if we stick to Lindbeck and Snower's assumption of a noncooperative game, we cannot allow for such commitment possibilities. In the absence of self-binding threats, $h_E^i > 0$ is not credible because it can only be implemented after the firm has chosen to employ some entrants.

Suppose that the employer has chosen $L_E > 0$ such that $\lambda = \lambda_0$.[6] This decision *fixes* the wage at $\alpha A f'(\lambda_0)$. *Given* this level of λ, it is never optimal for an insider to execute his threat because $h_E^i > 0$ does not change W_I but reduces Ω^i. Since a rational employer recognizes the incredibility of $h_E^i > 0$, he will always choose L_E such that $\lambda = \lambda_0$ and since a rational worker can foresee this, he will not threaten $h_E^i > 0$.

III. Pareto Improving Contracts

Our argument in Section II implies that if harassment is costly for the insiders, unemployment caused by harassment will vanish. In this section we show that even if harassment is *not* costly for insiders the firm can always "persuade" insiders to refrain from $h_E > 0$. Moreover the same type of contract that does away (in equilibrium) with $h_E^i > 0$ is also capable of inducing insiders to cooperate fully with entrants.

Let us now consider these contracts in more detail: (i) The first contract *guarantees*

[3] In scenario 2 the TPC requires $f(Am) - \alpha A f'(Am)m \geq \pi_0^*$. Adding $Af'(Am)m$ on both sides and using (8), results in $(1-\alpha)Af'(Am)m \geq (\pi_0^* - \pi_2^*)$. $(\pi_0^* - \pi_2^*)$ is positive if $Am < \lambda_0$.

[4] In order to simplify the presentation, Ω_2^i is not dependent on the number of entrants. It seems plausible that $(-\Omega_2^i)$ increases with L_E. This would strengthen the argument below.

[5] For the rest of this comment it is assumed that the TPC is met and that $W_I = \alpha A f'(\lambda)$ exceeds R_I.

[6] This argument holds for any level of $L_E > 0$ such that $\lambda \leq \lambda_0$.

insiders (in a legally enforceable way) a slightly higher *time-rate* wage than they would have received through individual bargaining and demands that they cooperate fully with and do not harass entrants. (ii) The second contract assumes that the firm can observe cooperation and harassment with some positive probability τ. It makes the payment above the level of wages that can be achieved through individual bargaining (i.e., the wage premium) contingent on the behavior of insiders; that is, if the firm discovers noncooperation or harassment, the wage premium is not paid.

We analyze first contract (i). Suppose that without this contract a scenario 3 equilibrium prevails,[7] that the number of insiders is $m' < \underline{m}$, and that each insider gets $\alpha A f'(A\underline{m}) > R_I$. In the case of $H_E = 0$, each firm would employ $(\lambda_0 - Am')$ entrants instead of $(A\underline{m} - Am')$. This would generate additional profits of π_h. In Figure 1 π_h is given by the area $(abcd)$. Applying contract (i) the firm guarantees insiders a wage of $W_I^* = [\alpha A f'(A\underline{m}) + w_h]$ where the premium w_h satisfies $0 < w_h \cdot m' < \pi_h$. In exchange for w_h it demands $h_E^i = 0$. Under this contract each insider and the firm is obviously better off.

Since W_I^* is legally enforceable, the firm cannot deviate from this contract and for the same reason insiders have no incentive to deviate. In the Lindbeck/Snower model (with wage bargaining) insiders want to raise their marginal product as much as possible because their wage depends on $A \cdot f'$. The lower the number of entrants, the higher is $\alpha A f'$. But with contract (i), wages are in some sense independent from Af'. Although the actual marginal product at λ_0 is given by $Af'(\lambda_0)$, insiders can be sure of getting W_I^*. They have no reason to restrict L_E through $h_E^i > 0$. It is important to notice that the feasibility of this contract does not depend on the observability of harassment by the firm. Since the firm knows that $\delta\Omega^i / \delta h_E^i = 0$, it also knows that insiders have no incentive for harassment.

[7]The following argument applies also to scenario 2 as long as $Am < \lambda_0$.

Deriving the implications of contract (i) for the cooperation behavior of insiders is now straightforward. The firm could make additional profits π_C (compared with a situation where $a_E = 1$, $\lambda = \lambda_0$, and $H_E = 0$) if each insider cooperates fully, that is, chooses $a_E^i = a_{E,\max}^i$.[8] In Figure 1 π_C is given by the area $(a'b'cbc')$.

It guarantees to pay $[\alpha A f'(A\underline{m}) + w_h + w_C]$, where $w_C > 0$, $w \cdot m' \equiv (w_h + w_C) \cdot m' < \pi_h + \pi_C \equiv \delta\pi$ and demands $a_E^i = a_{E,\max}^i$. As before the firm cannot deviate from this contract and insiders have no incentive to do so. The resulting level of the equilibrium work force is then $A\overline{m}$.

