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Factors influencing award of compensation contracts: an analysis of written protocols

Journal of Managerial Issues

Author Abstract

This study reports the results of an analysis of written protocols collected in a laboratory experiment from 77 subjects while they were making compensation contract selection decisions. Each subject made compensation decisions for four divisional managers operating under them. The researchers varied the level of environmental uncertainty, as well as the level of perceived agent effectiveness. The results show that the type of factors considered by the individuals differed significantly. Subjects indicated that they focused more heavily on one of the two manipulated conditions, but not equally on both. It was also found that, overall, agent effectiveness factors weighed more heavily in the compensation decisions than uncertainty considerations. Additionally, it was found that subjects used some factors in their decisions that were not part of the experimental treatments, lending further evidence to the individuality of influences on compensation contract selections.

The view that compensation should be tied to performance is widespread throughout the organization literature. It is commonly believed that if one wants to motivate high performance, one should attach rewards to it (Eisenhardt, 1988; Fein, 1976; Lawler, 1971, 1981; Pearce et al., 1985; Rubery, 1995).

While a majority of the literature generally advocates contingent pay systems, it is also recognized that under some conditions the implementation of such systems may be dysfunctional. For example, Lawler (1971, 1981) stated that performance contingent pay cannot be used when trust levels are low, when performance cannot be validly and inclusively measured, and when large pay rewards cannot be given to the best performers. Lawler (1971) also acknowledged that under certain circumstances, subjective judgments by superiors and objective performance data should be combined into a managerial performance measure on which pay could be based.

The accounting literature on performance evaluation has also dealt with issues of performance evaluation styles (Hopwood, 1972, 1973; Keely, 1977) and how uncertainty in the operating environment affects performance evaluation and compensation contract decisions (Govindrajana, 1984). In fact, several researchers in accounting and marketing have used techniques such as analytic modeling (Basu et al., 1985; Lal and Srinivasan, 1988; Baiman and Rajan, 1995), field studies (Coughlan and Narasimhan, 1992; Eisenhardt, 1988; John and Weitz, 1988, 1989; Lal et al., 1990; Oliver and Weitz, 1989; Ray and Cushing, 1994), and laboratory experiments (Umanath et al., 1993) to assess the individual and proportionate effects of environmental uncertainty and level of agent (employee) effectiveness on the salary/incentive mix in employment contracts. Of these studies, however, none have analyzed the decision process resulting in the final selection. Accordingly, this study is motivated by 1) the equivocal results obtained to date regarding the effects of environmental uncertainty and agent (employee) effectiveness, and 2) the lack of any decision process-oriented studies in this field.

This research also takes a unique methodological approach in accounting by analyzing the written protocols collected from subjects in a laboratory experiment to assess the impact of environmental uncertainty and agent effectiveness on compensation plan selection. Umanath et al.'s (1993) study used chosen contracts as the dependent variable of interest, thereby focusing on choice behavior. By using the written protocol data from that experiment, this study is the first to focus on the process of compensation contract selection under some controlled conditions.

HYPOTHESIS DEVELOPMENT

Background

Basu et. al (1985) and Lal and Srinivasan (1988) both examined the issue of sales force compensation using an analytic principal-agent framework. The basic principal-agent model has a risk neutral principal and a risk averse agent. The nature of the effort-outcome relationship is stochastic, that is the outcome given high or low effort cannot be determined with certainty. The agent is effort averse and there is a condition of information asymmetry, which implies that the agent has private information about prevailing conditions surrounding his/her work environment that is not available to the principal.

The principal's problem in the agency model is to maximize outcome less the compensation paid to the agent. As two extreme responses, the principal can either select a contract totally dependent on outcome or one that consists of only a fixed salary, neither of which are optimal solutions. A contract totally dependent on outcome would transfer the entire risk to the agent while a fixed salary would fail to elicit the right level of effort. One solution for the principal is to opt for a risk sharing contract which gives the agent a base (fixed) salary and an additional incentive component based on some measure of outcome that is observable.

