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WORK MOTIVATION

Truman F. Bewley

February 1999

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Truman Bewley

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In 1992 and 1993, I undertook a field study in the Northeast of the United States with the intention of learning why wages and salaries seldom fall during recessions.¹ I interviewed over 330 business people, labor leaders, counselors of unemployed workers, labor market intermediaries (headhunters), labor lawyers, and management consultants. The purpose of the study was exploratory; much of my effort went into the search for hypotheses rather than tests of specific ones. For this reason, I did not require informants to answer a fixed list of questions, but informed them of the purpose of the study and invited them to tell me what they thought was relevant, intervening only occasionally to seek clarification, to show interest, or to nudge the discussion in new directions. Only after informants had spoken at length did I ask specific questions to cover points that interested me. I usually avoided asking about economic theories until the end of interviews, for such questions sometimes stopped conversation, since the theories seemed naive and the questions led respondents to try to think like an economist rather than to explain their world concretely in their own terms. Some business people refused such open ended interviews, probably because they feared that while talking loosely they might say something that would embarrass them or hurt their company, and I concluded that low response rates would make it impossible to sample businesses randomly. (I had much less difficulty gaining the cooperation of the other types of respondents.) Most interviews with business people were obtained through personal contacts or by telephoning people and persuading them to cooperate. Often, people I interviewed arranged further interviews. I strove to avoid sample bias by interviewing in a large and diverse set of companies and by using many distinct avenues of approach to gain access to them. In this way, I avoided talking to people from only a few circles of friends. The companies were from a broad spectrum of industries and of a full range of sizes and financial conditions. Some were bankrupt, many were shrinking and experiencing heavy layoffs, and some were growing rapidly. Some had been founded only recently, while most were well-established. Some were unionized, whereas many had no union presence. Some were public corporations and others were closely held or family owned. I made a special point of finding businesses that had cut or frozen pay during the recession. There were few such; most firms continued to grant regular raises. My method did not yield a valid opinion survey or reliable statistics on the incidence of various business practices. However, I believe I gathered valuable information about what happens in the labor market during a recession and about how business people and labor leaders think about layoffs and pay cuts.

The explanation of wage rigidity given by the over 275 business people and labor leaders interviewed was based on views of worker motivation that deviate from the standard

¹The results of the study are reported in a book, provisionally entitled *Why Not Listen to Business? A Study of Wage Rigidity*, to be published by Harvard University Press in 1999.

model. In this paper, I formulate a somewhat speculative model of work motivation stimulated by what I heard. The model incorporates ideas from psychology into the utility maximizing framework of economics.

1. Wage Rigidity and Morale

In this section, I summarize what I heard in interviews, giving the reasons for wage rigidity explained to me by business people and labor leaders. The resistance to pay reduction comes in the first instance from managers, not from workers, though anticipated employee discontent motivates management opposition to pay cuts. The discontent, usually described as poor morale, would not necessarily be expressed openly, but business people believed it could be so harmful as to cause monetary losses exceeding the savings from a pay cut.

The downward rigidity of the pay of existing and of newly hired employees have separate explanations. The reason almost all managers gave for not cutting the pay of existing employees was concern about morale. New employees would probably object little if, before they applied for their jobs, pay rates for new hires had fallen by no more than the pay of existing employees in the same jobs. However, new employees resent as inequitable being paid according to a scale lower than that applying to colleagues hired earlier. For this reason, downward pay rigidity for new hires exists only because the pay of existing employees is rigid. The pay of new hires is usually downwardly flexible when co-workers do not have enough contact with each other to know each others pay. This circumstance arises typically when labor turnover is high and when a large fraction of the employees work part-time on schedules that seldom overlap. Typical examples are floor crews in fast food restaurants and in supermarkets.

Good morale means many things in industry; a willingness to cooperate with company objectives, a sense of common purpose consistent with the firm's goals, enthusiasm for the job, happiness, toleration of unpleasantness, moral behavior, and mutual trust. Business people value good morale because it reduces labor turnover, makes it easier to recruit good workers, and increases the productivity of the existing work force. The increase in productivity arises not so much because employees work harder at assigned tasks that are monitored, but because workers do the right thing even when no one is watching, do extra things without instruction, make suggestions for improvements, help each other, and share information with each other and with superiors. Good morale is thought to be especially important for productivity in jobs where it is difficult to monitor performance, where good performance requires imagination and creativity, and where workers must deal with customers. Morale is important in the latter case, because employees handle customers better when in a good mood.

The morale of existing employees is hurt by pay cuts because of what may be called an insult effect and a standard of living effect. The latter occurs because lower living standards

distract and aggravate workers, put them in a bad mood, and cause them to blame the company for the difficult adaptation to lower incomes. The insult effect occurs because workers associate pay with self-worth and recognition of their value to the company. Many workers receive increases regularly, grow used to them, and interpret them as recognition of loyalty and good performance. Hence, a pay cut is interpreted as a signal of dissatisfaction with employees, even if everyone's pay is reduced. These effects apply to both real and nominal pay reduction, though the effects of an abrupt nominal cut are stronger than those of a slow decline in the purchasing power of pay.

Another reason a pay cut is interpreted as an affront is that it is viewed as unfair, because the company takes something away while giving nothing in return. A pay cut is not felt to be insulting if management can convince workers that the reduction is justified, that is, if it prevents a large number of layoffs. Pay cuts typically occur when a business is in danger of closing or has trouble competing in product markets, and in these circumstances workers usually accept cuts. However, such circumstances are rare. A central fact of life for most businesses is that pay rates have little impact on total employment. That is, in most firms the elasticity of demand for labor is small. Pay cuts are more common among firms where this elasticity is high. Business people and labor leaders were confident they could usually convince employees, with some effort, that pay cuts were justified, if they indeed were so. I was told that workers refuse to believe what they are told about company difficulties only when management has a reputation for duplicity, when relations between management and union representatives are bad or when workers recoil from facing reality. I found little support for the many theories of wage rigidity based on information asymmetries, and, in particular, theories based on the assumption that management cannot persuade workers that low profits or competitive conditions require pay reduction. The general thrust of what was said was that normally information flows freely enough within businesses that most employees know when their company is in trouble. In some small and medium sized companies, the workers may know this before management does, because it is low level employees who take orders and keep accounts and gossip spreads quickly.

Nevertheless, asymmetries of information underlie the explanation of wage rigidity. Morale is important in large part because management finds it prohibitively expensive to monitor employees closely. For this reason, companies rely on workers doing what they are supposed to do without being told, even when supervisors are unlikely to check up on them or will never do so. Workers are likely to be so cooperative only if they have good morale.

Though employees expect to share in company success through larger pay increases, they do not expect to share in losses to the extent of having their pay reduced. The adjustment to lower income is too painful for workers relative to the sacrifices made by company owners, and pay cuts raise the awkward issue of the disparity between the incomes of workers and owners.

