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BURNOUT, ABSENTEEISM, AND THE OVERTIME DECISION

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A B S T R A C T

Although bearing major personal, organizational and social costs, 'burnout' stress syndromes, the consequense of continuing high levels of job stress, have failed so far to attract any analytical economic treatment. This paper constructs a simple model of the burnout process, deriving a positive relationship between absenteeism (due to the depletion of emotional and mental resources) and overemployment under stress conditions. Applying this connection to the firm's cost-minimization problem, the paper shows that burnout-induced absences produce a kink in the labor cost function, as a result of which the firm will employ less overtime per worker and more workers in the presence of absenteeism than in its absence. This result is different from that of Ehrenberg's (1970), who concluded that a rational economic response to a certain (and exogenous) absentee rate involves increasing overtime per employee, while the effect on the number of workers is ambiguous.

I. INTRODUCTION

Over the past two decades social and industrial psychologists have devoted considerable research effort to the study of 'burnout' stress syndromes, the consequence of continuing high levels of job stress. Being often referred to as the disease of modern life, burnout is mainly characterized by a state of emotional and mental exhaustion marked by physical depletion and fatigue, feelings of helplessness and hopelessness, and a negative attitude towards work, life, and other people (Maslach, 1982). While first considered as a problem exclusive to the helping professions (human services, health care, education), burnout is now recognized as applicable to all occupations, for anyone at any level. Its immediate consequenses, aside of an obvious health damage, are decline in labor productivity and increased absenteeism, turnover and job-related accidents (Minnehan and Paine, 1982).

Although bearing major personal, organizational and social costs, burnout has failed so far to attract any analytical economic treatment. This paper makes a first step in this direction, connecting between burnout and absenteeism. Absenteeism, another field intensively researched by psychologists, has, however, been more successful in gaining economists' attention, beginning with Ehrenberg's (1970) inquiry of its effect on the firm's overtime and employment decisions. Subsequent contributions dealt mainly with absenteeism as a deliberate labor supply adjustment of a worker dissatisfied with the number of contracted working hours: Winkler (1980), Allen (1981a, 1981b), Chelius (1981), Leigh (1981, 1985), Dunn and

Youngblood (1986), Yaniv (1986, 1991), Kenyon and Dawkins (1989), Barmby, Orme and Treble (1991), and Drago and Wooden (1992) studied the relationships between absenteeism and various explanatory variables such as sick leaves, wages, occupational hazards, union membership, unemployment and the work schedule. This paper views absenteeism as an *involuntary* occurrence resulting from the appearance of burnout syndromes due to overemployment under stress conditions.

In his seminal paper, Ehrenberg challenged the popular belief that the stochastic nature of absenteeism is the primary cause of increased overtime. Using Rosen's (1968) analytical framework for determining a firm's cost-minimizing combination of employees and hours per employee which produces a given flow of labor services, he demonstrated that a rational economic response to a *certain* (and exogenous) absentee rate involves *increasing* overtime hours per employee, while the effect on the number of employees is ambiguous. Crucial to this result was the observation that many of the fixed labor costs must be paid by the firm even when an employee is absent, but hourly wage payments need not be made to absentees. Thus, absenteeism increases the marginal cost of attending workers relative to the marginal cost of overtime, inducing the firm to substitute the former for the latter.

Ehrenberg's exposition ignores, however, the possibility that excessive use of overtime might be the cause of absenteeism. With this in mind, the present paper constructs a simple model of the worker's burnout process, deriving a negative relationship between the probability of his attendance in any given day and the number of overtime hours per day. Applying this knowledge to the firm's cost-minimization problem, the paper shows that burnout-induced absences (BIA) produce a kink in the labor cost function, as a result of which the firm will employ *less* overtime per worker and more workers in the presence of BIA than in its absence. That is, BIA does not simply moderate Ehrenberg's result; it rather increases the marginal cost of overtime more than that of attending workers, generating an opposite direction effect on equilibrium overtime. This conclusion holds whether or not the firm provides sick-pay benefits to its burned-out workers. Some policy-related implications are finally discussed.

