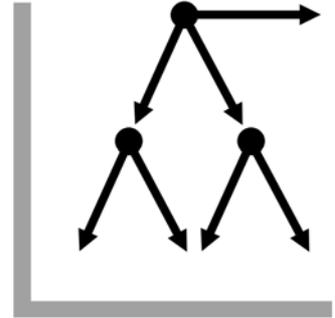


**DISCUSSION
PAPER SERIES
IN ECONOMICS
AND MANAGEMENT**



**An Empirical Examination
of Economic Rationales for Companies'
Use of Sales Contests**

**Murali K. Mantrala &
Manfred Krafft &
Barton A. Weitz**

Discussion Paper No. 00-07

**GERMAN ECONOMIC ASSOCIATION OF BUSINESS
ADMINISTRATION - GEABA**

An Empirical Examination of Economic Rationales for Companies' Use of Sales Contests

by

Murali K. Mantrala
Associate Professor of Marketing
Warrington College of Business Administration
University of Florida
Gainesville, FL. 32611
E-mail: Mantrala@Dale.CBA.UFL.EDU

Manfred Krafft
Otto Beisheim Professor of Marketing
Koblenz Graduate School of Management
Koblenz, Germany
E-mail: krafft@whu.edu

Barton A. Weitz
J.C. Penney Eminent Scholar Professor of Marketing
Warrington College of Business Administration
University of Florida
Gainseville, Fl. 32611
E-mail: Bweitz@dale.cba.ufl.edu

October 23, 1999

Revised: November 15, 1999

*This work is confidential. Please do not cite or circulate without permission from the authors. Comments are welcome. Preliminary results of this work were presented at the 1997 INFORMS Marketing Science Conference at University of California, Berkeley and the EMAC 1998 Conference at the Stockholm School of Economics. The authors thank participants at those meetings for their comments. The first author is currently a Consultant at ZS Associates, Evanston, Il., and thanks Andy Zoltners and Prabhakant Sinha for their support of this research.

Abstract

An Empirical Examination of Economic Rationales for Companies' Use of Sales Contests

The use of sales contests in sales force management is growing in popularity and receiving increasing allocations of sales budgets in many industries. So far, however, the sales management research literature offers little guidance on why and when firms benefit from employing “open-ended” and/or “closed-ended” sales contests instead of regular commission or quota-based bonus plans to motivate their sales forces. In this article, the authors review economic agency and tournament theory-based rationales for the use of contests as incentives. Based on this review, the authors develop a number of hypotheses about the effects of various characteristics of the selling environment, sales force, sales force control and regular sales force compensation plan, on the likelihood of companies being users of sales contests in general and closed-ended sales contests in particular. The hypotheses are tested on data from two independent surveys of sales organizations in the USA and Germany and many receive empirical support, suggesting that the agency- and tournament-theoretic models can usefully serve to guide sales managers' use and design of sales contests in the future.

The development of efficient and effective sales force compensation and motivation programs is an issue of major concern in many industries. Recent research by marketing scientists has thrown light on when different forms of *regular (or annual)* sales force compensation plans are efficient to use as well as yielded models and prescriptions for their optimal design (see, e.g., Coughlan and Sen 1989, Coughlan 1993 and Albers 1996 for reviews). Many companies, however, employ a variety of special *sales incentive programs* in addition to the regular compensation plan to motivate their sales forces. The most common format of such programs is the *sales contest* in which salespeople can win prizes, e.g., cash, merchandise, or travel awards, for surpassing a specified own sales goal or other salespeople's performances in some special short-term sales campaign. So far, however, the sales management research literature offers little guidance on why and when firms benefit from employing sales contests instead of regular commission or quota-based bonus plans to motivate their sales forces. This paper attempts to fill this gap in research by empirically examining predictions about the influence of various characteristics of the selling environment, sales force, sales force control system and regular sales force compensation plan on companies' use of sales contests drawn from the theoretical economics literature. The empirical tests are based on data collected in two independent surveys of sales organizations, one conducted in the USA and the other in Germany.

The motivation for this research stems from the significant and growing expenditures on sales contests in many industries. For example, annual sales incentive expenditures of US companies rose from about \$1.6 billion in 1971 to over \$7.8 billion in 1988 (Chrapek 1988). By the end of 1996, annual expenditures on travel and merchandise awards disbursed as prizes in sales and dealer incentive programs crossed \$16 billion dollars according to surveys conducted by the trade journals *Incentive* and *Sales & Marketing Management* (Alonzo, 1997a, 1997b).