Hypothesis

Basu et al. (1985) developed the proposition that an increase in uncertainty results in a decrease in the agent's expected compensation and an increase in the ratio of fixed salary to total expected compensation. Lal and Srinivasan (1988) developed the proposition that an increase in agent effectiveness results in an increase in expected compensation and an increase in the ratio of incentive pay to total expected compensation.

These propositions provided the basis for relationships between uncertainty, agent effectiveness and the salary/incentive mix that were tested by Umanath et al. (1993). Of interest to this study is the influence of the two manipulated attributes (agent effectiveness and environmental uncertainty) on the decision process of the principal in arriving at the final incentive/salary compensation contract decision. Since Umanath et al. (1993) collected written protocol data from subjects as they were making their contract selections, these data were used to explore the effect of the two manipulated attributes on the decision process and test for the presence of other nonmanipulated factors that might have been utilized by the subjects. The theoretical predictions and their explanations, therefore give rise to the following general hypothesis relating to the principal's decision process:

[H.sub.1]: The attributes Agent Effectiveness and Environmental Uncertainty will both be considered in the process of compensation contract selection.

OVERVIEW OF THE EXPERIMENT

Subjects

Fifty-eight male and 21 female first-year MBA students from a major university participated in the study. The average age for the group was 25. Seventy-seven percent had prior work experience, the average experience being three years. All subjects had an educational background in management and most had been exposed to performance reviews in their jobs. Finally, two subjects were eliminated from the analysis for failure to complete the written requirement of the task, leaving useable responses from 77 subjects.

Setting and Task

The subjects played several rounds of a simulation game - Business Management Laboratory (BML). The BML is a management game simulator where the administrator can control industry as well as firm-specific parameters. The simulated decisions pertain to considerations of plant expansion/contraction, marketing,

sales, finance, production and strategic planning. Courtney et al. (1983) demonstrated how BML can simulate structured as well as various degrees of ill-structured tasks in operations control, tactical, and strategic management scenarios.

In the experimental session, subjects played the role of CEOs (principals) and assigned compensation contracts from a given set to four Divisional Managers (agents). Subjects were told that the profits for each of four divisions, after subtracting compensation, would be pooled and converted into experimental points. The cash award for each subject (out of a total pool of \$600) would be determined by spinning a prize wheel, with the win area being a function of total experimental points earned. The prize wheel was used to operationalize the theoretical assumptions of a risk neutral principal and a risk adverse agent, using the methodology suggested by Berg et al. (1986).

The compensation plans chosen by the subjects were coded from one to ten. A value of one indicated a fixed salary and contracts two through ten reflected an increase in expected compensation coupled with a decrease in base salary.

Treatments

Environmental uncertainty was operationalized in terms of the subjects' perception of uncertainty. The treatment was designed to simulate two levels (high and low) of uncertainty as perceived by the subjects. The low uncertainty divisions were described as being fairly well established, focused in a small, relatively homogeneous area, and marketing a single insurance product that had been refined over a number of years to fit customer needs. In addition, they were described as having minimal turnover, were free from training and union-related problems and facing only four competitors who had equal market share. The high uncertainty divisions were described as operating on a nationwide basis, offering several policy products, facing stiff competition from seven competitors and experiencing volatile growth rates. Personnel training and motivation, union-supported work slowdowns, and strikes often disrupted operations.(1)

Since the pretreatment sessions with the BML simulator enabled subjects to experience each of these conditions directly, we expected subjects to perceive the former scenario as depicting a lower environmental uncertainty and the latter a higher environmental uncertainty.

Agent Effectiveness, the second independent variable, was manipulated in terms of contrasting track records/training, and two descriptive surrogates of skill: experience and education. Prior to the experimental task, the subjects participated in an exercise that was designed to induce this treatment. The subjects were asked to examine the description of the four agents and then respond to a question about the degree to which each agent could influence outcome through effort.

Post-test manipulation checks in the form of self-report questions verified inducement of differential perceptions of environmental uncertainty and agent effectiveness across the simulated qualification sets (Umanath et al., 1993).