Morale is fragile and can be destroyed quickly by matters more minor than pay cuts. It can be hurt by any form of unfair or inequitable treatment by management, where the

standards of fairness, especially regarding pay differentials, are often determined by company or industry traditions rather than by absolute standards of justice.

Good morale normally takes a long time to build. It is fostered by frank but good relations between subordinates and superiors, by prospects for economic security and progress within the company, by recognition and reward of contributions to the company, by good explanations of the social contribution of the company's products and of a worker's role in the production process. Collective activities within the company, such as charity drives and company picnics, also improve morale, as does almost anything that encourages workers to think of people other than themselves.

Morale is hurt by threats, such as threats of being fired if performance is substandard. Though companies fire some workers, it is thought to be bad business practice to have people work in a negative menacing atmosphere. However, just this style of management is often used with low-level and low-paid labor doing short-term jobs that are easily monitored. Firing is most useful for ridding an organization of scoundrels and ne'er do wells rather than as a way of motivating ordinary workers to perform. Positive incentives and an optimistic atmosphere encourage performance more effectively than do threats. Most workers want to do well and do so if given the opportunity and if they understand what they are supposed to do. Furthermore, many people enjoy their work.² A sense of pride, duty, and accomplishment can make even disagreeable jobs bearable. Nevertheless, strict discipline is necessary for good morale, for if some workers are allowed to get away with slacking, those who work hard feel they are being treated inequitably.

What has been said is a fair summary, I believe, of the dominant views of business people and labor leaders. I now turn to the problem of formulating these ideas in ways that may be useful for economic theory.

2. Interpretation of Morale

Good morale has three components; identification with the organization or internalization of its objectives, good moods, and trust and mutual affinity among members of the organization. A person may be judged to have internalized the objectives of their organization if they act so as to advance its interests without specific instructions and without any possibility of being monitored and rewarded. Identification is manifested by internalization of the organization's objectives as well as by efforts to demonstrate membership in it and by expression of feelings of belonging. Moods are states of mind that affect work habits and the pleasure or displeasure derived from work. Cooperation within an organization is fostered by a network of trusting relationships among employees.

²Juster (1985) found in a survey of ordinary people that most preferred work to activities associated with leisure.

However, cooperation may not be directed toward helping the organization, unless members accept its objectives. Though the social network is an important component of morale, it is not one that is hurt by pay cutting and so I give it little attention.³

Identity and Internalization It is clear that human beings have the capacity to identify with organizations and to internalize codes of behavior and the interests of others. Experimentally, it is easy to induce people to identify with a group and to act in its interests (Tajfel, 1970 and Turner, 1987). Children show empathy for others at a young age and learn to internalize social and moral rules (Gleitman, 1995, pp. 550-8). It is impossible to know whether the capacities for empathy, morality, and group identity are accidental or evolved in humanity because they increased chances of survival, nor do we need to know the answer to this question. What is important is that the capacities exist.

A psychological theory of organizational identity should describe its function or purpose and the mental mechanism of which it is a part. Identity in general is a person's image of who they are. One advantage of identity is that it simplifies mental processes by summarizing a person's goals and by providing a set of rules as to how to behave. A great deal of what we do mentally is done unconsciously or semi-consciously. Conscious mental operations are slow, though adaptable. Unconscious ones are rapid, though restricted to learned routines. Thus, it is hard to learn to play the piano or to speak a foreign language, but, once learned, playing or speaking occurs smoothly and with only general conscious direction. Identity includes many such mental subroutines. For instance, it would be nearly impossible to function socially if we had forever to weigh self-interest against collective advantage. These calculations are replaced in most cases by learned rules as to what we should do, who are our friends or foes, and what we should expect of them; rules that are all part of identity. In summary, the function of identity is to make mental activity more efficient and its mechanism is the set of unconscious goals and mental subroutines that it includes.

An additional advantage to individuals of group identification is that it contributes to their sense of being powerful, valuable, important, and wanted. A sense of self-worth is needed by people because it gives them a reason to survive and promote their own interests. Without a sense of worth and of having the power to shape their own lives, people can be incapacitated by what psychologists call learned helplessness (Gleitman, 1995, pp.133–35).

An obvious benefit of group identity is that it makes it easier to work with other people, which is important because most productive human activities require cooperation. However, this benefit does not explain morale's fragility. Its function may be to protect individual self-interest. Though commitment to a group helps overcome prisoner's dilemma or free-

³Some industrial psychologists measure morale as the existence of effective groups (Blum, 1956, pp.163–69).

rider problems arising in cooperative activity, the same sense of responsibility exposes individuals to exploitation. It is useful to have a system that balances private and group advantage, and conventional standards of fairness offer an orderly way of doing so. These establish rules of reciprocation among group members and between them and the organization, and the duties specified by these rules are accepted by members when they agree emotionally to join. Perhaps the brittleness of morale is a self-protective reflex provoked by violation of fairness standards. A reading of a psychology textbook, such as (Gleitman, 1995), makes it clear that many parts of the nervous system operate through offsetting pairs of activating and inhibiting signals. The teetering between group commitment and indignant rebellion may reflect just such a pairing built into the psyche.

It remains to be explained why unjustified pay cuts impair identification with the employer. A superficial answer, given earlier, is that they are regarded as unfair, because fairness specifies rules of reciprocation and workers receive nothing in exchange for a pay cut that saves few jobs. It might be that in a different world, workers would view wages and salaries coolly as fluctuating market prices and would accept price declines as a normal part of business life, just as salespeople accept large income fluctuations. However, most people do not think this way. I was told many times that workers do not view themselves as commodities and inevitably interpret pay cuts as statements about how satisfied the company is with them, because in their experience pay changes signal appreciation of workers' contribution.

Mood, Work Effort, and Its Disutility Managers and labor leaders did not usually speak of jobs as disagreeable, but assumed that employees liked to work. They said that one of the bad effects of layoff was loss of the pleasure of working and of social contacts on the job. However, if in the standard model of work we assume that effort brings positive rather than negative utility, then people should work hard, even if they have no financial incentive to do so; an implication that conflicts with common sense. Though volunteer labor makes important contributions to society, it is hard to imagine that it would be a success at producing ordinary economic output. Other phenomena inconsistent with the usual model of work effort are the importance of mood to job performance and to satisfaction from work. I was told that bad moods are distracting and increase fatigue, discomfort, and accidents.