Moreover, sales incentive programs are prevalent in all industries employing sales forces or selling agents. For example, sales contests have been sponsored by over two-thirds of consumer product companies and over half of all industrial goods companies (Eisman, 1993), and are becoming increasingly popular in services industries such as banking, financial services (Jucha 1997, Morrall 1996), and hotels (Kaydo 1998). Similar trends are observed in other countries. In Germany, for example, 65% of all firms with sales forces run sales contests with an average budget of about 280,000 DM a year (Kienbaum 1998, p. 64). Lastly, it has been estimated special sales incentive programs yield over \$40 billion of increased revenues (Salerno 1985).

This paper focuses on two major issues: First, why do firms use sales contests and under what conditions does the use of contests offer advantages over other sales force incentive mechanisms? The common response in the sales management literature is that firms use sales contests to excite and motivate agents to put in extra efforts to achieve special short-term sales goals e.g., (Churchill et al., 1997; Ingram et al., 1997; Stanton et al., 1995, Murphy and Dacin 1998). This view emphasizes the stimulating effects of participation in a competitive event on workers' efforts. However, this "joy-of-competition" perspective provides little insight into the issues of *how and when do sales contests serve a firm better than modifications in regular sales force compensation components, e.g., salary, sales commissions, annual bonuses, to meet its goals?*

A second and more specific question of interest that we study is *when are contests in which salespeople compete with each other for the available prizes more advantageous to use than those in which salespeople must beat some given own sales goal to win a prize or special bonus?* In the sales management literature, contests in which salespeople must beat some individualistic sales goal are called *open-ended* while those in which *relative performance, e.g., rank-order of performances, determines prize-winners*, are known as a "*closed-ended*" contests. In an open-

ended contest, every salesperson has a chance of winning a prize and the number of prizes that will be actually awarded in the end is not known in advance. On the other hand, in closed-ended contests, only a pre-specified number of top performer/s in the event receive prizes of known values. The choice between the open-ended and closed-ended contest formats is a much-debated one in sales management. The majority consensus appears to be in favor of the former type. Proponents of open-ended contests argue that “everyone can win” under this format while salespeople who fail to win in closed-ended contests will be left demoralized and disgruntled. Few commentators, however, have probed the conditions under which closed-ended contests may be more advantageous to *both firms and their sales forces* (e.g., Berger 1997, Cohen 1996, Colletti et al 1988, Wildt, Parker and Harris 1980/81).

To investigate these issues, we review recent models of worker incentives and “tournament” reward systems in the labor and personnel economics literature (see, e.g., McLaughlin 1988, Lazear 1998). Based on these models and earlier agency-theoretic research, we develop hypotheses about the product, market environment, sales force and regular compensation plan characteristics that increase the likelihood that (1) a firm is a sales contest user; and (2) a firm that uses contests is a closed-ended contest user. These hypotheses are tested using data provided by 118 respondents to a cross-sectional survey of US sales organizations and 270 respondents to a similar but independent survey conducted in Germany. To the best of our knowledge, these are the first such empirical studies of the predictions of economic tournament theory in either the fields of marketing or economics. Finding empirical support for these predictions would not only establish the value of this theoretical perspective for understanding the use of sales contests but also justify its application to the optimal design of sales contests, an area lacking any normative model at present.

The next section of the article provides brief reviews of the existing agency theory-based sales force compensation research and the more specialized tournament-theoretic economics literature.¹ Based on these reviews, we develop the two sets of economic theory-based hypotheses about how various selling environment and sales force characteristics influence companies' use of sales contests in general and closed-ended contests in particular. The data and methods employed in the empirical analyses are described next followed by a discussion of the results. The paper concludes with a summary of the overall results, managerial implications and directions for further research.

Economics Literature Review

Agency-theoretic research on regular sales force compensation plans:

The agency-theoretic paradigm of the information economics literature has proven very useful for understanding how firms should structure compensation contracts to induce desired behavior and levels of work efforts from their employees and agents. In particular, agency theory has led to important advances in understanding optimal sales force compensation policies in different environments. As shown in Table 1, the sales force compensation research literature has progressed from finding solutions to relatively simple incentive contracting problems involving a single agent to more complicated multiple-agent problems. Below, we briefly review this progress in research and how our present work is positioned relative to this literature.

¹ There exists considerable descriptive research on the popularity of sales contests and their perceived effectiveness (see, e.g., Churchill et al., 1997, Ingram et al., 1997, Stanton et al., 1995, Wildt, Parker and Harris 1980/81, Wotruba and Schoel 1983) as well as a fair amount of empirical research on salespeople's perceptions/attitudes toward various contest design elements, motivation and performances during sales contests e.g., Wildt et al. 1987, Beltramini and Evans 1988, Moncrief, Hart and Robertson 1988, Hart, Moncrief and Parasuraman 1989, Murphy and Sohi 1996; see, Murphy and Dacin 1998 for a recent review of these works). This entire body of research, however, ignores the theoretical economics rationales for the use of contests that we investigate in the present paper.