Written Protocols

The subjects were required to assign compensation contracts to each of the four divisional managers working for them (i.e., one more effective and one less effective agent working in the high uncertain environment, and one more effective and one less effective agent working in the low uncertain environment). As they made their contract selections, subjects were instructed to concurrently write down in brief the reasons for their choice of each contract. These unstructured written protocols were used in this study to test for the presence of the attributes of uncertainty and effectiveness, and explore in more detail how individual subjects responded to the experimental treatments in arriving at final compensation decisions.

METHODOLOGY

Background

Several accounting researchers have utilized differing methodologies in assessing written communications. Frazier et al. (1984) proposed the use of a structured computer program using imputed words to analyze narrative accounting disclosures. However, most accounting researchers have employed a less structured approach similar to the one used in this study. Dillard and Jensen (1983) and Geiger (1989) analyzed written responses to the Auditing Standard Board's Exposure Drafts. Klein (1978), Brown (1981) and Puro (1984) assessed comment letters written to the Financial Accounting Standards Board. Cushing and Loebbecke (1986) analyzed audit approaches of national accounting firms by examining their internal manuals and documentation. Wallace (1981) examined internal control reporting in the municipal sector; Carcello et al. (1991) examined auditors' free responses to survey questions concerning public accounting; and several researchers have examined corporate annual reports and disclosures (Smith and Smith, 1971; McConnell et al., 1986; Schroeder and Gibson, 1990). All of these studies have attempted to identify specific factors or categories of communication within the written messages (e.g., agreement with the FASB Exposure Draft, existence and type of internal control disclosure, and items discussed in management letters). No prior work in accounting, however, has analyzed written protocols derived from a laboratory experiment.

Although experiments are conducive to theory testing (Calder et al., 1981), we argue that an evaluation of unstructured written protocols adds richness to the analysis and yields valuable insights into the decision process (Mossholder and Harris, 1995). Having subjects indicate briefly the reasons for their decisions in a free-form style allows for the responses to be unbounded by the researcher's predetermined conceptualizations of the types of factors that should, or might, influence compensation decisions. Giving subjects a list of possible factors to be checked if they were considered, for example, imposes unnecessary constraint on the responses of the subjects, could possibly influence the subjects, and would not provide new insight into the factors considered in the compensation decision process. Also, having subjects briefly write down the influences on their decision concurrently with their decision eliminates a possible reflection bias of asking for their reasoning after all decisions are made, or at some later time period. It also imposes minimal disruption to their individual thought processes since we asked for, and received, only brief indications of the influence on their decision. Having subjects write down in detail all of the factors considered would have unnecessarily disrupted their decision-making process. The approach taken in this study for obtaining written protocols was believed to have been not unduly burdensome and yet effective in capturing the salient influences on subjects' compensation decisions.

Analysis of Experimental Protocols

Holsti (1969) and Krippendorf (1980) indicate that a valid analysis can only be performed if proper categories are established to represent the latent communications. In order to establish these categories, each subject's response was independently read twice by two researchers and separate lists of influence categories were derived. These two sets were then compared to arrive at a final set of 32 categories necessary to capture the influence factors indicated by the subjects. Of the final set, 24 categories (12 categories each) addressed issues related to environmental uncertainty and agent effectiveness. The remaining categories represented miscellaneous factors not directly attributable to either environmental uncertainty or agent effectiveness (e.g., effect of bonus on overall profits, compensation parity/discrimination). These remaining categories were not often cited and, accordingly, were excluded from the primary analysis.

A dichotomous coding scheme was employed for the existence or nonexistence of each of the categories for each compensation evaluation. If an attribute was identified as being present in the response, the corresponding category was coded a "1," and if the attribute was not present the category was coded a "0." Holsti (1969) indicates that the dichotomous decision technique has the advantage of facilitating focus on a single decision at a time and it is particularly useful when many categories are employed. In addition, the use of dichotomous coding implies that the mean of each category is also the proportion of evaluations that considered the particular characteristic. Dichotomous codings are also both easy to interpret and increase the feasibility of statistical evaluation of the information.

The two primary coders independently reread (i.e., the third reading) and coded the subjects' responses as to the existence/non-existence of each of the content categories. A total of 7,392 categories were evaluated by each researcher (77 subjects x 4 evaluations x 24 categories). An ex post comparison of the two codings revealed an overall agreement of 97 percent across all categories reported in this study. Additionally, the computed Kappa coefficient of inter-rater agreement was found to be very strong at .864 (Fleiss, 1981).