In order to make sense of these observations, it may be helpful to consider an analogy with a lion hunting an antelope. In chasing an antelope, the lion expends energy, loses time, and risks injury. These costs must be weighed against the probability of catching the prey and the pleasure of eating it. Imagine that the lion unconsciously or half consciously weighs the costs against the benefits before deciding whether to give chase and before choosing the level of physical effort to expend on the pursuit. Once the decision is made, the lion's mind automatically adjusts his mood and level of nervous and physical arousal to handle the effort required. If the lion decides not to go after the antelope, he will not be aroused, will feel lazy, and may find running uncomfortable. If he decides to try for a kill, he will be

mobilized and excited and will probably be exhilarated by the effort. Given this decision, he will consciously decide how much effort to put into the hunt and how to go about it. We may imagine that the lion's mind and body unconsciously choose the mood and level of arousal so that he consciously chooses an effort level that optimizes an unconscious utility depending on probability of success, energy expenditure, and risk of injury. The lion's unconscious choice of mood may be constrained by his preexisting state of mind. If he just lost his wives to a rival, he may be discouraged and not feel like hunting, whereas if he is a hopeful young bachelor, he may feel vigorous.

Another illuminating analogy may be that of a virtuoso pianist. For an appreciative and sensitive audience, he will probably play at his best and love doing so. If he hears snores and catcalls, he will no doubt feel his fingers stiffen, stumble, and hate playing.

It is important, in my opinion, to recognize that mood adjusts automatically to fit the perceived net benefits of tasks. I believe it is general human experience that capacities to act and perceptions of pain or pleasure adapt to circumstances. Danger stimulates us to fight or flee. Anger makes us ignore danger and pain. Though deprivation of necessities of life causes discomfort and unhappiness, we get used to prolonged hardship, probably so that we can cope with unavoidable misery. Soldiers and prisoners living in frightful conditions eventually cheer up and joke about their state, though, of course, they are not happy. It is a mistake to separate the disutility of labor from the utility of its reward or to imagine that labor is normally perceived as disagreeable. The utilities of labor itself and of its reward interact.

3. A Formal Model

In the usual incentive model, a worker expends effort, e , which is a non-negative number, and receives in exchange a wage, $w(e)$, which is a non-decreasing function of e . The worker chooses e so as to maximize

$$u(w(e)) - c(e),$$

where both u and c are increasing functions and u is concave and c is convex. The first term is the utility of consumption purchased with the wage and the second is the disutility of effort. In this model, the consumer prefers to expend as little effort as possible to earn a given income, so that if the wage does not increase with effort, the consumer expends none of it whatsoever. Because effort creates disutility, people acting according to the model would experience work as unpleasant, which is contrary to what most people say (Juster, 1985). If we try to escape this difficulty by assuming that $c(e)$ is zero, then the worker offers the maximum effort possible if $w(e)$ increases with e , an implication contradicting common sense. This difficulty can be evaded by assuming that $c(e)$ decreases with e until it reaches

a certain level, beyond which it increases. If the functions u and c are differentiable, then the optimum level of effort satisfies the equation

$$\frac{du(w(\mathbf{e}))}{d\mathbf{e}} = \frac{dc(\mathbf{e})}{d\mathbf{e}},$$

from which it is easy to see that increasing the level of the function $w(\mathbf{e})$ by adding a positive constant decreases effort (or, more accurately, does not increase it), whereas optimal effort increases (or does not decrease) when the slope of $w(\mathbf{e})$ at the optimum is increased without increasing the function's level there. These conclusions seem consistent with reality. A difficulty with the model is that it does not distinguish reward from punishment, though this distinction is crucial in reality. There is no way of determining what level of utility marks the boundary between punishment and reward.

I now modify the above model to obtain one that retains its plausible conclusions and yet does not represent labor as a burden, gives a role to emotion in mobilizing and directing the powers of mind and body, and includes a distinction between reward and punishment. I try to model mood, because it is important to the explanations of wage rigidity given by managers and labor leaders. The model is suggested by the analogies described in the previous section.

Focus on an action (or program of actions), \mathbf{e} , to be taken by a person over a fixed period of time. Though \mathbf{e} may be thought of as effort, it is better to interpret it as productive activity. The action has an unconsciously felt mental and physical cost, measured as the number, $C(\mathbf{e})$, and earns income $w(\mathbf{e})$, which might be a wage paid by an employer.⁴ The unconsciously felt benefit to the worker of the wage is the number $B(w(\mathbf{e}))$, and the net unconscious gain is

$$B(w(\mathbf{e})) - C(\mathbf{e}).⁵$$

Unconscious goals could include the basic psychological drives as well as fidelity to family, firm, or country. Assume that the function B is increasing and strictly concave.

I propose that people *unconsciously* adjust their mood and general state of mobilization so that *conscious* choices maximize $B(w(\mathbf{e})) - C(\mathbf{e})$. The conscious person does not choose \mathbf{e} but makes a decision (or program of decisions), \mathbf{d} . The actual action taken is $\mathbf{e} = E(\mathbf{d}, \mathbf{m})$, where \mathbf{m} is the person's mood and state of mental and physical arousal. The decision \mathbf{d}

⁴The earnings, $w(\mathbf{e})$, could be vector including pay, praise, promotion, and other rewards.

⁵Here and elsewhere, I choose the additively separable functional form for convenience of exposition, not out of conviction.

might correspond to the pace of work desired by the person, whereas $E(\mathbf{d}, \mathbf{m})$ is the realized pace of work; the person might actually work faster or slower than he or she intended. The person's consciously experienced utility is

$$U(w(E(\mathbf{d}, \mathbf{m})), \mathbf{m}) + V(E(\mathbf{d}, \mathbf{m}), \mathbf{m}),$$

where the first term is the utility of the earnings and the second is the utility from the action itself. The person chooses the decision, $\mathbf{d} = D(\mathbf{m}, w)$, so as to solve the problem

$$\max_{\mathbf{d} \in \mathbf{D}} [U(w(E(\mathbf{d}, \mathbf{m})), \mathbf{m}) + V(E(\mathbf{d}, \mathbf{m}), \mathbf{m})],$$

where \mathbf{D} is the set of possible decisions. The unconscious side of the person chooses the mood, \mathbf{m} , so as to maximize the unconscious utility, that is, to solve the problem

$$\max_{\mathbf{m} \in \mathbf{M}} [B(w(E(D(\mathbf{m}, w), \mathbf{m}))) - C(E(D(\mathbf{m}, w), \mathbf{m}))],$$

where \mathbf{M} is the set of possible moods.

If the person has a preexisting state of mind or mood, then his or her unconscious self may not be able to choose \mathbf{m} freely, but must choose from a subset, \mathbf{SM} , of \mathbf{M} . The subset \mathbf{SM} may be thought of as representing restrictions imposed by solution of a larger unconscious utility maximization problem that determines the context of the one under consideration. For instance, the person may be frightened by some danger, which may be escaped through the actions under consideration.

