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Commentary

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A new consensus is emerging among labor economists: Wage formation is the result of something more than the interaction of supply and demand. Organizations structure compensation as part of the larger task of structuring incentives and other features of employment relationships. Competitive labor market forces play a role in this design process, but so do many other things.

The core empirical problem posed by this new view of wage determination is understanding the enormous diversity we observe in the structure of compensation. In my view, understanding this diversity is as important to organizational economics as understanding the diversity of species was to natural history in the 19th century. Unlike the natural historians, however, our theoretical prowess far outstrips our empirical knowledge. As a result, our theories are at grave risk of diverting our attention towards the wrong phenomena.

The paper by Bentley Macleod and Daniel Parent is important because it builds a bridge between theory and empirics. I think that it goes about as far as you can with the conventional labor economics data sets. As a result of Macleod and Parent's (henceforth referred to as M & P) efforts, I found myself having to confront directly the issue of how organizationally minded economists should undertake the empirical study of compensation.

THEORY

The authors begin with a very nice exposition of a principal agent model of incentive design. The key points of the model are: (i) incentives are costly because agents are risk averse; (ii) the optimal

incentive contract should pay attention to all informative indirect measures of output (e.g. rudeness by a sales person) as well as output (sales). M & P correctly observe that compensation is not nearly as responsive to these direct and indirect performance measures as our model would suggest. The question then becomes what's wrong with the principal agent model? What follows are some answers.

Complex Tasks

The most novel feature of M & P's analysis of principal agent models is their analysis of how difficult it is to write a complete contract when tasks are even a little bit complex. In their framework, the cost of implementing a complete contract is $n^k m^k \gamma$ where k is the number of tasks, γ is the cost of writing a contract provision, and n and m are the number of productivity and cost levels associated with each task. Because costs increase exponentially with the number of tasks, an optimal contract can't be written when there is even a small amount of complexity. The clear implication is that "constrained optimal" incentive schemes (i.e. those designed while taking into account the costs of writing complex contracts) will typically focus on a subset of informative actions and outcomes.

If complexity causes firms to operate with incentives that do not include all informative measures of input and output, then multi-task issues must be very commonplace. Multi-task models apply to settings where only a subset of value creating activities can be metered and incented. In a multi-task world, high powered incentives are costly because they divert effort and attention away from valuable, but hard to meter, activities.¹ M & P go on to suggest that the problem of contract complexity can be resolved by relational contracts (i.e. incentive arrangements that rely on noncontracted, *ex post* rewards based on the subjective evaluations of the

¹ Holmstrom and Milgrom (1991) argue that some multi-task problems can be reduced by the design of jobs.

supervisor). This is an interesting claim. I don't think, however, that M & P adequately address the question of how subjective, *ex post* evaluations solve the complexity problem.

I see two classes of answers to this question. The first answer focuses on subjective evaluations of complex behaviors. Human beings are very good at parsing information that is very complex and messy. We can form accurate judgements about things that we couldn't begin to write down in an explicit contract or algorithm. Think how easily young children solve the problem of recognizing faces or understanding a sentence, both problems that are notoriously difficult to write down explicitly. Subjective impressions about the contributions of individual employees may, therefore, be a "good enough" foundation on which to anchor incentive pay. The second approach focuses on timing. By relying on *ex post* assessments, managers can reduce the complexity of the assessment task because they do not need to consider states of nature that didn't actually occur.

Accepting for the moment that incentive schemes based on subjective, *ex post* assessments and rewards solve the complexity problem, it seems clear that relational contracts raise other problems. In particular, subjective incentive schemes require that supervised employees trust supervisors to fairly assess and evaluate performance.² Arranging things so that employees can trust the subjective assessments of managers is no doubt difficult and costly. I would have liked to see M & P analyze the benefits and costs of relational contracts relative to feasible principal agent contracts (i.e., a contract that relies on a small number of indicators) and to then identify conditions under which one incentive scheme outperforms the other.

Job Design and Problem Solving

The principal agent model takes jobs, or tasks, as given. This view is certainly too narrow. Organizations design both jobs and incentives to elicit desirable behaviors from employees. A theory of

incentives that ignores job design is probably going to get important things wrong.

Casual examination of the literature on high-performance work organizations suggests what organizations want from their employees is problem solving. Specifically, employers increasingly want to combine the tacit information available to front-line employees with their problem-solving skills to achieve higher levels of quality and service. Car manufacturers and steel companies want production workers to use local, tacit information to sustain a process of continuous quality improvement. Insurance companies want their front-line employees (those having direct contact with customers) to have the information, knowledge and communication skills to offer full-service, one-stop shopping to all customers.³

Problem-solving responsibilities (and the associated "soft tasks" like communication and team work) are extremely complex and, following M & P's logic, are probably impossible to fully specify *ex ante*. My impression is that high performance organizations spend at least as much time and effort on job design as incentives. Experts, for example, are divided on the importance of incentives for modern manufacturing, but they are unanimous on the importance of such job-design issues as problem-solving teams and giving employees responsibility for their own quality control. Economics offers only the most rudimentary theory of job design and this lacunae poses a real problem for developing economic theories of incentive design.