Single Agent – Individualistic Contracts. A basic agency-theoretic proposition is that if a salesperson's effort can be perfectly monitored without cost then the firm's best compensation alternative for that agent is to pay him/her a fixed dollar amount per hour of selling effort (e.g., Lazear 1986). However, many marketing organizations employ field salespeople assigned to independent geographic territories away from headquarters and it is usually difficult and/or costly for management to directly monitor the input efforts of these salespeople. How then should a field salesperson be compensated? If sales outputs of these efforts can be easily measured and monitored then the answer is an output-based incentive pay plan like a straight commission plan. Much of the early research on sales force compensation policies, e.g., Farley (1964), and Srinivasan (1981), focused on the optimal design of straight commission plans for a single salesperson operating in a deterministic sales environment, ignoring the real-world complication of sales response uncertainty (see, e.g., Coughlan and Sen 1989). The consideration of sales uncertainty becomes especially important when a salesperson's utility function displays aversion to risk. In such circumstances, agency theorists (e.g., Holmström 1979) have shown that the optimal incentive solution is a risk-sharing plan consisting of fixed plus variable pay components. Following this perspective, Basu et al. (1985) established that a fixed salary plus sales commission plan is optimal to employ with respect to a risk-averse salesperson, assuming both the sales manager and salesperson are equally well-informed about the stochastic sales-effort relationship and other parameters of the problem. Further work, e.g., Basu and Kalyanaram (1990), and Lal and Srinivasan (1993) showed that a linear salary plus commission plan would be optimal or near optimal for motivating a salesperson displaying any of the common forms of risk-aversion.

Multiple Agent – Individualistic Contracts. While the work of Basu et al. (1985) allowed for sales response uncertainty, it effectively assumed a single person or homogeneous sales force

and thus ignored the additional complications of *asymmetric information* combined with *sales force heterogeneity* that usually exist in reality (e.g., Albers 1996). Information asymmetry exists when the agent is better informed than his/her manager about the sales-effort relationship in his/her territory. Information asymmetry poses a particularly difficult challenge to a sales manager who is managing a multiple- rather than single-agent sales force, especially one consisting of salespeople varying in their selling ability, risk attitudes and/or sales territory characteristics, e.g., sales potentials. In such circumstances, a single salary plus commission contract covering the entire sales force is unlikely to be efficient. Instead, as shown by Lal and Staelin (1986) and Rao (1990), it may be optimal to offer a menu of contracts and let salespeople self-select the contract they wish to enter. By doing so, salespeople reveal their private information about their selling ability etc., to the firm. One famous implemented example of this type of menu is that used at IBM Brazil described by Gonik (1978) and analyzed by Mantrala and Raman (1990). However, in general, the optimal design and implementation of a menu of sales compensation plans is rather complicated, see, e.g., Rao (1990).

A more pragmatic solution is to set appropriate individualistic sales quotas that account for heterogeneity combined with a common plan that maintains the semblance of equity across the sales force (e.g., Mantrala, Sinha and Zoltners 1994, Raju and Srinivasan 1996). However, this approach requires management to overcome the information asymmetry problem by deliberately measuring each salesperson's utility and sales-effort functions. Needless to say, the application of methods like conjoint analysis to measure salespeople's utility functions is a challenging exercise in itself (see, e.g. Darmon 1979). An alternative approach that avoids such overt measurements is to simply observe and learn from how salespeople perform relative to different quotas over time (e.g., Mantrala, Raman and Desiraju 1997).

Interestingly, all of the above solutions to the asymmetric information problem share a common feature. Specifically, all of them involve the use of sales quotas (self-selected or set by management) and payment for *performance relative to this quota* rather than according to *absolute sales output* as in a pure commission plan. Thus, open-ended contests in which salespeople must beat an individualistic quota to win a prize fall into this category of incentive solutions.

