Efficiency Wages: Signals or Incentives?
An Empirical Study of the Relationship between Wage and Commitment

PETER MÜHLAU* and SIEGWART LINDENBERG
*Department of Sociology/ICS, University of Groningen, Grote Rozenstraat 31, 9712 TG Groningen, The Netherlands (*author for correspondence, e-mail: P.Muhlau@ppsw.rug.nl)*

Abstract. Efficiency wage theories argue that firms induce their employees to work in a more disciplined way by paying high wages. Two basic mechanisms have been pointed out in economics about how these wage premia motivate employees. The incentives-driven 'shirking model' implies that employees who have a highly paid job work in a more disciplined way so as to avoid being dismissed. The "gift exchange" model is based on the assumption that high wages change the relationship between employer and employee. Empirical evidence on the incentives approach is mixed and a thorough competitive testing against the gift exchange model was not possible due to the fact that the latter was not worked out enough. However, there is a relational theory of efficiency wages which is worked out in detail in order to allow direct competitive testing. This *relational signaling* approach, as it is called, is based on framing effects and comes to specific hypotheses about the conditions under which efficiency wages work. These hypotheses contrast sharply with predictions from the incentives approach. The paper presents an empirical test of the theories and shows that the data clearly reject the incentive-based predictions and confirm the relational signaling predictions.

Key words: efficiency wages, framing, incentives, Japan-U.S., organizational commitment, relational signaling, shirking

1. Introduction

Efficiency wage theories argue that it is sometimes efficient for the employer to pay a wage above the going rate. This is the case if super-competitive wages raise the productivity of the workforce to a degree that it outweighs the higher pay. There are various reasons why high wages may be efficient. A high relative wage may induce more productive types to apply for a job (e.g., Weiss, 1980) or motivate workers to stay with the firm (e.g., Salop, 1979). The most important efficiency wage theories regard the payment of high wages as efficient because high wages improve the 'morale' of the workforce. Generally speaking, two branches of these motivational efficiency wage theories can be distinguished (see for instance Weiss, 1990). The first argues that employees who have a highly paid job are more disciplined in their work to avoid being caught 'shirking' and therefore dismissed. The second branch consists of various sociologically informed models (also by economists) of enhanced cooperation induced by high wages (see Akerlof, 1984;

Akerlof and Yellen, 1990). The common ground of these sociological accounts is that wage "gifts" translate into improved cooperation by changing the nature of the employment relation. The labor transaction becomes embedded in a relationship of reciprocity.

There has not been a serious comparative direct test of both models due to the fact that the "gift exchange" model has not been worked out in enough detail by economists in order to come to hypotheses that are clearly contrary to expectations from the incentives approach. A theory of efficiency wages worked out by sociologists (the theory of relational signaling) does offer enough detail for a direct confrontation between an incentives and a relational approach. It is the aim of this paper to present this relational signaling approach and test empirically predictions from this approach against predictions from the incentives approach.

1.1. INCENTIVES PERSPECTIVE

The 'shirking model' is an elaboration of the 'incentives model'. The 'incentives model' has been formulated as the 'law-enforcement model' that aims to explain how government employees can be induced both to enforce governmental laws and not to succumb to being bribed (see Becker and Stigler, 1974). The basic model states that employees will enforce laws only if the costs of non-enforcement exceed the costs of law enforcement. The costs of enforcement for the employee are the efforts expanded in enforcing the law and the loss involved in foregoing the bribes offered not to enforce. The costs of non-enforcement are the sanction the agency applies if non-enforcement is detected. The general insight of the incentives model is that, given a certain probability that malfeasance is detected, employees can be induced to behave more loyally if the sanction applied for malfeasance is strengthened. The sanctioning capacity is increased when employees are compensated above the amount they can get elsewhere. The compliance of the worker is a function of three parameters of the model: How much it costs the employees to do what they ought to do; how easily it can be observed whether they comply with their duties; and the costs associated with job loss.

The 'shirking model' (Shapiro and Stiglitz, 1984; cp. Allgulin and Ellingsen, 2002 for a recent elaboration) applies incentives reasoning to employees of private companies and postulates an efficiency wage equilibrium with unemployment. First consider the situation without efficiency wages. If monitoring is imperfect and costly, employees may gain from shirking if the firm pays competitive wages. In this case, employees caught while shirking easily find a new job and the threat of dismissal is an ineffective means to discipline the workforce. The efficiency wage equilibrium is a solution to this problem because firms can effectively sanction the malfeasance of their employees when wages above the going rate are paid. Dismissed workers not only lose their well-paid jobs but, as efficiency wages drive the wage rate above the market clearing level, they can also be caught in the trap of long-term unemployment.