The Sociology of Groups

Another limitation of principal agent models (one that M & P are aware of but didn't write about in this paper) has to do with the individualistic nature of the production process in the principal agent model. A large amount of human productive activity takes place in small groups and the sociology of groups must matter for the design of incentives.

In standard principal agent models, incentive pay is costly because employees

² See Baker, Gibbons and Murphy's (1994) analysis of incentive compatible implicit contracts.

³ See Levy and Murnane (1996) and Ichniowski, Shaw, and Prennushi (1997).

are risk averse. Thus, risk aversion causes employers to operate with lower-powered incentives than would otherwise be the case. Small groups, however, create additional incentive costs. If, for example, individuals care about their income relative to others in the work group, firms may eschew high-powered incentives to avoid morale-lowering invidious comparisons. Concerns about morale may cause supervisors with responsibility for performance evaluation to alter their evaluations so that all individuals perform “above the average.” In this way, group sociology will alter the functioning of the relational contracts described by M & P. Group sociology also can make problematic incentives based on objective performance measures. If individuals in groups can engage in mutual help activities, high-powered incentives based on individual output can discourage valuable mutual help activities in groups.⁴

The sociology of small groups does more than create incentive costs. Informal interactions among members of the group can also create additional incentive instruments—notably peer pressure. If individuals in a work group have superior information about local conditions than managers, mobilizing peer pressure can significantly improve performance.

The Social Psychology of Incentives

The principal agent model requires that individuals be rational opportunists. This means that individuals take actions now with expectations about how these actions will influence their future economic welfare. This view of decision-making is ubiquitous in economics but not elsewhere. Consider, for example, the following quote from James March’s *How Decisions Happen*. March argues that rule-following can be more important than rationality in the operation of incentives.

When individuals and organizations fulfill identities, they follow rules or procedures that they see as appropriate to the situation in which they find themselves. Neither preferences as

they are normally conceived nor expectations of future consequences enter directly into the calculus...Rule following is grounded in a logic of appropriateness... The process is not random, arbitrary or trivial. It is systematic reasoning, and often quite complicated. In those respects, the logic of appropriateness is quite comparable to the logic of consequences. But rule-based decision-making proceeds in a way different from rational decision-making. The reasoning process is one of establishing identities and matching rules to recognized situations. (March 1994, p. 57-58)

In a similar vein, some sociologists and a few economists have written about the detrimental effect that high-powered incentives can have on intrinsic motivation. Consider, for example, Akerlof’s (1982) gift-exchange models. In Akerlof’s models individuals are powerfully motivated by a desire to take actions that are appropriate to the relationship they have with their employer. By offering high and stable wages, employers can reduce opportunism by inducing individuals to adopt actions appropriate to a gift exchange. Close monitoring and/or high-powered incentives, in contrast, cause individuals to adopt actions appropriate with a low-trust situation.

Why might high-powered incentives undermine intrinsic motivation? I haven’t found a convincing answer to this question.⁵ One plausible possibility is that incentives work differently depending on the beliefs employees attribute to management’s use of incentives. Close monitoring may send the message that the employer doesn’t believe employees are reliable people. Perhaps high-powered incentives send a similar signal.

Two provocative implications flow from the social psychological view of incentive problems:

- Individuals may be less opportunistic than conventional models suppose; and
- Treating people as if they were opportunistic can create more opportunism.

⁴ These issues are analyzed in Encinosa, Gaynor, and Rebitzer (1998).

⁵ See Kreps (1997) for an intriguing statement of the problem.

These claims are inherently difficult to investigate empirically because the smartest opportunists will shirk only where it is hardest to catch them. If, however, they are correct, the principal agent model profoundly misunderstands the ways in which incentives motivate behavior.

EMPIRICS

M & P's empirical excursions use data from conventional microeconomic surveys (NLSY 88-90 and the PSID) to examine the incidence of different types of compensation.

In the first set of results (Table 1), M & P present cross-occupational variation in the form of compensation. From these results, it is clear that the form of compensation varies in intriguing ways with broad occupational categories. Piece rates, for example, are used widely for precision machine operatives (36.81%) and not for textile operators (9.76%). Not surprisingly, sales workers are frequently paid by commission (37.98%), but so are personal service workers (20.25%). These results are intriguing, but relying on such broad occupational averages may conceal as much as they reveal. My own research on incentives in medical groups has convinced me that there is enormous heterogeneity of compensation arrangements even within narrowly defined physician specialties (Encinosa, Gaynor and Rebitzer, 1998). I would be interested, therefore, in seeing a breakdown of the variation within and between the broad occupation group listed in Table 1.