The results of the independent codings, as a partial reliability check, indicated that no significant researcher bias was apparent in the final data set and also confirmed the comprehensiveness of the established categories. Any initial coding differences were reevaluated by both researchers and resolved in arriving at the final coding.

RESULTS

The results of the protocol analysis support the study's general hypothesis that both environmental uncertainty and agent effectiveness were considered by the subjects in their compensation plan selection process. Table 1 presents the overall mean and total number of times subjects identified the various factors in their decision-making process.

Overall, the subjects identified a slightly greater total number of agent effectiveness characteristics than environmental uncertainty characteristics (496 and 432, respectively) for an average over the 77 subjects of 6.44 and 5.61, respectively. "Experience in the field" was the only attribute mentioned by more than half the subjects (53.2%), indicating its high priority as an aid in compensation plan selection. Of the remaining effectiveness characteristics, the Divisional Manager's "Level of ability" (30.2%) and "need to provide the manager with an incentive" (23.7%) were also highly utilized in the subjects' decision process. The environmental factors most often considered were: "market growth rate" (31.5%), the "level of competition in the market" (24.4%), and "perceived risk in the market" (23.4%).

Table 1
Attributes Indicated as Influencing Compensation Plan Selection

ATTRIBUTE RESPONSES	MEAN RESPONSE FREQUENCY	RANK	TOTAL
Agent Effectiveness:			
Experience in Field(*)	0.532	(1)	164
Level of Ability(*)	0.302	(2)	93
Need to Provide the Manager Incentives (+)	0.237	(3)	73
Educational Background(*)	0.143	(4)	44
Need to Provide Manager with Satisfying Bonus (+)	0.120	(5)	37
Ability to Affect Growth Rate(*)	0.117	(6)	36
Ability to Affect Market Share(*)	0.101	(7)	31
Need to Provide Manager with Job Security (+)	0.023	(8)	7
Willingness to Work (+)	0.013	(9)	4
Decision Making Ability(*)	0.010	(10)	3
Problem Solving Ability(*)	0.010	(11)	3
Intelligence (+)	0.003	(12)	1
			496
Environmental Uncertainty:			
Market Growth Rate(*)	0.315	(1)	97
Level of Competition(*)	0.244	(2)	75
Perceived Risk in Market(*)	0.234	(3)	72
Perceived Workload to Compete			

Effectively(+)	0.149	(4)	46
Geographic Area(*)	0.127	(5)	39
Availability of Managerial Replacements(+)	0.101	(6)	31
Number of Products(*)	0.091	(7)	28
Unionized Workforce(*)	0.071	(8)	22
Current Market Share(*)	0.039	(9)	12
Probability of Future Problems(+)	0.016	(10)	5
Research & Development(*)	0.010	(11)	3
Need for Sales Leadership(+)	0.006	(12)	2

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Note: The numbers in parenthesis represents the rank of the mean response frequency of each attribute mentioned by the subjects.

* Denotes characteristic that was part of the operationalization.

+ Denotes characteristic that was not a part of the operationalization (i.e. treatment).

A close examination of Table 1 reveals that the subjects considered several characteristics that were not explicitly conveyed via the treatments (items marked with a "+" in Table 1). With respect to environmental uncertainty, the factors "perceived workload to compete effectively" (ranked 4th) and "availability of managerial replacements" (ranked 6th) appeared the most often. With respect to agent effectiveness, the factors "need to provide incentives" (ranked 3rd) and "need to provide managers with satisfying bonus" (ranked 5th) were also not part of the formal treatments.

The references to workload and the need to provide incentives implies that the subjects wanted the Divisional Managers (agents) to exert greater effort under conditions of higher uncertainty. The hypotheses derived by Basu et al. (1985) and Lal and Srinevasan (1988) contained an assumption that under conditions of higher uncertainty the principal will prefer that the agent supply a lower level of effort as the marginal cost of eliciting effort exceeds the benefit. The results of the experimental protocols indicated that the subjects thought differently.