The Japanese economy was famous for its low level of unemployment. Okuno-Fujiwara (1987) developed an efficiency wage model that incorporates this fact. He showed that an efficiency wage equilibrium is possible without unemployment. Okuno-Fujiwara proceeded from the observation that Japanese premium companies recruit recent graduates from school and university and offer them career employment. If workers are never caught cheating and thus never dismissed, there will be no mid-career workers looking for new jobs. Consequently, workers may conclude that no market exists for mid-career workers and that dismissal means permanent unemployment for the employee; in this case, dismissal is such an effective sanction that shirking is completely deterred. This equilibrium – as noted by Okuno-Fujiwara – is fragile as it depends crucially on the worker's expectation that once fired, he or she can never become re-employed.

The incentives model of efficiency wages have stimulated a considerable amount of research. Ewing and Payne (1999) found a positive relationship between span of control and wage level. However, neither Leonard (1987) nor Neal (1993) could show that there is a relationship between the intensity of supervision and wage differences for American employees. Although Rebitzer (1995) and Groshen and Krueger (1990) found such a negative relationship between wages and supervision intensity for American nurses, this relationship was insignificant or even positive for three further occupational groups they studied. Moreover, Cappelli and Chauvin (1991) and Weakliem and Frenkel (1993) showed that plants paying a wage premium have less disciplinary dismissals and Wadwhani and Wall (1991) found that more productive companies are more likely to pay a generous wage. Taken together, these empirical findings provide only mixed support for the model, and when the data are supportive, they do not discriminate between the incentives model and the relational models[1] introduced in the next section.

1.2. RELATIONAL SIGNALING PERSPECTIVE

The relational approach differs from the incentives models with respect to the motivation that induces employees to work hard and behave loyally. Doeringer (1991, p. 110) concluded after an examination of personnel practices in American firms that the "most significant inconsistency between efficiency wage theory and management practices lies in the assumption about worker motivation". The relational view on wage efficiency is much more in line with the managerial common sense theories that Doeringer found in his research. It fits Doeringer's observation that "principal-agent conflicts at the workplace are resolved by harmonizing the conflicting objectives of labor and management rather than by altering economic incentives" (1991, p. 105; cp. Angell and Lundborg, 1995; Bewley, 1999). This appears to be the essence of the idea that the wage premium is part of a "gift-exchange" between the company and the workforce (Akerlof, 1982; Leibenstein, 1987). In the economic discussion, it has never been worked out in any detail how this "gift exchange" supposedly works, and therefore we do not find serious compe-

titive test of the gift exchange model against the predictions from the incentives. In the sociological discussion, there has been a detailed elaboration of how efficiency wages might work, based on relational signaling. This approach will be presented next.

The *relational signaling* approach assumes that the wage premium works as a *relational signal* that changes the perception of the employment relationship. Lindenberg (1988, 1998) worked out a relational signaling theory based on the theory of framing. Wielers and Lindenberg (1991) applied this theory to efficiency wages. The theory argues that the wage premium works as a relational signal that mobilizes a relational orientation (technically: a frame). A frame is the cognitive enhancement of certain features of the situation through selective attention and selective accessibility of memory and knowledge chunks (for a recent statement see Lindenberg, 2001). This selective enhancement leads to a heightened sensitivity to certain aspects of the situation, to the perception of certain alternatives and to an ordering of these alternatives according to a particular goal. It is the fact that frames are governed by goals that combines cognitive and motivational effects. For example, in experiments on negotiation, individuals behave very differently if they are instructed to be cooperative or to be competitive. Carnevale and Lawler (1986) found that when people were given the goal to act cooperatively, their thought processes (attitudes, judgement criteria and expectations) and behavioral repertoire (the perceived alternatives for action) were different than when the given goal was to act competitively. De Dreu and Boles (1998) found different guiding rules (heuristics) for behavior . For example, a cooperative orientation would go with heuristics such as "equal split is fair", whereas a competitive orientations would be connected to heuristics such as "your gain is my loss", leading to very different behavior. Van Lange and Kuhlman (1994) found that orientations (frames) also affect the evaluation of the basic features of other person. For example, in a cooperative orientation, cooperation by other is seen as a sign of intelligence whereas in a competitive orientation, cooperation is seen as a sign of ignorance, something to be exploited.

In short, frames really matter for the way the situation is seen, the aspects that are being considered and the heuristics that are being applied. If the overriding goal at the moment is "to act appropriately according to relational expectations", then the alternatives perceived pertain to actions that are more and less appropriate in the light of social norms that govern relationships (such as fairness, trustworthiness, cooperativeness for a joint goal, considerateness). Other goals (such as making profit) are pushed into the cognitive background. From there, they still exert some influence on the strength of the current overriding goal by lowering its salience to various degrees and possibly even displacing the current frame altogether when the foreground and background goals become too incompatible. For example, the more money an employer spends on relational aspects (such as "non-stress" work norms, training in general skills, advancement opportunities, good recreational facilities, etc.), the greater the likelihood that the goal in the background (to make a profit)

will take over as the new frame, pushing relational concerns into the background. The crucial question then is whether the relational concern, once in the background, is strong enough to ever displace making a profit when the latter becomes too incompatible with the former, i.e., when the profit orientation leads to strained relations with employees due to heightened work norms, training only in company specific skills, reduced advancement opportunities, and abolishment of recreational facilities.