The standard results mentioned earlier regarding incentives apply to the new model, when interpreted properly. Imagine a two dimensional plot with $-C(E(D(\mathbf{m}, w), \mathbf{m}))$ on the abscissa and $B(w(E(D(\mathbf{m}, w), \mathbf{m})))$ on the ordinate, as in Figure 1. The unconscious chooses \mathbf{m} so as to maximize the sum of the two components, so that the northeast frontier of the plot is the relevant set of points. I compare two earnings functions w and w' and assume that

$$\{E(D(\mathbf{m}, w), \mathbf{m}): \mathbf{m} \in \mathbf{SM}\} = \{E(D(\mathbf{m}, w'), \mathbf{m}): \mathbf{m} \in \mathbf{SM}\} \equiv \mathbf{E},$$

so that the set of possible actions achievable by manipulation of mood does not depend on the earnings function. Then, the two-dimensional plots are of the sets

$$\{(-C(\mathbf{e}), B(w(\mathbf{e}))) : \mathbf{e} \in \mathbf{E}\} \text{ and } \{(-C(\mathbf{e}), B(w'(\mathbf{e}))) : \mathbf{e} \in \mathbf{E}\}.$$

If w' is w plus a positive constant, then, because of the strict concavity of the function B , the northeast frontier of $\{(-C(\mathbf{e}), B(w'(\mathbf{e}))) : \mathbf{e} \in \mathbf{E}\}$ is no steeper than that of

$\{-C(\mathbf{e}), B(w(\mathbf{e}))\}: \mathbf{e} \in \mathbf{E}\}$, so that at the optimum the disutility of effort, $C(\mathbf{e})$, is no higher with the earnings function w' than with the function w .

The second standard result regarding incentives is that making w steeper at the optimum does not decrease effort. In the new model, it is not possible to speak of the slope of w because the action variable, \mathbf{e} , may not be a number. However, by an analogous definition, w' is “at least as steep” as w at $\underline{\mathbf{e}}$ if $w'(\mathbf{e}) = w(\underline{\mathbf{e}})$, where $\underline{\mathbf{e}}$ is the optimum for w , and if $w'(\mathbf{e}) \geq w(\mathbf{e})$, whenever $w(\mathbf{e}) \geq w(\underline{\mathbf{e}})$, and $w'(\mathbf{e}) \leq w(\mathbf{e})$, whenever $w(\mathbf{e}) \leq w(\underline{\mathbf{e}})$. Given this definition, it is obvious that if w' is at least as steep as w at $\underline{\mathbf{e}}$, then $-C(\underline{\mathbf{e}}) \leq -C(\mathbf{e})$ and $w'(\underline{\mathbf{e}}) \geq w(\mathbf{e})$, where $\underline{\mathbf{e}}'$ is the optimum with earnings function w' . That is, steepening the earnings function does not decrease the unconscious disutility of effort at the optimum.

The utility $V(E(\mathbf{d}, \mathbf{m}), \mathbf{m})$ may be positive if mood favors effort, though V may decrease with effort when it is increased beyond a point appropriate for the mood. What I have in mind may perhaps best be explained by returning to the usual model in which the effort variable is a number corresponding to the pace of work. In this spirit, assume for the moment that \mathbf{d} and \mathbf{m} are non-negative numbers, where larger values of \mathbf{m} correspond to a better mood. Assume also that $E(\mathbf{d}, \mathbf{m}) = \mathbf{d}$, and that $w(\mathbf{e}) = \mathbf{e}$, so that \mathbf{e} and w can be suppressed. Finally, assume that U and V are twice differentiable functions satisfying the following conditions: $\partial U(\mathbf{d}, \mathbf{m})/\partial \mathbf{d} > 0$, $\partial^2 U(\mathbf{d}, \mathbf{m})/\partial \mathbf{d}^2 < 0$, $\partial^2 U(\mathbf{d}, \mathbf{m})/\partial \mathbf{m} \partial \mathbf{d} > 0$, $\partial V(\mathbf{d}, \mathbf{m})/\partial \mathbf{d} > 0$, $\partial^2 V(\mathbf{d}, \mathbf{m})/\partial \mathbf{d}^2 < 0$, and $\partial^2 V(\mathbf{d}, \mathbf{m})/\partial \mathbf{m} \partial \mathbf{d} > 0$, for all \mathbf{d} and \mathbf{m} . Let $\mathbf{d} = D(\mathbf{m})$ solve the problem

$$\max_{\mathbf{d} \geq 0} [U(\mathbf{d}, \mathbf{m}) + V(\mathbf{d}, \mathbf{m})].$$

Under the given conditions, it is easy to see that D is a non-decreasing function of \mathbf{m} and is increasing at values of \mathbf{m} for which $D(\mathbf{m}) > 0$. That is, improved mood increases effort. Notice also that at the optimum,

$$\frac{\partial V(\mathbf{d}, \mathbf{m})}{\partial \mathbf{d}} < 0,$$

so that the worker finds increased effort unpleasant. From now on, I drop the assumption that \mathbf{d} and \mathbf{m} are numbers.

Rationality It is natural to ask whether people behaving as in the above model are rational. Economists define people to be rational if they reason correctly and use all available information in order to maximize their utility. The model is consistent with rationality, if we allow utility maximization to occur at two levels, the conscious and the unconscious. The effect of mood on realized actions and on conscious objectives does not contradict rationality. However, in a loose sense the model is inconsistent with rationality. Realistic models of conventional rationality take account of limits on the ability of the conscious

mind to reason and use information. No doubt, sentiment influences imperfect logic, so that a more realistic version of the above model should take account of the effect of mood on reasoning.

The model accomplishes the objectives of giving mood a role in motivation and allows workers to enjoy positive utility from work, all while preserving the obvious common sense results about the impact of financial incentives. However, the model fails to permit a distinction between reward and punishment, nor does it include morale or explain why pay reductions have such a severe impact on mood.

Normal Life I now assume that the unconscious mind forms a notion of what is normal in terms of unconscious living standards. This idea of normality may be thought of as useful for two reasons; it tells the mind what to store as habits or mental subroutines and it serves as a trigger level for alarm. The mind adapts habits to the way of life that is expected to be normal. Decline of living standards below normal signals the unconscious that something is wrong, provoking anger, unhappiness, or distress. These moods, in turn, stimulate the conscious mind to make efforts to find solutions to the problems that have arisen. It is not efficient for the conscious mind always to be stimulated and on the look-out for new solutions, for bad moods and the efforts they incite are exhausting. Therefore, bad moods should be called upon only when needed. The normal or expected path of welfare may grow, shrink, or fluctuate over time. For instance, salespeople expect their income to fluctuate sharply and probably react badly only to prolonged patterns of low income. A fall in welfare below the expected level may not trigger alarm if the conscious mind can persuade the unconscious one that there is no reason to worry, that the bad situation will soon be rectified, or that there is nothing to be done about it. The unconscious probably adapts gradually to lower welfare, as do the soldiers mentioned earlier.