A separate t-test on the total number of agent effectiveness characteristics versus environmental uncertainty characteristics (mean of 6.44 and 5.61, respectively) indicate no significant differences for this group of subjects (p [less than] 0.91). However, the correlation of the aggregate number of agent effectiveness characteristics with the aggregate number of environmental uncertainty characteristics by each subject was found to be significantly negative ($r = -0.21$; $p = .068$).

These results suggested that individuals differed in the type of attributes they evaluated in determining compensation contracts for their agents. While the total number of effectiveness and uncertainty factors considered were the same for the group, the type of characteristics evaluated by the individuals were vastly different. Seldom did individuals evaluate equal numbers of factors from the two experimental manipulations. During the process of selecting compensation contracts, subjects appeared to evaluate environmental uncertainty factors to the relative exclusion of the agent effectiveness factors, or vice versa.

The largest number of agent effectiveness factors or environmental uncertainty factors indicated by any individual was 7 for each type. In order to determine whether the level of compensation selected for each manager was dependent on the number or type of factor evaluated, a two-way ANOVA for unbalanced data was performed. Table 2 presents the results of the ANOVA and indicates that while the actual number of environmental uncertainty factors evaluated was not associated with compensation plan selection ($p = 0.491$), the number of agent effectiveness factors was significantly associated with higher compensation ($p = 0.031$).

This result implies that the subjects tended to compensate more for increased numbers of agent effectiveness characteristics identified than for increased environmental uncertainty considerations facing managers. One possible explanation is that the subjects perceived the Divisional Managers as being more directly

responsible for their "personal" effectiveness attributes, but less apt to directly affect the environment in which they operate. In addition, the subjects may have only identified personal characteristics when they tended to provide evidence of higher levels of effectiveness, leading to choice of larger compensation contracts with higher proportion of incentives.

Table 2
Effect of Agent Effectiveness and Environmental Uncertainty
Attributes on Compensation Plan Selection

VARIABLE: Compensation Plan Selected

SOURCE	DF	F	p VALUE
Model	12	1.62	0.084
Error	295		
Agent Effectiveness	6	2.34	0.031
Environmental Uncertainty	6	0.90	0.491

Further analysis was conducted to explore whether the levels of agent effectiveness or environmental uncertainty affected the factors that were considered by subjects in determining compensation levels. In order to address these two questions, several two-way ANOVAs were performed using the level of effectiveness (low/high) and the degree of environmental uncertainty (low/high) as independent variables, and the number of agent effectiveness characteristics, number of environmental uncertainty characteristics and total number of characteristics analyzed as dependent variables in three separate models. Table 3 presents the results of these analyses.

As expected, more effectiveness characteristics were evaluated (Panel A) when the manager's effectiveness increased ($p = 0.003$) than when environmental uncertainty increased ($p = 0.197$). Likewise, significantly more environmental uncertainty characteristics were assessed (Panel B) when the operating environment became more uncertain ($p = 0.333$) than when agent effectiveness increased ($p = 0.145$). The findings also provide evidence that the experimental manipulations were effective in that subjects attended to more condition specific characteristics when those conditions were manipulated.

In assessing the overall number of characteristics evaluated (Panel C), the level of environmental uncertainty played a significant role ($p = 0.008$), while the level of agent effectiveness did not ($p = 0.215$). This result suggests that, overall, more attention may have been directed toward environmental uncertainty characteristics than agent effectiveness factors. However, when coupled with the results presented in Table 2, these more numerous environmental characteristics did not influence the compensation decision as heavily as the agent effectiveness characteristics in deciding on the final compensation plan.

CONCLUSIONS

Based on the analysis of subjects' written protocols, there are several major conclusions of this paper. First, it was found that, as anticipated, both environmental uncertainty and agent effectiveness attributes were considered in the compensation contract selection process. In the aggregate, both treatments received the same relative attention based on the number and type of characteristics that were listed as influencing subjects' compensation decisions. However, the analysis also indicated that the two treatments had varying effects on what characteristics individual subjects considered in their decision process. Subjects were found to focus more heavily on one of the two manipulations by identifying more factors associated with either environmental uncertainty or agent effectiveness, but not equal numbers of both.