II. THE BURNOUT - ABSENTEEISM CONNECTION

Consider a worker, possessing an initial stock, E_0, of emotional and mental resources, who is hired for work over a period of N days, consisting of K workdays and D days off. Suppose that the work contracted is performed within a highly stressful environment which gradually burns out the worker's resources. Suppose further that the rate of burnout is positively related to the intensity of employment, reflected by the length of the workday. In particular, suppose that in each day of attendance, stress burns out b(h) units of the worker's resources, where h denotes the number of working hours per day, and $b'(h)>0$, $b''(h)\geq 0$.[1] If, at the beginning of a given workday, resources have depleted to (or below) some critical level, E_c, the worker is assumed to experience burnout syndromes which will disable him from attending work at that particular day. Burnout-induced absences (BIA), as well as contracted days off, will serve, however, to replenish the worker's resources at the rate of e units per day.[2]

Figure 1 illustrates the daily fluctuations in the worker's stock of emotional and mental resources and his BIA (number and timing) over a work month of four one-day weekends. Starting at the beginning of the first workday, the inital stock, E_0, burns out at a (constant) rate of b(h) units per day, until the first weekend where replenishment of e units takes place. Thereafter, resources continue to deplete, reaching the burnout syndrome level, E_c, at the beginning of the twelvth day (S_1). Absenteeism then helps to recover resources, enabling attendance (and burnout) in the next workday, to be followed by an additional recovery during the second weekend. The third weekend comes just in time to prevent a second day of BIA, postponing the latter to the twenty-fifth day (S_2).

Formally, BIA will occur during the employment period if

$$E_0 - b(h)K + eD < E_c, \tag{1}$$

or, if $h>h_b$, where h_b is the intensity of daily employment satisfying

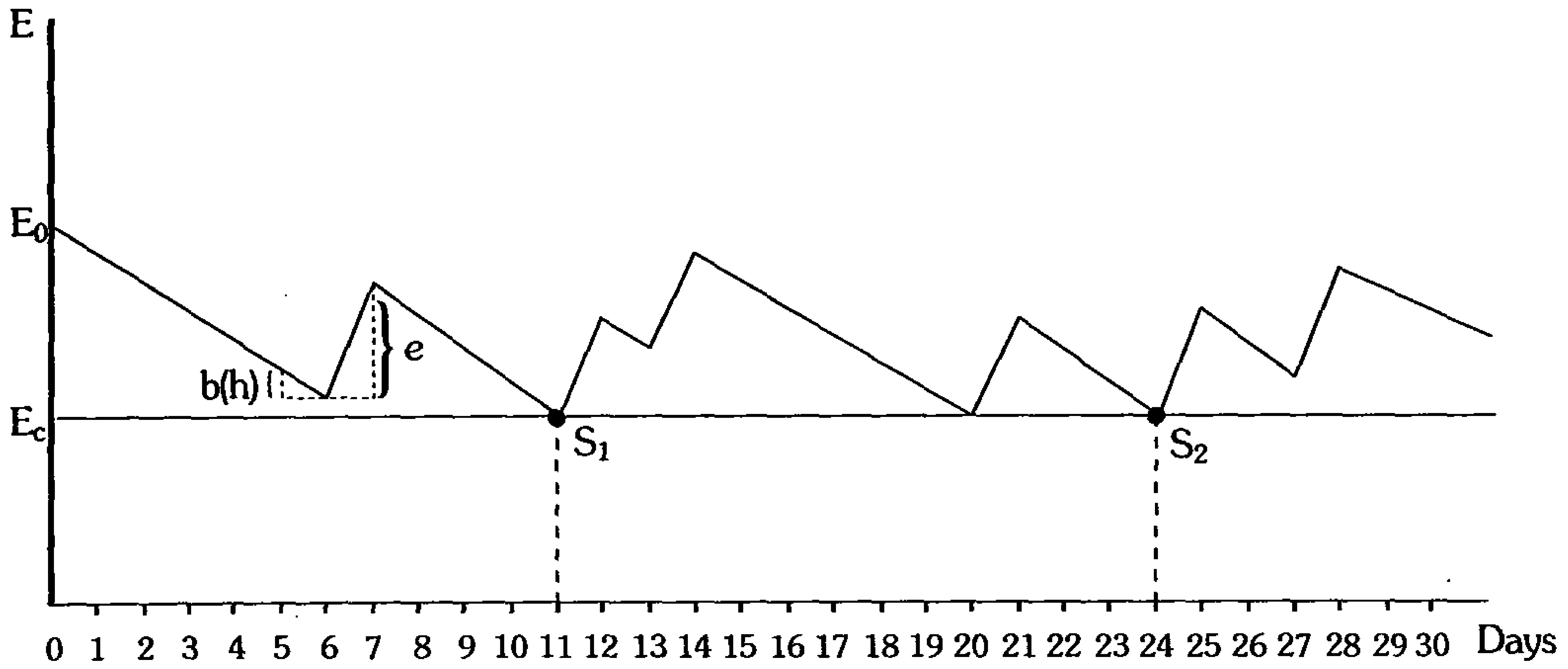

Figure 1: Number and timing of BIA

$$b(h_b) = \frac{E_o - E_\alpha + eD}{K} . \tag{2}$$

That is, BIA will take place if the daily burnout of resources exceeds the average daily stock. The number of BIA days, S, will be determined by