Rewards may be defined to be payments that provide welfare in excess of the normal level, whereas punishments may be defined to be payments that bring welfare below the normal level. Punishments have a greater impact than rewards because they provoke a powerful negative emotional reaction and rewards trigger no corresponding positive reaction. Rewards or punishments that are too frequent become normal and so lose their impact; a matter of concern to managers.

A pay cut causes anxiety and discontent because the fall in workers' welfare below the normal level both triggers bad moods and requires the effort of adopting new habits appropriate to the new standard of living. Pay cuts that are perceived as justified are also thought of as inevitable, and so do not provoke a strongly negative mood.

It is easy to incorporate a normal welfare level in an intertemporal version of the formal model. The external conditions of the person's decision problem at one time, t , are defined by the earnings function, $w_t(\mathbf{e})$, and by the set of possible decisions, \mathbf{D}_t . Let the function $D_t(\mathbf{m}, w_t)$ be the solution to the problem

$$\max_{\mathbf{d} \in \mathbf{D}_t} [U(w_t(E(\mathbf{d}, \mathbf{m})), \mathbf{m}) + V(E(\mathbf{d}, \mathbf{m}), \mathbf{m})].$$

The unconscious welfare in period t is

$$W_t = \max_{\mathbf{m} \in \mathbf{SM}} [B(w_t(E(D_t(\mathbf{m}, w_t), \mathbf{m}))) - C(E(D_t(\mathbf{m}, w_t), \mathbf{m}))].$$

The expected or normal welfare level may be assumed to be a constant, \underline{W} , so that the person reacts with anger and discontent when W_t falls below \underline{W} .

Coercion and Freedom Managers and labor leaders stressed that workers are energized by the feeling that they control their lives and are antagonized and made passive by compulsion and excessive control. These matters are beyond the scope of the model presented here and are not easy to think about carefully. For instance, it is difficult to define coercion precisely. Presumably, it implies a lack of freedom, but a person who is coerced into doing something, strictly speaking, also chooses to do it, for he or she could refuse to comply and suffer the consequences. Also, everyone works under some degree of compulsion. For instance, stealing from the company or punching the boss usually lead automatically to firing, so that people are in a sense forced not to do these things. Similarly, blatant insubordination can bring firing, so that workers may be said to be compelled to take orders. When managers spoke of coercion, they did not refer to cases such as these. A rough definition of what they had in mind might be that a worker is compelled to do something if not doing it results in punishment and if the worker would do something else if there were no threat of punishment and he or she had good morale. The key aspects of coercion that managers and labor leaders found demotivating were that they hurt morale, frighten people, and diminish self-confidence. Though fear is understood by all to be a powerful and useful motivator, managers typically use threats only to discourage extreme behavior. They do not want workers to be preoccupied with fear, for it distracts and undermines self-confidence. The latter is important, because it frees the mind and body to act smoothly and efficiently. An apprehensive person consciously thinks through every step of what they do lest they make a mistake, and conscious thought overrides the mental subroutines that guide much of what people do. In relation to the formal model, lack of self-confidence limits the set of moods to a disadvantageous subset.

Extreme forms of coercion may lead to what psychologists call learned helplessness, which, from what I understand of the subject, involves not just loss of self-confidence but reduction in mental activity as well, perhaps with the unconscious goal of desensitizing the brain to pain.

4. Extension to Morale

Recall that morale has two key aspects, mood and internalization of organizational objectives. Internalization may be expressed by including the firm's objectives among those of the worker. This procedure is appropriate, since utility functions are inferred from behavior and workers who internalize their firm's objectives act as if these were their own. Formally, let $R(\mathbf{e})$ be the revenue the firm earns from a worker's output, so that the firm's profit is $R(\mathbf{e}) - w(\mathbf{e})$. Internalization may be expressed formally by adding multiples of the firm's profit to the worker's conscious and unconscious utility functions, so that these become

$$B(w(\mathbf{e})) + \mu_1[R(\mathbf{e}) - w(\mathbf{e})] - C(\mathbf{e}) \quad \text{and}$$

$$U(w(\mathbf{e}), \mathbf{m}) + \mu_2[R(\mathbf{e}) - w(\mathbf{e})] + V(\mathbf{e}, \mathbf{m}),$$

respectively, where μ_1 and μ_2 are constants that are positive if morale is good and should be thought of as part of the worker's personality. The impact of morale on mood may be expressed by varying the subset \mathbf{SM} of possible moods available to the unconscious side of the person. Improvements in morale increase the size of the set \mathbf{SM} , thereby giving the unconscious a larger selection of possible states of mind. Improvements in mood resulting from improved morale do not decrease and may increase the maximized value of the unconscious objective function $B(w(\mathbf{e})) + \mu_1[R(\mathbf{e}) - w(\mathbf{e})] - C(\mathbf{e})$, because it is maximized over a larger set of moods. That is, if $\mathbf{d} = D(\mathbf{m}, w)$ solves the problem

$$\max_{\mathbf{d} \in \mathbf{D}} \{U(w(E(\mathbf{d}, \mathbf{m}), \mathbf{m})) + \mu_2[R(E(\mathbf{d}, \mathbf{m})) - w(\mathbf{e})] + V(E(\mathbf{d}, \mathbf{m}), \mathbf{m})\},$$

then the value of

$$\max_{\mathbf{m} \in \mathbf{SM}} \{B(w(E(D(\mathbf{m}, w), \mathbf{m}))) + \mu_1[R(E(D(\mathbf{m}, w), \mathbf{m})) - w(E(D(\mathbf{m}, w), \mathbf{m}))] - C(E(D(\mathbf{m}, w), \mathbf{m}))\}$$

increases as the size of the set \mathbf{SM} increases.

Without more assumptions, it is not possible to say whether the effect of improved morale on mood increases profits. A plausible set of assumptions is that the wage function, w , is constant and that improvements in morale enlarge \mathbf{SM} in such a way as to make available actions or effort levels, \mathbf{e} , that increase $R(\mathbf{e})$ for each level of $C(\mathbf{e})$ and furthermore increase $R(\mathbf{e})$ more, the greater is $C(\mathbf{e})$. Imagine a two-dimensional diagram, such as Figure 2, with $-C(\mathbf{e})$ on the abscissa and $B(w) + \mu_1(R(\mathbf{e}) - w)$ on the ordinate. Then, improvement in morale causes the northeast frontier of the set of possible points $(-C(\mathbf{e}), B(w) + \mu_1(R(\mathbf{e}) - w))$ to rise vertically in such a way that the vertical increase is greater the larger is $C(\mathbf{e})$

(i.e., the smaller is $-C(\mathbf{e})$). Because w is constant, it follows that the new optimum yields a higher value of $R(\mathbf{e})$ and a lower value of $-C(\mathbf{e})$. In other words, improved morale affects mood in such a way as to increase profits.