For the relational signaling theory, two overriding goals are particularly important. A *normative frame* is governed by the goal 'to act appropriately'. A *gain frame* is governed by the goal 'to increase one's resources'. In a normative frame, gain as a goal is pushed into the cognitive background, and, along with it, opportunity costs and strategic behavior are also pushed into the background. In a frame, alternatives are selected and ordered according to the dominant goal. Thus, in a normative frame, the behavioral alternatives are those that are appropriate (to various degrees) for the conformity to certain norms. In a gain frame, the behavioral alternatives are those that realize personal gain (to various degrees). It makes a big difference for behavior and the predictability of behavior which goal is in the foreground, and this foreground/background effect makes framing so relevant for governance (see Lindenberg, 2003). The partner in a relationship asks "Is the other really committed to the relationship with me, or is he just nice to me because he wants to manipulate me, dropping me the moment it suits him?" Frames are thus very important but they are also precarious. They can change and for this reason, partners in a relationship search each other's behavior for signals that indicate what frame the other is in and whether there are signs that point to a frame switch. There are good reasons to assume that apriori, a gain frame is stronger than a normative frame because the former is directly tied to the self (the aim is to improve one's own resources whereas the aim in a normative frame is only directly tied to a standard, with the goal "to act appropriately", see Lindenberg, 2001). A normative frame thus must have strong support in order to withstand being displaced by a gain frame. One important support for a normative frame is interaction with a significant other who is also in a normative frame. In addition, this greater strength of a gain frame also holds for the encounter of two people, one with a normative and one with a gain frame. In this case, the normative frame, being confronted with a gain frame of the other, is likely change into a gain frame. Thus if one is in a normative frame and the other in a gain frame, both are likely to end up in a gain frame. For this very reason, an employer who signals being in a gain frame vis-à-vis his employees, will greatly reduce the number of employees who are in normative frame. By contrast, if he signals being in a normative frame, he will not just avoid pushing employees into a gain frame but he will also strengthen their normative frames. Such "frame signals" can work because it is not possible to simply choose a frame for oneself. Frames belong to automatic cognitive processes. They can be influenced over time by one's own behavior but are not under instant conscious control. For example, an individual in a normative frame can avoid contact with colleagues who are in a gain

frame for fear of being pulled into a gain frame himself. In an ongoing relationship, it is difficult to fake these signals.

In an employment relation, a *relational signal* is behavior that signals to the other that the actor is in a normative frame (i.e., he follows relational norms and strategic opportunism is pushed into the background). The signaling "game" is likely to be initiated by the employer who typically makes the initial job offer. The employer can and must often be in a gain frame. But for this very reason, it is the more important that the employer signals to the employee that with *regard to the boss's relationship with his employees*, the employer's behavior is guided by relational norms (especially reciprocity, fairness, and equity). Signals are the more credible, the higher the sacrifice needed to produce them. This makes high wages ideal signals of a relational frame (i.e., of a normative frame linked to relational norms). However, as we will work out in more detail below, not every form of a high wage will signal a normative frame of the employer.

Why would the employee not exploit the employer's normative frame by shirking when nobody watches? How is his or her commitment produced by the "gift" of the employer? The employee, being in the weaker position, is interested in the stability of the employer's normative frame. A gain frame of the employee is in danger of eliciting a gain frame of the employer, especially by lowering co-workers' and supervisors' normative frame stability, thereby contributing to a larger preponderance of gain frames. This preponderance, in turn, destabilizes the management's normative frame. The employee can thus influence the employer's frame by avoiding a clear signal that he is in a gain frame. The easiest way to do this is to avoid being in a gain frame and thus to avoid actions (such as shirking) that would stabilize a gain frame. A different way to put this is that if the employee prefers the boss's non-strategic behavior, the best thing to do is to avoid strategic behavior himself. It is thus the employee's interest in his own frame stability that suspends strategic behavior vis-à-vis the employer. This is how the "gift" of the employer translates itself into commitment of the employee. As long as the relational signals from the employer are clearly received as such by the employee, the latter is likely to reciprocate and the cooperative relationship should last.

In sum, while for the incentives model the improved discipline is an outcome of utility-maximizing decisions of the employee, the relational model argues that the wage signal turns the employment relationship from a relationship among 'opportunists' into a relationship of a 'joint venture' governed by norms of (weak) solidarity and cooperation. According to the relational perspective, high wages induce employees to work hard because the employee enters a cognitively governed solidarity relationship with the firm, a relationship the employee would like to keep. Therefore, the employee will behave so as to maintain the frame that makes continuation of that relationship most likely. Mutual stabilization of the normative frame rules out that either party gains by harming the other. The relationship the employees does not want to lose is not employment per se (as assumed in the

incentives approach) but a solidarity bond with the company, a bond that must be maintained by both sides.