One might argue that although contract (i) gives insiders no incentive to deviate from $a_{E,\max}^i$ and $h_E^i = 0$, it provides also no incentives to stick to these levels. The resulting equilibrium will, therefore, be weak.[9] This problem can be overcome if there exists a positive probability τ that an insider who chooses $h_E^i > 0$ or $a_E^i < a_{E,\max}^i$ loses w. And that is exactly what can be achieved through contract (ii).[10] Starting from the same scenario 3 equilibrium as above, the firm offers a wage $W_I^* = \alpha A f'(A\underline{m}) + w$, $0 < wm' < \delta\pi$.

But now insider behavior is observed at no cost to the firm with probability $\tau > 0$[11] and,

[8]$a_{E,\max}^i$ is the maximum level of cooperation of an individual insider toward entrants. Of course if $a_E^i = a_{E,\max}^i$, all i, $a_E = A$ follows.

[9]According to Harsanyi (1986, p. 104), an equilibrium is called strong if each player's (i.e., insider's and firm's) equilibrium strategy is the *only* best reply to the other players' equilibrium strategies. Otherwise it is called weak. Under contract (*i*) any level of a_E^i and h_E^i with $0 \le a_E^i \le a_{E,\max}^i$, $0 \le h_E^i \le h_{E,\max}^i$ is a best reply; hence the equilibrium is weak.

[10]Of course, if a_E^i and h_E^i are *perfectly* observable *and* verifiable in court and the firm can make the payment of w contingent on $a_E^i = a_{E,\max}^i$, $h_E^i = 0$. But contract (*i*) assumes neither perfect observability nor verifiability in court.

[11]The employer's getting this information costlessly (with some minimum probability) does not seem to be a strong assumption. In most (hierarchical) production processes a minimum of vertical supervision arises as a joint product. Probably there is some degree of horizontal supervision because entrants obviously dislike harassment and prefer to work in a cooperative environment. If they are harassed or do not receive full cooperation, they may complain about it. All that is needed for the validity of the argument below is $\tau > 0$ and $w > 0$. τ and w may be very low.

therefore, if $a^i_E < a^i_{E,\max}$ or $h^i_E > 0$, the expected income of an insider is given by $\{\tau\alpha Af'(A\underline{m}) + (1-\tau)[\alpha Af'(A\underline{m}) + w]\} = \alpha Af'(A\underline{m}) + (1-\tau)w$. In the case of full cooperation and no harassment, income is $\alpha Af'(A\underline{m}) + w$. It is obvious that each insider prefers a no-harassment/full cooperation strategy under this contract. Since $w > 0$ they accept such a contract and since $\delta\pi - wm' > 0$ firms will offer them.

There exists an argument against the implementability of contract (ii), namely, that firms may cheat insiders and claim falsely that $a^i_E < a^i_{E,\max}$ or $h^i_E > 0$ has been observed. In order to remove this incentive to cheat, the contract may stipulate that any premium which is not paid because of noncooperation or harassment has to be distributed to other insiders.

Contract (i) and contract (ii) do away with noncooperation and harassment; that is, in equilibrium there is no incentive for $a^i_E < a^i_{E,\max}$ or $h^i_E > 0$. This induces firms to choose the maximum level of λ that is compatible with their production possibility frontier and the disutility of work (without harassment): $Af'(\lambda) = 1$ of $\lambda = A\overline{m}$. Although in this model we can never get more employment in efficiency units than $A\overline{m}$ (in this sense $\lambda = A\overline{m}$ is a full employment equilibrium) and although in a contract (i)—or contract (ii)—equilibrium any outsider can get a job at his reservation wage, we may have involuntary unemployment if we apply the definition of Lindbeck and Snower. According to their definition, a worker without a job is involuntarily unemployed if his reservation wage in efficiency units and under identical conditions of employment (R^{ICE}_E/a^{ICE}_E) is strictly below the efficiency wage of *insiders* (W_I/a_I). Assuming for simplicity that $a^{ICE}_E = A$, we have $R^{ICE}_E/a^{ICE}_E = 1/A$. In our contract (i)—or contract (ii)—equilibrium W_I is *always* above 1 because insiders can always enforce at least a wage of $R_I = 1$ through individual bargaining and get in addition $w > 0$. Therefore, we have $W_I/a_I = W_I/A > 1/A$, and hence any worker without a job is involuntarily unemployed.[12] In our view it is more appropriate to compare $R^{ICE}_E/a^{ICE}_E = 1/A$ with the efficiency wage of *entrants*, W_E/a_E. Without harassment entrants get $W_E = 1$ and with full cooperation $a_E = A$ (see fn. 8). Thus, implementing contract (i) or (ii) leads to an equilibrium with no involuntary unemployment.[13]

[12]If we assume $a^{ICE}_E < A$, we may still have $W_I/A > 1/a^{ICE}_E$.

[13]We want to stress that our arguments in Section III are also applicable to union models of unemployment (for example, McDonald and Solow, 1981; Johnson and Layard, section 5.1, 1986). These models are implicitly or explicitly based on the *assumption* that all workers in a firm have to be paid the same nonmarket clearing wage. It is, however, not clear why insiders (union workers) should object to the employment of some outsiders at a market clearing wage if they are guaranteed their jobs and get a wage premium which gives them a higher total income than they would have received through collective bargaining.

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