Assume that the utility functions B and U are differentiable with respect to income, w , so that the unconscious and conscious marginal utilities of income, dB/dw and $\partial U/\partial w$, respectively, are well-defined. It must be that

$$\mu_1 < \frac{dB(w(\mathbf{e}))}{dw} \quad \text{and} \quad (4.1)$$

$$\mu_2 < \frac{\partial U(w(\mathbf{e}), \mathbf{m})}{\partial w}, \quad (4.2)$$

for levels of \mathbf{e} and \mathbf{m} that are actually realized. If these inequalities did not hold, the worker would be indifferent to having his or her wage increased, or would prefer to have it reduced, contrary to common sense.

The inclusion of profit in the worker's utility function does not portray the sort of good morale that inhibits theft, for according to inequalities (4.1) and (4.2), workers could improve their welfare by stealing from the employer. In order to give a utilitarian interpretation to moral values, it is necessary either to include punishment, to introduce a sense of guilt, or to have people take into account the consequences of having other people break moral codes they break themselves.⁶

Though the model cannot explain the impact of morale on morality, it does capture important consequences of good morale. Using the argument made in the previous section, it is easy to show that the inclusion of the terms

$$\mu_1[R(\mathbf{e}) - w(\mathbf{e})] \quad \text{and}$$

$$\mu_2[R(\mathbf{e}) - w(\mathbf{e})]$$

does not decrease and may increase profits. More precisely, profits do not decrease, provided μ_1 is positive and provided the inclusion of these terms does not change the set of actions, \mathbf{e} , achievable by varying mood, \mathbf{m} . In order to see why, let $\underline{\mathbf{e}}$ be the choice of \mathbf{e} that maximizes $B(w(\mathbf{e})) - C(\mathbf{e})$ and let $\underline{\mathbf{e}}'$ be the choice of \mathbf{e} that maximizes $B(w(\mathbf{e})) + \mu_1[R(\mathbf{e}) - w(\mathbf{e})] - C(\mathbf{e})$. Then,

⁶ Akerlof and Kranton (1998) model the moral aspects of identity as internalized rules restricting the utility function.

$$\begin{aligned}
B(w(\mathbf{e}')) + \mu_1[R(\mathbf{e}') - w(\mathbf{e}')] - C(\mathbf{e}') &\geq B(w(\mathbf{e})) + \mu_1[R(\mathbf{e}) - w(\mathbf{e})] - C(\mathbf{e}) \\
&\geq B(w(\mathbf{e}')) + \mu_1[R(\mathbf{e}) - w(\mathbf{e})] - C(\mathbf{e}'),
\end{aligned}$$

which implies that $R(\mathbf{e}') - w(\mathbf{e}') \geq R(\mathbf{e}) - w(\mathbf{e})$, as is to be shown.

Financial Incentives and Morale I next show that financial incentives and morale complement each other. An argument similar to the one just made shows that increasing μ_1 does not decrease and may increase profits, for any wage function w , including ones offering financial incentives. In order to see how to make the argument, assume that $\mu_1' > \mu_1$, notice that

$$\begin{aligned}
&B(w(\mathbf{e}) + \mu_1'[R(\mathbf{e}) - w(\mathbf{e})] - C(\mathbf{e})) \\
&= B(w(\mathbf{e})) + \mu_1[R(\mathbf{e}) - w(\mathbf{e})] - C(\mathbf{e}) + (\mu_1' - \mu_1)[R(\mathbf{e}) - w(\mathbf{e})],
\end{aligned}$$

and assume that increasing μ_1 to μ_1' does not change the set of actions achievable by varying mood.

I next show that if μ_1 is positive, then increasing financial incentives increases profits, provided the function B is not too concave and provided the change in μ_1 does not change the set of actions attainable by choice of mood. Introduce explicit incentives by assuming that $w(\mathbf{e}) = \mathbf{w}_0 + \mathbf{w}_1 R(\mathbf{e})$, where $\mathbf{w}_1 > 0$. Assume that the firm varies \mathbf{w}_0 and \mathbf{w}_1 so that $\mathbf{w}_0 + \mathbf{w}_1 R(\mathbf{e})$ remains constant, where \mathbf{e} is the worker's choice of action. Now, hold $\mathbf{w}_0, \mathbf{w}_0', \mathbf{w}_1,$ and \mathbf{w}_1' fixed, where $\mathbf{w}_1' > \mathbf{w}_1$. Assume that B is linear, that is, $B(\mathbf{w}) = \mathbf{b}\mathbf{w}$, where \mathbf{b} is a positive number. By inequality (4.1), we must assume that $\mathbf{b} > \mu_1$. I show that increasing \mathbf{w}_1 to \mathbf{w}_1' increases profits. Let \mathbf{e} and \mathbf{e}' be the worker's optimal choices of \mathbf{e} when the wage is $\mathbf{w}_0 + \mathbf{w}_1 R(\mathbf{e})$ and $\mathbf{w}_0' + \mathbf{w}_1' R(\mathbf{e})$, respectively. By the optimality of \mathbf{e} and \mathbf{e}' , it follows that

$$\begin{aligned}
&\mathbf{b}[\mathbf{w}_0 + \mathbf{w}_1 R(\mathbf{e})] + \mu_1[R(\mathbf{e}) - \mathbf{w}_0 - \mathbf{w}_1 R(\mathbf{e})] - C(\mathbf{e}) \\
&\geq \mathbf{b}[\mathbf{w}_0 + \mathbf{w}_1 R(\mathbf{e}')] + \mu_1[R(\mathbf{e}') - \mathbf{w}_0 - \mathbf{w}_1 R(\mathbf{e}')] - C(\mathbf{e}') \quad \text{and}
\end{aligned} \tag{4.3}$$

$$\begin{aligned}
&\mathbf{b}[\mathbf{w}_0' + \mathbf{w}_1' R(\mathbf{e}')] + \mu_1[R(\mathbf{e}') - \mathbf{w}_0' - \mathbf{w}_1' R(\mathbf{e}')] - C(\mathbf{e}') \\
&\geq \mathbf{b}[\mathbf{w}_0' + \mathbf{w}_1' R(\mathbf{e})] + \mu_1[R(\mathbf{e}) - \mathbf{w}_0' - \mathbf{w}_1' R(\mathbf{e})] - C(\mathbf{e}).
\end{aligned} \tag{4.4}$$