The second set of empirical results (M & P's Table 2) indicate that occupational characteristics do matter for the incidence of piece rates and commissions. The authors regress the type of compensation an individual receives against occupation-level averages of perceived job autonomy, task completion and variety. The finding that autonomy, task completion and variety matter for the form of compensation is intriguing, but difficult to interpret because it relies upon the interpretations that respondents give to these concepts. My job as an economics professor, for instance,

offers me a great deal of autonomy, variety and task completion. It is not hard to imagine, however, that a manufacturer's representative might report that she also enjoys lots of autonomy, variety and task completion. Does this mean that autonomy, variety and task completion mean the same thing in these two occupations? I don't think so.

Using cross-occupational variation in a small number of job characteristics to explain individual compensation strikes me as especially tricky because of the plethora of omitted variables that may be correlated with occupation-level job characteristics. Piece rates make good sense for manufacturers' representatives but not for university professors, because the product of the former occupation is easy to measure and the output of the latter is complex, multi-dimensional and hard to measure. As this example (and our previous discussion) indicates, some of the most interesting omitted variables are likely to relate to job-design issues because job design and incentives are likely to be jointly determined.

The third set of empirical results in the paper concern the relationship between unemployment rates and the likelihood of bonus pay. M & P ask us to imagine relational contracts in which there are essentially two types of *ex post* sanctions/rewards, dismissal or the payment of a bonus. They argue that as local unemployment rates fall, dismissal threats become less effective, so firms come to rely increasingly on bonuses as an alternative incentive mechanism. This logic implies that the incidence of bonus pay will be a decreasing function of the worker's unemployment rate. If local unemployment rates are a good measure of the worker's alternative job opportunities, we would then expect the incidence of bonus pay to decline as local unemployment increases.

An alternative explanation is that bonuses are a form of profit sharing, and their incidence should, therefore, be positively correlated to firm profits. If industry unemployment rates are a good proxy for profits, we would then expect the incidence

of bonus pay to rise as industry unemployment rates fall.

The results in M & P's Table 3 indicate that the industry unemployment rate has little effect on the incidence of bonuses while the local unemployment rate has a negative impact. I am not convinced by this interpretation of the results. It seems to me that local and industry unemployment rates are poor proxies for the underlying variables of interest. Profits for firms offering geographically restricted services (e.g., hotels, restaurants, hospitals, cabs, etc.) are more likely to be affected by local rather than industry unemployment rates. Profits at manufacturing enterprises also may respond more to local than industry-level unemployment if firms are heavily dependent on a local customer.

M & P's model hypothesis is that relational contracts are not incentive-compatible where the worker faces high unemployment. They investigate this idea using annual unemployment rate variation. Relational contracts, however, depend critically on trust and firms should therefore be loathe to alter them in response to short-term spikes in the unemployment rate. Thus, investigation of M and P's hypothesis should rely on relatively long-term shifts in unemployment. Indeed, an interesting extension of M & P's empirical work would be to examine the effect of short- and long-term movements in the unemployment rate. If short-term movements have more influence on compensation than long-term movements, this would argue against the incentive-compatible, relational contracts.

WHAT WOULD THE RIGHT DATA SET LOOK LIKE?

M & P's paper is important because it takes good and reasonable economic models of compensation and compares their predictions to the patterns visible in the data. The problems they encounter in their empirics stem from the fact that the information collected in conventional micro-economic data sets are simply too distant from the phenomena of interest (i.e., jobs and incentives in organizations).

If I am right that conventional data are not up to task of understanding the determinants of compensation, then what would the right data look like? I think the ideal data set would have the following features:

- Data on a large number of firms in a specific industry and employees in specific jobs;
- Data on the form of compensation contract as well as compensation outcomes;
- Qualitative interviews about what managers and employees see as critical tasks of the job;
- Information on how employee behaviors varied with variation in the form of compensation, intensity of supervision, job design and work setting.

It is clear to me that the demanding data-collection efforts entailed by this list would only be manageable for narrowly focused case studies. For the same reason, it is unlikely that any single study would succeed in collecting data along all four dimensions at the same time. If large numbers of empirical organizational economists joined their colleagues in sociology and went about the business of collecting and analyzing this sort of data, we would be left with a rich assortment of case studies. Each of these studies would be limited and inadequate for developing a general theory of compensation. Taken together, however, these studies could (like the natural histories of 19th century biology) form patterns that we could then use to construct a suitable and general theory of compensation.

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