$$E_o - b(h)(K-S) + e(D+S) = E_\alpha, \tag{3}$$

which yields (substituting D=N-K)

$$S = K - \frac{E_o - E_\alpha + eN}{b(h) + e} . \tag{4}$$

Hence, given the length of the employment period (N), BIA will occur more frequently the larger the number of contracted workdays (K), the longer the workday (h), the greater the daily burnout rate [b(h)], the lower the replenishment rate (e) and the closer the initial stock of emotional and mental resources to the burnout syndrome level (E_o-E_α). Equation (4) implies also that the number of attendance days, K-S, will be determined by the ratio of the worker's "full" emotional and mental resources - i.e., the effective stock, E_o-E_α, plus the potential replenishment over the employment period, eN - and the full (direct and indirect) daily burnout rate, b(h)+e. That is, attendance will be carried out up to the exhaustion of the worker's full resources.

III. THE FIRM'S OVERTIME DECISION

Consider a firm, operating a high-stress location, which employs M workers, identical in their emotional and mental characteristics, over a period of N days. Suppose that the firm awards each worker D (paid) days off, which may not suffice, however, to prevent the appearance of burnout syndromes. Suppose further that the firm operates every day, so that days off must be (evenly) distributed among workers at different points of time. Consequently, the timing of BIA will also vary among workers, although the number of occurrences is identical for all. Using (4), the probability that a worker will attend work at any given day, $(K-S)/N$, is

$$a = \begin{cases} \dfrac{K}{N} = a^{o} & \text{when } h \leq h_b \\[2ex] \dfrac{E_o - E_e + eN}{[b(h) + e]N} = a(h) & \text{when } h > h_b \, , \end{cases} \tag{5}$$

which determines the number of workers in attendance, $A = aM$. Hence, 'a' represents also the the *fraction of all workers attending work at any* given day, or the 'attendance rate'.

Given the level of output to be produced, the technology and the flow of capital services, the production function determines the required flow of labor services, L. This flow may be provided by different combinations of A and h. The firm's problem is to choose that combination of attending workers and employment intensity which minimizes its labor costs, C. The choice of h determines the attendance rate, which, given the number of attending workers, determines the employment stock, M. Formally, the firm seeks A^* and h^* which

$$\text{minimize } C = \{ \frac{c}{a} + [w_s h_s + w_v(h-h_s) + \frac{a^{o}-a}{a} f]N\}A \tag{6}$$

$$\text{subject to } L = L(A, h) \tag{7}$$

and to (5), where c represents employmemt costs per worker which are independent of attendance (recruiting and training costs, insurance payments, paid days off, etc.), h_s indicates the number of standard working hours per day, w_s and w_v denote the wage rate per standard and per overtime hour, respectively, whereas f represents daily sick-pay benefits per worker which may be paid to $[a^{o}-a(h)]M$ burnt out absentees. Notice that equilibrium is assumed to occur at the overtime region.

Solving the firm's problem, we obtain that in equilibrium

$$\frac{L_h}{L_A} = \begin{cases} \dfrac{w_v N A}{\dfrac{c}{a^{o}} + [w_s h_s + w_v (h-h_s)]N} & \text{when } h \leq h_b \\[2ex] \dfrac{\left\{\dfrac{c + a^{o} f N}{a(h)} \cdot \dfrac{b'(h)}{b(h)+e} + w_v N\right\} A}{\dfrac{c + [a^{o}-a(h)] f N}{a(h)} + [w_s h_s + w_v (h-h_s)]N} & \text{when } h > h_b , \end{cases} \tag{8}$$

which implies that the ratio of the marginal 'products' of attending workers and daily hours per attending worker should equal the ratio of their respective marginal costs.