1.3. DIFFERENT PREDICTIONS FROM INCENTIVES AND RELATIONAL SIGNALING MODELS

Both models assume that a high wage paid by the firm induces employees to choose actions that are supportive of the organization, induces the employee to working harder, to devote more attention to the task and to show initiative in problem solving. Both views lead one to expect that firms paying high wages will have workers who are strongly committed to the organization. Yet, the relational perspective and the incentives perspective lead to different expectations about whose wages will have a major effect on commitment. Will it be the individual wage of the worker, or will it be the firm's willingness to pay high wages to its employees in general (i.e., the relative wage level of the firm)?

Assume that both the relative wage of an individual worker (i.e., how much he earns in comparison with other workers of the same quality) and the relative wage-level paid by the firm are known (i.e., how much the firm pays in comparison to the wages paid by other firms that employ a workforce of the same quality). According to the *incentives model*, knowledge about the relative position of the firm does not predict commitment of the worker. It is information that is already contained in the relative wage position of the worker. Also, it does not matter for the commitment of the worker whether the firm pays the relative wage only to him or to all employees of the firm. What counts in fact is whether the individual employee earns more than he or she can get elsewhere. If this is so, then this employee shows more commitment in order to keep such an attractive job. The incentives approach thus leads to the hypotheses that *the relative wage of an individual worker is positively associated with the commitment of the worker* and that the *effect (if any) of the firm's relative wage level on the worker's commitment should vanish once controlled for the relative wage of the individual.*

The *relational model* assumes that high wages only increase commitment if they signal relational concern (i.e., a normative frame of the firm's leaders regarding the relationship with the worker). Thus, it is important to the worker whether the firm only pays him/her a high wage or whether high wages are paid to all the firm's employees. A high wage is a favorable outcome to the employee, but the provision of favorable outcomes is no relational signal per se (Mühlau, 2000). Consider for example an employee who, despite being just as capable and diligent as others nevertheless receives a larger wage than his co-workers. Indeed he may be quite content with this 'wage premium' but there is no particular reason why the high wage should be seen by him as a signal of the employer's interest in and commitment to a relationship governed by relational norms. In fact, if he thinks he simply gets what he deserves, he will not interpret his wage as a signal of a relational commitment on the side of the employer. If he thinks he is just as deserving as the

others, the employer will even appear as somebody who violates norms of equity. Then, the employer may even be seen as paying more to this particular individual for strategic reasons, such as setting an example for rewarding silent acceptance of higher production norms, or "ratting" on others who do not accept these norms. Although the employee can gain from this 'opportunism' of the employer, nevertheless he cannot be confident that in the future, should the employer's interests fail to coincide with his, he will be treated in a fair and equitable manner. Essentially, the implications are that unless internal wage differences are legitimized by equity rules and complemented by other signals of relational interest, there is little sense or reason to try to signal a relational interest to individual workers by giving them a wage that is higher relative to those of their fellow workers. Note that we don't assume workers necessarily care for each other. Workers' concerns about how the employing organization is treating other workers has signal value in that it indicates to the individual employee how he or she can expect to be treated in future situations, i.e., whether the employer is likely to act strategically or with relational concern. A high wage paid to all employees does not raise problems of signal consistency or credibility and therefore the relational signaling approach expects that the 'collective wage premium' works better as relational signal than an individual wage increment. The hypothesis is therefore that *the wage level of the employing firm (i.e., the 'collective wage premium') is more closely related to the worker's commitment than the worker's individual relative wage.*

Of course, there are circumstances under which individual wages can become a relational signal and they are not difficult to identify from the point of view of the relational signaling approach. If there is at all a positive effect of individual relative wages on commitment, it is due to the fact that the employer clearly signals relational concern in other ways as well. Individual wages are then seen in the light of these other relational signals and thereby become credible signals. We call this the *embedded individual wage signal.* For example, if the employer offers intrinsic rewards, good co-worker relations, good worker-supervisor relations and advancement opportunities, then individual earnings *may* also be used with success by the employer as an extra commitment-enhancing signal. Without this embedding, individual earnings are expected to have little signaling strength because by lack of other evidence for relational concern, the employee cannot clearly make out whether the individual wage is strategic or the expression of relational concern. In the remainder of the paper, we will test these hypotheses.

2. Empirical Study

Data. The data are not recent but very rich and still highly relevant for comparative testing of commitment mechanisms. They come from a survey of manufacturing plants in two matched regions in the United States and in Japan, the Indianapolis area and the Atsugi region of Kanagawa Prefecture collected between 1981 and 1983 (see Lincoln and Kalleberg, 1990 for a detailed description of the dataset

and the sampling and collection procedure. The data combine detailed information about plants and about employees working in the plants. They were collected in an organization-based two-stage design (see Kalleberg, 1990). The dataset contain responses of 4567 employees of 52 American plants and 3735 employees of 46 Japanese plants.