Multiple Agent – “Interdependent” Contracts. There are two common assumptions underlying all the incentive models reviewed so far. First, there is the assumption that the sales force consists of *independent salespeople* selling in separate geographic territories with *uncorrelated environmental disturbances*. Hence, all the corresponding incentive solutions are essentially *individualistic output-based* plans. Second, while an individual’s input is difficult to monitor, his/her (sales) output is assumed to be well-defined and measurable, and the monitoring of this output is easy and/or inexpensive. Neither of these conditions, however, may hold in many real-world settings. This necessitates consideration of other forms of multiple-agent incentive plans, e.g., *competitive* or *cooperative* incentive schemes. Closed-ended contests, e.g., rank-order contests, belong to the class of competitive schemes while team compensation plans fall in the class of cooperative schemes. So far, neither of these classes of *interdependent incentive schemes* has received much close attention in the sales force compensation literature. We focus on the former in the next section and the rest of this paper, leaving the subject of team or group incentive plans as a topic for future research. (See Table 1 for a summary of the agency-theoretic research on sales force compensation).

Table 1: Agency-theoretic research on sales force compensation

Complexity of Sales Incentive Contracting Problem Faced by Sales Management		Proposed Solution	Selected Literature	Type of Contract
Simple  Complex	Salespeople's Effort is Observable	Salary (fixed \$ / hour)	--	Single Agent, Individualistic Contracts ①
	Unobservable Efforts (UE)	Straight Commission Plan	Farley (1964), Srinivasan (1961)	
	UE + Sales Uncertainty (U)	Salary plus Commission	Basu et al. (1985), Lal/Srinivasan (1993)	
	UE + U + Sales Force Heterogeneity (H)	Salary plus Quota-based Incentive Plans	Mantrala et al. (1994), Raju/Srinivasan (1995)	Multiple Agent, Individualistic Contracts ②
	UE + U + H + Asymmetric Information	Menus of Quota-based Incentive Plans	Lal/Staelin (1986), Rao (1990), Mantrala/Raman (1990), Mantrala/Raman/Desiraju (1997)	
	UE + U + H + Correlated Noises and/or Costs that Affect Adequacy of Output as a Measure of Salespeople's Performance	"Competitive" Performance or Rank-order Contests	Lazear and Rosen (1981), Nalebuff and Stiglitz (1983)	Multiple Agent, Interdependent Contracts ③
	Fostering Teamwork	"Collective" or Team Compensation Plans	Holmström (1982), Lazear (1998)	

Tournament Theory Explanations for Firms' Use of Relative Performance Contests

Tournament theory is a branch of the agency-theoretic literature in economics that provides explanations for the use of relative performance incentive schemes such as closed-ended contests. The archetypal tournament has the following basic characteristics (see, e.g., Lazear 1998): First, the prizes or rewards offered in a tournament are fixed in advance and are independent of absolute performance. That is, the “winner” of the contest receives a fixed prize that does not depend on the amount by which he/she beats the other players. Second, a player receives the winner’s or loser’s prize not by being good or bad but by being better than, or worse than, the other player. The tournament theory literature suggests that it can be advantageous for firms to use such closed-ended sales contests under the following conditions:

- When there is an overall *incentive budget constraint*
- When an ongoing management goal is to *sort and identify the best candidate(s) for a limited number of special job assignments or promotion slots*
- When individualistic *outputs are costly and/or difficult to monitor*
- When agents’ *outputs are subject to correlated random disturbances or “common uncertainties”*

Award budget constraint. The advantages of a closed-ended sales contest when a firm has a limited total award budget are well-recognized in sales force management (e.g., Colt 1998). First, by awarding a limited number of fixed prizes that depend on relative rather than absolute performances, managers know exactly what total sales force compensation costs will be, and can ensure that the total prize amount stays within the budget constraint. In contrast, total payouts under a sales commission or quota-bonus scheme are far less predictable and controllable. Second, employing an open-ended rather than a closed-ended contest in the face of a limited total

prize budget would result in lower value prizes that may be inadequate to elicit the desired levels of additional selling efforts.

Sorting and Promotion. Sales managers frequently have to identify the best candidates among their salespeople for a limited number of new job assignments or promotion slots. For example, who should be promoted to sales supervisor? Who should be assigned service vs. creative selling duties? Who should be made a key account rep? Some individuals have skills that make them better suited to some positions than to others. However, sorting salespeople in terms of ability for different jobs is a difficult task for managers of large sales forces in environments with asymmetric information. In such circumstances, holding a closed-ended contest (or series of “elimination contests” as in a tennis tournament) is an efficient way to perform this sorting function. (see, e.g., Rosen 1986). By having individuals compete with one another, and then having winners compete with other winners, eventually the comparisons end up sorting individuals to their best use (Lazear 1998).