Table 3
Characteristics Evaluated Under Different Conditions

PANEL A
VARIABLE: Agent Characteristics

SOURCE	DF	F	pVALUE
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Model	2	5.40	0.005
Error	305		
Agent Effectiveness	1	9.12	0.003
Environmental Uncertainty	1	1.68	0.197

PANEL B

VARIABLE: Environmental Characteristics

SOURCE	DF	F	pVALUE
Model	2	3.37	0.036
Error	305		
Agent Effectiveness	1	2.14	0.145
Environmental Uncertainty	1	4.60	0.033

PANEL C

VARIABLE: Total Characteristics

SOURCE	DF	F	pVALUE
Model	2	4.36	0.014
Error	305		
Agent Effectiveness	1	1.55	0.215
Environmental Uncertainty	1	7.16	0.008

The results also indicated that the more agent effectiveness factors evaluated, the higher was the compensation level and the proportion of incentives in the contract. In addition, as expected, increased numbers of effectiveness characteristics were considered under conditions of higher agent effectiveness, and under conditions of higher uncertainty the subjects considered a greater number of environmental factors. The manipulation of environmental uncertainty was found to cause significantly more factors to be evaluated than that of agent effectiveness. These combined results indicate that the subjects assigned different weights to the two treatments, and that in the aggregate the agent effectiveness characteristics influenced the compensation decision more heavily than the environmental uncertainty considerations.

Some limitations of the study, however, need to be mentioned. First, the results of this laboratory experiment should not be directly generalized to field settings without further work. Also, although believed to be accurate and representatives of the subject's thought processes, the results of the study are limited to the extent that the written protocols reflect the actual influences on the subject's compensation decisions (Krippendorff, 1980). Finally, the possibility that writing down influential factors affected the actual decision or the decision process is a possible limitation (Klersey and Mock, 1989; Mossholder and Harris, 1995).

Notwithstanding these limitations, the findings of the study are important in that they demonstrate a condition where overall the group of evaluators appears to equally consider both types of influences, but in fact, the individual decision makers evaluated the identical situations very differently. Some subjects indicated only personal effectiveness characteristics influenced their compensation decisions to the exclusion of identifying any environmental characteristics, and vice versa.

In managerial settings, the process of compensation plan design should therefore be aimed at identifying the factors that, when combined with plan design, are expected to influence performance. In addition, compensation plan design must incorporate and reflect top management preferences about desired effort levels under different circumstances. Accordingly, it must be recognized that different factors are evaluated and weighted differently by individuals in making compensation assessments of agents and subordinates, even in controlled, identical situations. Acknowledging and allowing for these individual differences must be made an integral part of any compensation decision procedure.

The study also found that subjects considered several issues that were not a direct part of the experimental treatments. References to workload, availability of managerial replacements, the need to provide a satisfying bonus and job security were all mentioned by subjects but were not part of the controlled experimental

manipulations. These and other factors may be brought into the compensation decision process regardless of situation. This finding is another reflection of the individuality of the decision makers and from a methodological point of view, reaffirms the need to use unstructured, open-ended questions when assessing an ill-structured decision-making process. Some of these items would undoubtedly have been neglected if only a checklist approach was adopted for soliciting these responses.

The findings also indicate that more investigation needs to be performed on the process of compensation contract determination. This study found that different relative weights were accorded to the attributes of environmental uncertainty and agent effectiveness by individuals, as well as to the various characteristics of these attributes. Examining these and other issues, along with the relative level (high/low) of attribute evaluated, appears to be fertile ground for future compensation research.

This study also adds to the literature that finds managers do not always make seemingly rational managerial decisions. While the compensation contract literature suggests that managers should select smaller contracts with higher proportionate fixed pay when environmental uncertainty increases, this study found the opposite effect. Additional empirical research needs to further explore this discrepancy. Do individuals perceive increased environmental uncertainty similar to increased operating complexity and over-reward managers for operating in these environments by not fully evaluating the reduced overall expected benefit to the firm? Future research should further investigate the effect of environmental uncertainty on the compensation contract selection outcome and decision process.

1 These components of environmental uncertainty were derived from a set of factors identified by Duncan (1972).

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