Suppose now that labor costs are minimized at $h>h_b$, where the firm is subject to BIA.[3] Figure 2 expresses the firm's optimal choice of A and h as a tangency (point E) between an iso-L curve, LL, and an isocost curve, CC, of two kinks (at h_s and h_b)[4]. In the absence of BIA, however, a typical isocost curve would have the shape of CC' (i.e., a kink at h_s only, and flatter than CC at $h>h_b$). In this case, equilibrium would obviously be reached at lower costs further to the right of LL (point E'). It thus follows that in the presence of BIA the firm chooses *less* overtime per worker and *more* workers in attendance than in the absence of BIA. Since $a(h)<a^{o}$ at $h>h_b$, it also follows that the firm employs a larger number of workers M $(=A/a)$ in the presence of BIA than in its

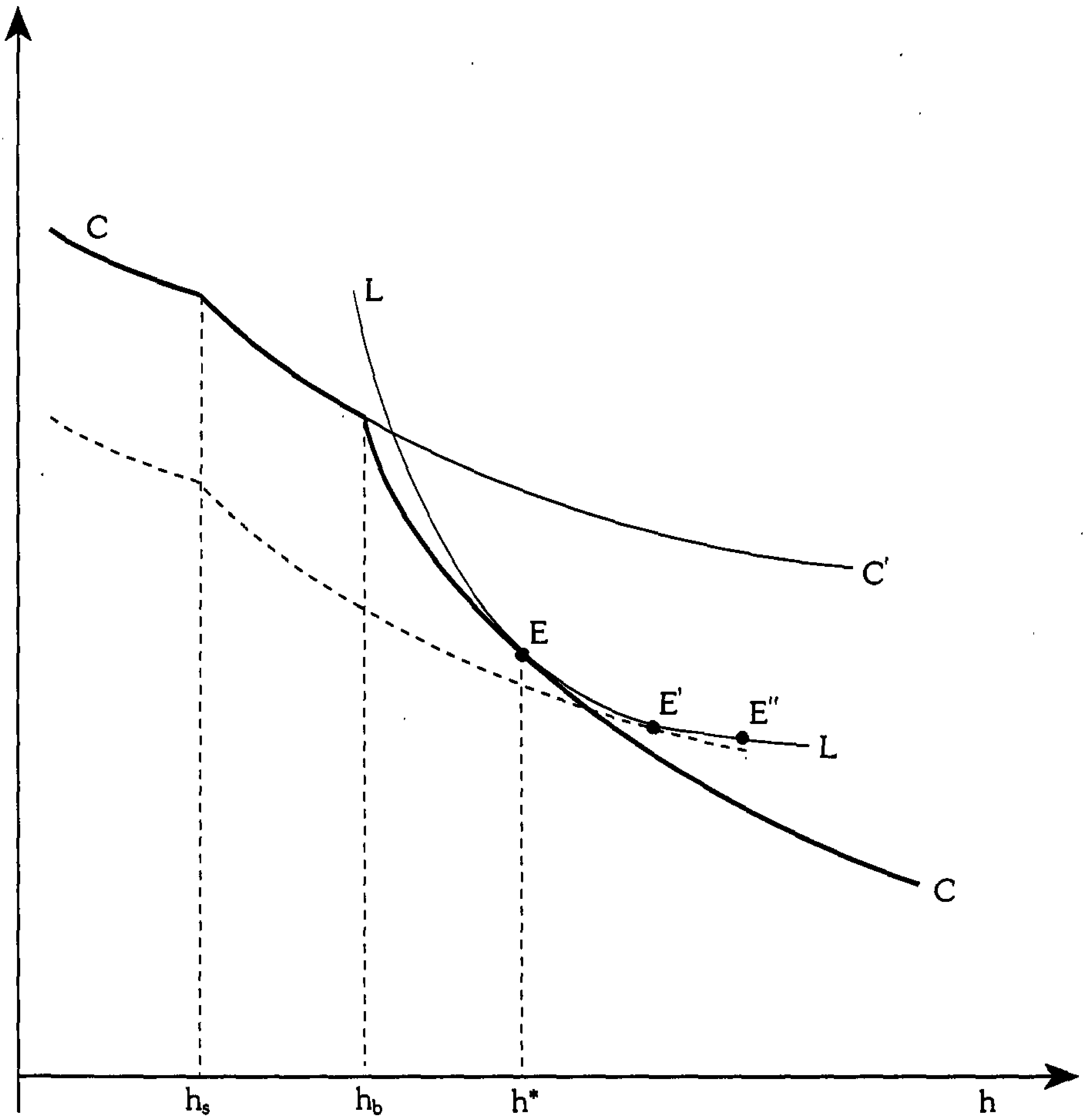

Figure 2: Cost-minimizing equilibrium

absence. Notice that this conclusion holds even if the firm is not obliged to provide sick-pay benefits (i.e., if $f=0$).