Method. The data are grouped as a two-level hierarchy with employees nested in plants. We used random coefficient models known as multi-level model or hierarchical linear model (Bryck and Raudenbush, 1992; Goldstein, 1995; Snijders and Bosker, 1999) to estimate the wage position of the firm and to assess the regression parameters, variance components, and residuals of the regressions of commitment.

2.1. OPERATIONALIZATION AND MEASUREMENT

2.1.1. *Dependent Variable*

The major dependent variable is organizational commitment of the worker by which we mean the willingness to work hard, the positive attitudes towards the company (which in combination with the willingness to work hard are known to generate intelligent effort, see Podsakoff et al., 2000). We measure *organizational commitment* of the employee with a 3-item scale with the following items: *"I am willing to work harder than I have to, to help this company succeed" (1 = strongly disagree ... 5 = strongly agree), "I feel very little loyalty for this company" (1 = strongly agree ... 5 = strongly disagree), "I'm proud to be working for this company" (1 = strongly disagree ... 5 = strongly agree).*

2.1.2. *Independent and Control Variables*

Wage measures. The **relative wage position of the firm** or the *Wage Level* is operationalized as a 'posterior means' of a two-level Mincer-type wage regression. The following groups of predictors were used to estimate the log earnings: (1) The wage data refer to annual earnings. All respondents worked full-time. They differ however with respect to the overtime (in hours per month). Overtime was thus used to control roughly for differences in working time. (2) As human capital variables, we used years of education and training time needed to perform the job, work experience and work experience squared, and in order to differentiate between the general and the specific component of the life-cycle wage growth, we used tenure and tenure squared. (3) We controlled for the marital status (married = 1) of the employee. Note that these variables are used to determine the relative wage position of the firm. Table I reports the results of these wage regressions. By and large they replicate the results of OLS-regressions wage regressions on these samples (see Kalleberg and Lincoln, 1988; Levine, 1993b).

The **relative wage position of the worker** is measured by the wage of the worker (*Ln Earnings)* and the effects of the relative wage position of the worker on

Table I. Regression (random intercept) of human capital/life-cycle variables on earnings

Dependent variable	Japan Ln (earnings)		U.S. Ln (earnings)	
	γ	SE	γ	SE
Individual				
Intercept	9.3909		9.2960	
Overtime	0.0364*	0.0073	0.0163*	0.0031
Education	0.0319*	0.0043	0.0248*	0.0038
Training	0.0151*	0.0046	0.0396*	0.0033
Experience	0.0239*	0.0013	0.0051	0.0008
Exp. Squ/100	–0.0875*	0.0070	–0.0207*	0.0049
Tenure	0.0147*	0.0018	0.0148*	0.0014
Ten. Squ/100	–0.0151	0.0124	–0.0516*	0.0071
Marstat	0.0522*	0.0193	0.0319*	0.0079
Variance components				
σ_0^2	0.060130		0.075206	
τ_0^2	0.024601		0.045848	

commitment are estimated under controls for the most important predictors of the wage – age, marital status, education, and tenure.[2]

As **extra relational signal variables** we used *intrinsic rewards* (measured by the degree that the respondent regards his or her work challenging and meaningful and has opportunities to learn new skills [4-item scale]); *promotion expectation* (measured by the item: "Do you expect to be promoted to a higher level job within this company: 0 = no, 1 = yes, within (months/years)); *quality of the co-worker relations* (measured by the trust and confidence put into fellow workers [2-item scale]), and *quality of the worker-supervisor relations* (measured by the trust and confidence put into the immediate supervisor [2-item scale]).

2.2. RESULTS: THE RELATIVE WAGE POSITIONS OF THE FIRM AND OF THE WORKER

Table II reports the results of the regressions of the firm wage level on organizational commitment. Remember, according to the incentives approach, the wage level of the firm should have no or only a very small effect on commitment, whereas the relational signaling approach would predict a strong effect. In order to get at the net effect of the firm wage level, the regression of organizational commitment is controlled at the individual level for background variables (Age, Education, Tenure, Marital_Status), for extra relational signals (Intrinsic Rewards, Quality

Table II. Regression (random-intercept) of organizational commitment on wage level

Dependent variable	Japan[1]	U.S.[1]
	Commitment	*Commitment*
	γ (SE)	γ (SE)
Plant		
Wage level	2.429*	1.318*
	(0.736)	(0.463)
Variance components		
σ_0^2	3.698	3.582
τ_0^2	0.200*	0.246*