These inequalities imply that

$$(\mathbf{b} - \mu_1)\mathbf{w}_1[R(\mathbf{e}) - R(\mathbf{e}')] \geq C(\mathbf{e}) - C(\mathbf{e}') + \mu_1[R(\mathbf{e}') - R(\mathbf{e})] \geq (\mathbf{b} - \mu_1)\mathbf{w}_1'[R(\mathbf{e}) - R(\mathbf{e}')].$$

Because $b - \mu_1 > 0$ and $\mathbf{w}_1' > \mathbf{w}_1$, the last inequalities imply that

$$R(\mathbf{e}') \geq R(\mathbf{e}).$$

Since by assumption $\mathbf{w}_0 + \mathbf{w}_1 R(\mathbf{e}) = \mathbf{w}_0' + \mathbf{w}_1' R(\mathbf{e}')$, it follows that profits are not decreased by increasing incentives. Profits would be strictly increased if there were strict inequality in either of inequalities (4.3) or (4.4). In this case, profits would still increase if the function $B(\mathbf{w})$ were a slightly concave approximation to the linear function $b\mathbf{w}$. It is easy to make an example in which B is very concave and increased incentives decrease profits. This completes the argument that increased incentives may increase profits, even when morale is good, just as improved morale increases profits even when workers receive financial incentives. It is in this sense that incentives and morale are complements.

Cooperation The model can be used to demonstrate one reason good morale fosters cooperation among workers; it gives them a common objective. Let there be N workers and let the subscript n indicate variables and functions applying to the n^{th} worker. The employer observes worker n 's output to be

$$y_n(\mathbf{e}_n) = y_n(E_n(\mathbf{d}_n, \mathbf{m}_n))$$

and pays him or her

$$w_n(y_n(\mathbf{e}_n)) = w_n(y_n(E_n(\mathbf{d}_n, \mathbf{m}_n))).$$

The actual output of all N workers is

$$\mathbf{y}(\mathbf{e}_1, \dots, \mathbf{e}_N) = y(E_1(\mathbf{d}_1, \mathbf{m}_1), \dots, E_N(\mathbf{d}_N, \mathbf{m}_N)).$$

Worker n 's unconscious utility is

$$B_n(w_n(y_n(\mathbf{e}_n))) + \mu_{n1}[R(y(\mathbf{e}_1, \dots, \mathbf{e}_N)) - w_1(y_1(\mathbf{e}_1)) - \dots - w_N(y_N(\mathbf{e}_N))] - C(\mathbf{e}_n),$$

and his or her conscious utility is

$$U_n(w_n(y_n(E_n(\mathbf{d}_n, \mathbf{m}_n))), \mathbf{m}_n) + \mu_{n2}[R(y(E_1(\mathbf{d}_1, \mathbf{m}_1), \dots, E_N(\mathbf{d}_N, \mathbf{m}_N))) - w_1(y_1(E_1(\mathbf{d}_1, \mathbf{m}_1))) - \dots - w_N(y_N(E_N(\mathbf{d}_N, \mathbf{m}_N)))] + V(E_n(\mathbf{d}_n, \mathbf{m}_n), \mathbf{m}_n).$$

Interaction among the N workers suggests a coordination game, for they all derive utility from profits. In order to see the connection more clearly, assume that workers' moods adjust so that the utility of labor, $V(E_n(\mathbf{d}_n, \mathbf{m}_n), \mathbf{m}_n)$, is the same for all decisions \mathbf{d}_n actually adopted by the workers, so that this term may be ignored. In addition, suppress mood and the distinction between the conscious choice, \mathbf{d}_n , and the realized action, \mathbf{e}_n , and focus on conscious utility, since cooperation is arranged deliberately. Suppose that the choice of action has two components, selection of a method of production and the selection of effort, thought of as the pace of work. Since effort is influenced by mood, which is governed unconsciously and almost automatically, it makes sense to ignore the effort part of actions and to think of these solely as production methods. Under these assumptions, the relevant utility functions are

$$U_n(w_n(y_n(\mathbf{e}_n))) + \mu_{n2}[R(y(\mathbf{e}_1, \dots, \mathbf{e}_N)) - w_1(y_1(\mathbf{e}_1))] - \dots - w_N(y_N(\mathbf{e}_N))], \quad (4.5)$$

for $n = 1, \dots, N$. If the parameters μ_{n2} are positive and the functions w_n are constant, as would be the case for truly fixed wages, then the workers in effect play a coordination game with payoff $R(y(\mathbf{e}_1, \dots, \mathbf{e}_N))$ for all players, and the obvious solution is to maximize this payoff jointly. However, management normally gives workers at least some financial incentives linked to individual performance, such as production targets, performance evaluations, promotion criteria, and piece rates. I was told that it is difficult to design incentives so that workers' financial interests are entirely consistent with those of the firm. An important function of good morale is to motivate workers to act in the firm's interest, even when it conflicts with their own financial advantage. I show that the above model includes this function. More precisely, I argue that cooperation induced by internalization of the firm's goals increases profits.

Suppose that morale is neutral. That is, suppose that $\mu_{n2} = 0$, for all n . In addition, suppose that the wage functions, w_n , include financial incentives. For each n , let $\underline{\mathbf{e}}_n$ be that value of \mathbf{e}_n that maximizes $U_n(w_n(y_n(\mathbf{e}_n)))$. With these choices of effort, the firm's profit is

$$R(y(\underline{\mathbf{e}}_1, \dots, \underline{\mathbf{e}}_N)) - w_1(y_1(\underline{\mathbf{e}}_1)) - \dots - w_N(y_N(\underline{\mathbf{e}}_N)).$$

In contrast, suppose now that morale is good, so that the μ_{n2} are all positive. Though it is hard to say how the workers would behave, it would be to their mutual advantage to choose actions $(\bar{\mathbf{e}}_1, \dots, \bar{\mathbf{e}}_N)$ that 1) were a Nash equilibrium for the game with payoffs as in (4.5) and 2) gave each worker, n , a payoff exceeding $U_n(w_n(y_n(\underline{\mathbf{e}}_n))) + \mu_{n2}[R(y(\underline{\mathbf{e}}_1, \dots, \underline{\mathbf{e}}_N)) - w_1(y_1(\underline{\mathbf{e}}_1)) - \dots - w_N(y_N(\underline{\mathbf{e}}_N))]$. Suppose that such an equilibrium exists. Because of the form of utility (4.5) and because μ_{n2} is positive and $\underline{\mathbf{e}}_n$ maximizes $U_n(w_n(y_n(\underline{\mathbf{e}}_n)))$, for all n , it follows that

$$\begin{aligned}
& R(\bar{\mathbf{e}}_1, \dots, \bar{\mathbf{e}}_N) - w_1(\bar{\mathbf{e}}_1) - \dots - w_N(\bar{\mathbf{e}}_N) \\
& > R(\mathbf{y}(\mathbf{e}_1, \dots, \mathbf{e}_N)) - w_1(y_1(\mathbf{e}_1)) - \dots - w_N(y_N(\mathbf{e}_N)).
\end{aligned}$$

That is, internalization of the firm's objectives increases profits.