As mentioned in the introduction to this paper, Ehrenberg (1970) concluded that a rational response to a certain (but exogenous) absentee rate would be to *increase* overtime hours per worker. Indeed, if the attendance rate were known to fall below a^o for reasons independent of employment intensity, the marginal cost of labor through additional overtime relative to the marginal cost of labor through additional workers (the upper right-hand term of eq. (8)) would fall as well (CC' would become flatter), driving the firm's equilibrium to the right of E' (point E").[5] Hence, BIA does not merely moderate Ehrenberg's result; it rather increases the *marginal cost of overtime more than that of attending workers, inducing an* opposite direction adjustment.

IV. CONCLUDING REMARKS

We have applied a simple model of the burnout process to the firm's overtime decision. Contrary to Ehrenberg (1970), workers' absentee rate is viewed as an endogenous variable, being positively related to the intensity of stress exposure. Attendance has been assumed to linearly burn out the worker's emotional and mental resources, down to a critical level below which absenteeism is inevitable. Absenteeism, as well as contracted days off, help recover resources without specific medical intervention. While these are rather very simplifying assumptions, it should be noted that at present there is no agreed-upon, empirically validated, general model of the burnout process.

Professionals also have not been able to agree about the optimum mix of intervention options. Still, one frequently encountered cause of burnout is inadequate training to cope with the stessful job requirements. Improving hiring procedures and on-the-job training, offering high-quality and practical orientation programs for new employees as well as providing personal counseling, are very often recommended as desirable lines of intervention. However, while lowering burnout for a given length of the workday, such measures are bound to raise the fixed costs of labor, inducing substitution towards more overtime, thus tending to counteract the initial favorable effect. Increasing the overtime premium, enforcing the provision of sick-pay benefits or even illegalizing (and sunctioning) overtime beyond a certain limit, may turn out, via discouraging the usage of overtime, to be more effective in controlling burnout. As the costly ramifications of burnout become more acknowledged, and adequate procedures for their estimation develop, decision makers will become better equipped to identify the factors that could be modified to reduce costs as well as to assess the relative efficiency of the various intervention strategies.

FOOTNOTES

[1] $b(h)$ may represent <u>net</u> burnout per day of attendance, allowing leisure consumed after work to have a favorable effect on resources. Denoting gross daily burnout by $\beta(h)$ and daily replenishment by $\varepsilon(24-h)$, we then define $b(h) = \beta(h) - \varepsilon(24-h)$, restricting the analysis to values of h satisfying $b(h)>0$. Assuming that $\beta'(h)>0$, $\varepsilon'(24-h)>0$ and $\beta''(h)\geq 0$, $\varepsilon''(24-h)\leq 0$, we have $b'(h) = \beta'(h) + \varepsilon'(24-h) > 0$ and $b''(h) = \beta''(h) - \varepsilon''(h) \geq 0$.

[2] In view of footnote 1, 'e' may receive the value of $\varepsilon(24)$, but may also be entirely independent of the ε-function if the mere avoidance of the workplace has a favorable impact on the worker's resources. Notice also that BIA and contracted days off may, in practice, have different replenishment effects on resources. Distinguishing between the two, while complicating the exposition, would not have a qualitative effect on the results which follow.

[3] An entry condition into the BIA region is that at h_b the slope of LL exceeds that of CC. That is,

$$\left.\frac{L_h}{L_A}\right|_{h=h_b} > \frac{w_v NA}{\dfrac{c}{a^o} + [w_a h_a + w_v(h_b-h_a)]N}.$$

[4] The kink at h_a is obtained when the upper term of (8) is evaluated at $h=h_a<h_b$, noticing that at $h<h_a$ the numerator of (8) is $w_a NA$, where $w_a<w_v$. The kink at h_b is obtained when the lower term of (8) is evaluated at $h=h_b$, where $a(h)=a^o$. Notice also, by substituting (5) into (8) and assuming $b''(h)=0$, that the slope of CC falls as h rises above h_b.

[5] Since the firm would then choose to decrease the number of workers in attendance, it follows that the effect on actual employment would be ambiguous.

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