[1]Controlled for employee *'background' variables* (Age, Marital Status [dummy], Education, Tenure [years]; *extra relational signals* (Intrinsic Rewards, Promotion Expectations [dummy], Quality Co-Worker Relations, Quality Worker-Supervisor Relations) and *Net Wage* (Ln Individual relative Earnings minus Plant Wage Level).

of Co-Worker Relations, Quality of Worker-Supervisor Relations and Promotion Expectations), and for the Net Wage (Ln Earnings minus the Wage Level). We see that for both Japan and the US, there is a significant effect of the firm's Wage Level on organizational commitment of the worker. This confirms the relational signaling hypothesis and disconfirms the incentive hypothesis. As expected on the basis of the relational signaling approach, the firm's wage level seems to be a relational signal over and above the extra relational signals. Thus, workers are influenced in their own commitment by how the firm treats the other workers. When the firm pays everybody well, the worker is more likely to want to work hard to make the firm succeed, and to identify with the firm. Can the same be said about individual wages?

In Table III, we present the regression of individual earnings on organizational commitment. Remember, the expectation of the incentives approach is that the individual wages strongly contribute to the worker's commitment to the organization. The relational signaling hypothesis is that if there is any effect of individual wages at all, it is smaller than the firm's wage level effect and it is due to the fact that the firm offers a variety of clear other relational signals which allow the firm to credibly present the individual wages as a relational signal as well (the so-called *embedded individual wage signal*). In order to test these expectations, we control again for individual background variables (as before) in order to get the net effect of the individual wages clearly into relief. As we can see in Table III, there is no individual wage effect on commitment for the Japanese data and a significant individual wages effect for the US data. Is this an incentive or a signaling effect? In order to find this out, we controlled the U.S. regression also for the extra relational

Table III. Regression of organizational commitment on individual wages

Dependent variable	Japan[1]	U.S.[1]
	Commitment	*Commitment*
	γ (SE)	γ (SE)
Individual		
Ln (Earnings)	0.040	0.361*
	(0.243)	(0.159)
Individual		
Ln (Earnings)		
controlled for		0.042
extra relational signals[2]		(0.144)

[1]Controlled for employee 'background' variables (Age, Marital Status [dummy], Education, Tenure [years]).
[2]Intrinsic Rewards, Promotion Expectations (dummy), Quality Co-Worker Relations, Quality Worker-Supervisor Relations.

signals. If the incentives approach is right, the extra relational signals should have no effect on the workings of individual wages as a commitment device (efficiency wages). If the hypothesis on embedded individual wage signals is right, then the effect of individual wage on commitment should vanish once we control for the embeddedness of individual wages in other relational signals. Indeed, we find that once we control for extra relational signals, individual wages have no effect on commitment, confirming the relational signaling hypothesis. There is thus no incentive effect of individual wages on commitment in our data and the incentive hypothesis is disconfirmed. The difference between Japan and the U.S. seems to be that in the U.S., firms use individual wages as one of several relational signals whereas in Japan individual wages are not used as a signal at all.

3. Summary and Conclusion

Incentive-driven efficiency wage theories in economics assume that workers who have highly paid jobs are more committed to working hard and to their company because they are afraid of being dismissed when they are caught shirking or not doing their best, thereby losing a wage advantage difficult to find elsewhere. Thus efficiency wages change the incentive structure in such a way that workers can ill afford to risk dismissal. Empirical support for these theories has mainly come from studies that show a positive effect of wages on commitment and it has been mixed. Serious testing was hampered by the fact that the sociologically informed efficiency wage models in economics were not worked out in enough detail to allow direct competitive testing with the incentives approach. In sociology, there is an efficiency wages model that is detailed enough to allow such competitive testing:

The *relational signaling* model. It is based on the idea that behavior is governed by an overriding goal that "frames" cognitive processes and pushes other goals into the background. For a worker, it is important to know whether the employer's decisions regarding the relation to the employees are generated by a "gain" frame (with strategic behavior vis-à-vis the employee) or by a "normative" frame (with relational concern as guiding goal). The worker tries to read the employer' behavior as signals that betray his frame (so-called *relational signals*). This leads to testable hypotheses and clear differences of this relational approach with the incentives approach. For the latter, it is the wage of the individual worker that should create commitment. For the relational signaling approach, relational concern by employer should show up first and foremost in wages paid to all employees. Generally, the worker cannot interpreted his own wages as a relational signal because it is not clear whether the employer act's out of a specific relational concern or for some strategic reason (such as setting an example for not complaining when performance norms are increased). An employer who wishes to use individual wages as a relational signal must embed them in an array of clear other relational signals, such as intrinsic rewards, the quality of co-worker and worker-supervisor relations, and promotion expectations.