Information Sharing One of the reasons it is difficult to give workers incentives consistent with the firm's objectives is that the conditions workers face change frequently, so that the actions that are correct from the employer's point of view also change. If management knew conditions precisely, it could order workers to do exactly what was needed or it could include the conditions in the specification of incentives. However, often only the workers observe the relevant changes in circumstances. Managers said that one of the benefits of good morale is that it induces workers to share information with each other and with superiors. This advantage can be introduced into the above model by having company revenues depend on random variables observed by the workers alone. For instance, assume that worker n observes the random variable θ_n and that company revenue depends on all the θ_n , so that utility function (4.5) becomes

$$U_n(w_n(y_n(\mathbf{e}_n))) + \mu_{n2}[R(\mathbf{y}(\mathbf{e}_1, \dots, \mathbf{e}_N); \theta_1, \dots, \theta_N) - w_1(y_1(\mathbf{e}_1)) - \dots - w_N(y_N(\mathbf{e}_N))],$$

If all workers reveal the values they observe of the θ_n , then workers can cooperate more effectively and expected profits and hence expected individual utilities earned from cooperation may increase and will not decrease, provided the parameters μ_{n2} are all positive. Hence, workers have a positive incentive to share their observations with each other and with management.

Morale versus Coercion Managers explained that the chief disadvantage of using threats to obtain cooperation is the loss of worker initiative. Though force may succeed in making people work with great intensity, people working under such pressure may only make a show of cooperation and may not use their heads to help the firm. I was told that coercion works well for tasks that are easily monitored and when management knows what employees should do; managers said that compulsion is inefficient when workers know best what they ought to do because of information they alone receive. I express these ideas formally using an example in which I suppress mood, the unconscious, and the distinction between decisions and realized effort, since these are irrelevant here. Suppose a worker may do one of two types of tasks, A and B, and that these are performed with intensities, \mathbf{I}_A and \mathbf{I}_B , respectively, where \mathbf{I}_A and \mathbf{I}_B are non-negative numbers. The action $\mathbf{e} = (i, \mathbf{I})$ is task i done with intensity \mathbf{I} , where $i = A$ or B . Let the disutility of doing either task, i , with intensity \mathbf{I} be $-V(i, \mathbf{I}) = \mathbf{I}^2$ and let the utility of wage, \mathbf{w} , be simply $U(\mathbf{w}) = \mathbf{w}$. Suppose that one and

only one of the tasks is profitable, that management does not know which task is profitable, and that the worker can learn which is profitable at a small cost in utility. Suppose further that management observes the intensity level, that task A is profitable with probability p , where $1/2 < p < 1$, and that a task done with intensity \mathbf{I} earns revenues $R(i, \mathbf{I}) = \sqrt{\mathbf{I}}$, when it is profitable, and earns no revenue otherwise. Finally, suppose that to retain the worker, management has to offer a reservation utility level of at least $1/16$. If the firm obtains cooperation through threats, morale is zero and the worker cannot be counted on to do the task that is profitable. In this case, optimal management strategy is to set the wage, \mathbf{w} , equal to $[1 + (2p)^{4/3}]/16$, to fix the task to be A, and to require work intensity, \mathbf{I} , to be $(2p)^{2/3}/4$, for these values solve the profit maximization problem

$$\begin{aligned} & \max_{\mathbf{w}, \mathbf{I}} [pR(A, \mathbf{I}) - \mathbf{w}] \\ & \text{s.t. } U(\mathbf{w}) + V(\mathbf{I}) \geq 1/16 \quad \text{or} \\ & \max_{\mathbf{w}, \mathbf{I}} [p\sqrt{\mathbf{I}} - \mathbf{w}] \\ & \text{s.t. } \mathbf{w} - \mathbf{I}^2 \geq 1/16. \end{aligned}$$

The firm fires the worker if work intensity is less than $(2p)^{2/3}/4$, in which case the worker earns his or her reservation utility level of $1/16$. The firm's expected profits are the positive number $[3p(2p)^{2/3}/8] - 1/16$, and expected revenues are $[p(2p)^{1/3}]/2$.

Suppose management does not threaten, but depends on positive morale. Assume that in this case the morale parameter, μ_2 , equals $1/2$. Then, the worker's total utility function is

$$U(\mathbf{w}) + V(\mathbf{I}) + \mu_2[R(i, \mathbf{I}) - \mathbf{w}] = \mathbf{w} - \mathbf{I}^2 + 0.5[R(i, \mathbf{I}) - \mathbf{w}],$$

minus a small quantity if the worker verifies which task is profitable. Assuming the worker knows which task is profitable, he or she solves the problem

$$\max_{\mathbf{I}} [-\mathbf{I}^2 + 0.5\sqrt{\mathbf{I}}],$$

so that work intensity is $\mathbf{I} = 1/4$, which is less than the intensity in the previous case with compulsion and no morale. However, because the worker chooses the profitable task, the firm's expected revenues are $\sqrt{\mathbf{I}} = 1/2$, which exceeds the level with no morale. If the firm continues to pay wage $\mathbf{w} = [1 + (2p)^{4/3}]/16$, then total expected worker utility, $U(\mathbf{w}) + V(\mathbf{I}) + \mu_2[R(i, \mathbf{I}) - \mathbf{w}]$, is at least $1/16$, and expected profits are higher with positive morale than with no morale, unless $[p(2p)^{1/3}]/2 > 1/2$, i.e., unless $p > 0.5^{1/4} \approx 0.84$. That is, coercion

is more profitable than dependence on morale alone only if management knows with high probability which task is profitable, a result that corresponds to the intuition I wish to express.

5. Testing the Model

The proposed model of work motivation might be tested by psychological experiments. One implication of the model is that the utility or disutility of work effort depends on expected reward. In testing this implication, it would not be correct to measure the disutility of effort by offering people a choice between effort and something else, such as having to pay a certain amount of money, for that choice would affect the context of the work and hence might affect mood. However, something might be learned by asking people how they feel about their efforts. By looking for consistency in people's reactions to various work and reward situations, it might be possible to test for the existence of an unconscious utility function and even to estimate it.

6. Conclusion

The usual model describes a worker's trade-off between financial reward and the disutility of labor and has no place for morale. However, neither managers nor labor leaders dwelled on the unpleasantness of work, but rather stressed its benefits. Managers spoke as if one of their primary tasks was to maintain good morale, and labor leaders also emphasized its importance. In view of these observations, it seems appropriate to replace the usual model with one more consistent with the observations of people running work places. I do not know whether my own suggestions are correct. Perhaps further empirical inquiry will give a firmer basis for theory.

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