We tested these expectations with data from a survey of manufacturing plants by Lincoln and Kalleberg (1990) in two matched regions in the United States (the Indianapolis area) and in Japan (the Atsugi region). The results are clearly in favor of the relational signaling approach. In Japan, it is only the firm's wage level that creates commitment. Individual wages have no effect at all. In the United States, the firm's wage level also has a strong relation to commitment, but there is also a smaller but still significant effect of individual wages on commitment. As expected, the individual wage effect vanishes when we control for the embedding of individual wages in other relational signals. This clearly confirms the hypothesis that if employers wish to use individual wages as a relational signal, this will only work for commitment if the employer also shows clear relational signals in other areas (in our case: intrinsic rewards, quality of co-worker and of worker-supervisor relations, and promotion opportunities). A big difference between the United States and Japan is that in the former, individual wages are seemingly used in concert with other relational signals whereas in Japan they are not used at all.

This test leaves little confidence in the incentives model of efficiency wages.[3] The sample was sizable as research on wage effects goes (4567 employees in 52 American firms, and 3735 employees in 46 Japanese firms) and allowed the multilevel tests necessary for comparing individual versus firm level wages. At the same time, the test considerably increased confidence in the relational signaling approach and encourages more research in this direction in the future.

Acknowledgements

Notes

[1] Experimental results, in contrast, are much more in line with the relational signaling model (see Fehr et al., 1998; Fehr and Falk, 1999; Gächter and Falk 2002).

[2] The alternative procedure is to calculate the relative wage position of the worker as a sum of the wage residual of the individual worker and the wage residual (random intercept) at the level of organizations. The latter procedure looks more elegant, but risks a loss of statistical efficiency given that a two-step procedure is used to estimate the impact of the relative wage position of the worker.

[3] Of course, it is always possible to make the incentives model behave "as if" it were relational, for example by interpreting the signaling as solving a situation of incomplete information by the employee on the employer's changeable gain and social preferences. However, this will only be a formal exercise because it is only possible post hoc after framing theory has already identified what the relevant preferences are and why and how they are changeable. For example, Margolis tried to incorporate the relational aspect straight into the microeconomic model (Margolis, 1982). Some years later, he observed that "I've become much more aware of the need to augment the mechanical calculus of rational choice with allowance for how flesh-and-blood cognition and perception actually work" (Margolis, 1990, p. 244).

References

Agell, J. and P. Lundborg: 1995, "Theories of Pay and Unemployment: Survey Evidence from Swedish Manufacturing Firms", *Scandinavian Journal of Economics* 97: 295–307.

Akerlof, G.A.: 1982, "Labor Contracts as Partial Gift Exchange", *Quarterly Journal of Economics* 97: 543–569.

Akerlof, G.A.: 1984, "Gift Exchange and Efficiency Wages: Four Views", *American Economic Review* 74: 79–83

Akerlof, G.A. and J. Yellen: 1990, "The Fair Wage-Effort Hypothesis and Unemployment", *Quarterly Journal of Economics* 105: 255–283.

Allgulin, M. and T. Ellingsen: 2002, "Monitoring and Pay", *Journal of Labor Economics* 20: 201–216.

Becker, G. and G. Stigler: 1974, "Law Enforcement, Malfeasance, and the Compensation of Enforcers", *Journal of Legal Studies* 3: 1–18.

Bewley, T.: 1999, *Why Wages Don't Fall during a Recession* (Cambridge, MA: Harvard University Press).

Bryk, A.S. and S.W. Raudenbusch: 1992, *Hierarchical Linear Models* (Newbury Park: Sage).

Cappelli, P. and K. Chauvin: 1991, "An Interplant Test of the Efficiency Wage Hypothesis", *The Quarterly Journal of Economics*: 769–787.

De Dreu, C.K.W. and T.L. Boles: 1998, "Share and Share Alike or Winner Take All?: The Influence of Social Value Orientation upon Choice and Recall of Negotiation Heuristics", *Organizational Behavior and Human Decision Processes* 76: 253–276.

Doeringer, P.B.: 1991, "The Socio-Economics of Labor Productivity", in R.M. Coughlin (ed.), *Morality, Rationality, and Efficiency* (Armonk, London: M.E. Sharpe), pp. 103–118.

Ewing, B.T. and J.E. Payne: 1999, "The Trade-off between Supervision and Wages: Evidence of Efficiency Wages from the NLSY", *Southern Economic Journal* 66: 424–432.

Fehr, E. and A. Falk: 1999, "Wage Rigidity in a Competitive Incomplete Contract Market", *Journal of Political Economy* 107: 106–134.

Fehr, E., E. Kirchler, A. Weichbold and S. Gächter: 1998, "When Social Norms Overpower Competition: Gift Exchange in Experimental Labor Markets", *Journal of Labor Economics* 16: 324–351.

Gächter, S. and A. Falk: 2002, "Reputation and Reciprocity: Consequences for the Labor Relation", *Scandinavian Journal of Economics* 104: 1–26.

Goldstein, H.: 1995, *Multilevel Statistical Models* (London: Edward Arnold).

Groshen, E. and A. Krueger: 1990, "The Structure of Supervision and Pay in Hospitals", *Industrial and Labor Relations Review* 43: 1345–1365.

Halaby, C.N.: 1986, "Worker Attachment and Workplace Authority", *American Sociological Review* 51: 634–649.

Kalleberg, A.L. and J.R. Lincoln: 1988, "The Structure of Earnings Inequality in the United States and Japan", *American Journal of Sociology* 94: S121–S153.

Leibenstein, H.: 1987, *Inside the Firm. The Inefficiency of Hierarchy* (Cambridge, MA: Harvard University Press).

Leonard, J.S.: 1987, "Carrots and Sticks: Pay, Supervision, and Turnover", *Journal of Labor Economics* 5: 136–152.

Levine, D.I.: 1993a, "What Do Wages Buy?" *Administrative Science Quarterly* 38: 462–483.

Levine, D.I.: 1993b, "Worth Waiting for? Delayed Compensation, Training, and Turnover in the United States and Japan", *Journal of Labor Economics* 11: 724–752.

Lincoln, J.R. and A.L. Kalleberg: 1990, *Culture, Control, and Commitment* (Cambridge: Cambridge University Press).

Lindenberg, S.: 1988, "Contractual Relations and Weak Solidarity: The Behavioral Basis of Restraints on Gain Maximization", *Journal of Institutional and Theoretical Economics* 144: 39–58.

Lindenberg, S.: 1998, "Solidarity: Its Microfoundations and Macro-Dependence. A Framing Approach", in P. Doreian and T.J. Fararo (eds.), *The Problem of Solidarity: Theories and Models* (Amsterdam: Gordon and Breach), pp. 61–112.

Lindenberg, S.: 2001, "Intrinsic Motivation in a New Light", *Kyklos* 54: 317–342.

Lindenberg, S.: 2003, "The Cognitive Side of Governance", in V. Buskens, W. Raub and C. Snijders (eds.), *The Governance of Relations in Markets and Organizations*. Special Volume of *Research in the Sociology of Organizations*.

Margolis, H.: 1982, *Selfishness, Altruism, and Rationality: A Theory of Social Choice* (Cambridge: Cambridge University Press).

Margolis, H.: 1990, "Dual Utilities and Rational Choice", in J.J. Mansbridge (ed.), *Beyond Self-Interest* (Chicago: University of Chicago Press), pp. 239–253.

Mühlau, P.: 2000, *The Governance of the Employment Relation. A Relational Signaling Perspective*. Dissertation. University of Groningen.

Neal, D.: 1983, "Supervision and Wages Across Industries", *Review of Economics and Statistics* 75: 409–417.

Okuno-Fujihara, M.: 1987, "Monitoring Cost, Agency Relationships and Equilibrium Modes of Labor Contracts", *Journal of the Japanese and International Economies* 1: 147–167.

Podsakoff, P.M., S.B. MacKenzie, J.B. Paine and D.G. Bachrach: 2000, "Organisational Citizenship Behaviors: A Critical Review of the Theoretical and Empirical Literature and Suggestions for Future Research", *Journal of Management* 26(3): 513–563.

Rebitzer, J.B.: 1995, "Is There a Trade-Off between Supervision and Wages? An Empirical Test of the Efficiency Wage Theory", *Journal of Economic Behavior and Organization* 29: 107–129.

Salop, S.C.: 1979, "A Model of the Natural Rate of Unemployment", *American Economic Review* 69: 117–125.

Shapiro, C. and J. Stiglitz: 1984, "Equilibrium Unemployment as a Worker Discipline Device", *American Economic Review* 74: 433–444.

Snijders, T.A.B. and R.J. Bosker: 1999, *Multilevel Analysis. An Introduction to Basis and Advanced Multilevel Modeling* (London: Sage Publications Ltd.).

Van Lange, P.A.M. and D.M. Kuhlman: 1994, "Social Value Orientation and Impressions of Partner's Honesty and Intelligence: A Test of the Might Versus Morality Effect", *Journal of Personality and Social Psychology* 76: 126–141.

Wadwhani, S. and M. Wall: 1991, "A Direct Test of the Efficiency Wage Model Using UK Micro Data", *Oxford Economic Papers* 43: 529–548.

Weakliem, D.L. and S.J. Frenkel: 1993, "Work Discipline in Contemporary Capitalism", *Research in Social Stratification and Mobility* 12: 83–112.

Weiss, A.: 1980, "Job Queues and Layoffs in Labor Markets with Flexible Wages", *Journal of Political Economy* 88: 526–538.

Weiss, A.: 1990, *Efficiency Wages. Models of Unemployment, Layoffs, and Wage Dispersion* (Princeton, NJ: Princeton University Press).

Wielers, R. and S. Lindenberg: 1991, "Beloning en allocatie op een informele arbeidsdeelmarkt", *Mens en Maatschappij* 66: 5–20.