High costs of monitoring absolute sales outputs. In contrast to other forms of remuneration such as piece rates, relative performance contests may involve lower output monitoring costs (e.g., Lazear and Rosen, 1981). This is because it is generally cheaper to observe relative position or order of performances than it is to monitor absolute performance levels. This is particularly true if there are to be only one or two top prizes, so the need is to identify, say, the two best candidates rather than assess each candidate’s performance with great care. For example, potential employers with just one vacancy frequently sort through resumes at considerable speed, evaluating only the very top candidates carefully. Even when all contestants must be reviewed, the contest may be more efficient, since relatively crude, ordinal measurements may suffice to distinguish between candidates (O’Keefe, Viscusi and Zeckhauser [in the following OVZ] 1984).

Correlated environmental disturbances or “common” noise. Earlier agency-theoretic models, e.g., Basu et al. (1985), do not distinguish between random localized disturbances that are specific to one salesperson and correlated or common disturbances that affect all salespeople equally. An example of the effect of a local disturbance is a lucky break for a salesperson when he/she receives a large order due to an unexpected increase in the purchasing budget of a large customer, leading to so-called windfall income in incentive systems. In contrast, an unanticipated withdrawal of a competitor’s product from the market would be a common disturbance affecting all salespeople’s outputs. The economics literature shows that closed-ended contests are more efficient than absolute output-based incentives when common disturbances are dominant in the selling environment (e.g., Green and Stokey 1983). This is because relative comparisons of performance *difference out* or eliminate the effects of a common disturbance from the individual reward structure.

Next, the tournament theory literature identifies the following conditions when contests can fail:

- When salespeople *are of unequal (or heterogeneous) ability*
- When salespeople *can easily collude*
- When salespeople may be overly competitive and *sabotage* their colleagues’ efforts
- When *teamwork is important*

Heterogeneity in Abilities and Territory Potentials. To maintain high levels of effort, it is important to group workers so that, at least at the outset, workers feel they are evenly matched with those against whom they will directly compete for a particular prize. This is of course easier said than done especially when managers are not as well informed about the differences in individual salespeople’s selling abilities and/or territories as the salespeople themselves (OVZ

1984). As Lazear (1998, p. 247) puts it, “Effort suffers when heterogeneous workers compete with one another. Effort has the largest effect on changing the probability of winning when contestants have similar ability. If ability differs among contestants, then both the less able and more able tend to slack off.” Consequently, for reasons discussed in the last section, individualistic quota-based incentive schemes or open-ended contests may be preferred to closed-ended formats when contesting salespeople vary widely in their abilities and are aware of these differences.

Collusion. The use of rank-order contests with one winner’s prize provides a strong incentive for agents to collude in choosing their actions because, as long as they all choose the same action, each agent’s expected compensation from the principal remains unchanged (e.g., Dye 1984). More specifically, all workers would prefer to put forth less effort, i.e., shirk, and simply split the winner’s prize if they could. To the extent that salespeople can act cooperatively, i.e., collude in their work and get away with it, such behavior places a severe limitation on tournaments (McLaughlin 1988). The risk of this occurring may be exacerbated by small numbers and by repetition of the relationship over time (Malcomson 1986). Conversely, collusion is less likely to occur in situations where there are a large number of potential winners as it is then more difficult to get all of them to reduce their efforts and split the proceeds. That is, enforcement of collusion is difficult in large groups. Collusion is also less likely when the contestants do not know each other well as would be the case if outsiders can enter the contest easily (Malcomson 1986).

Sabotage. This problem is opposite to the collusion problem (e.g., Dye 1984). Workers who are paid on the basis of relative performance have incentives to be too competitive with one another and increase the probability of winning by reducing their opponent’s measured output. Tournaments then fail because the saboteur can reduce his output while maintaining a given

probability of winning (Lazear 1989). Since individualistic payment schemes are not subject to sabotage, this places tournaments at a disadvantage (McLaughlin 1988).

Teamwork and Team Externalities. In general, teamwork and cooperation is good for the firm, even if not for an individual worker. However, as pointed out by Drago and Turnbull (1991), tournaments which reward employees on the basis of some relative comparisons of performances provide incentives for uncooperative behavior by workers. More precisely, under a tournament scheme, employees may curtail helping efforts or aid to co-workers that are desirable from the firm's viewpoint because they do not increase one's own output while increasing that of another. Tournaments effectively penalize help and induce suboptimal levels of these activities. This problem of course does not arise when workers are paid on the basis of their own absolute performances. Therefore, as a general rule, workers should directly compete only against those with whom cooperation is unimportant.

Lastly, tournaments may also fail in the presence of "team externalities" i.e., when one agent's output is affected by another agent's efforts. When team externalities exist, they do introduce a partial or complete sharing of blame or credit among individuals. Since these externalities reduce the probable gain from increased individual efforts, tournaments become more susceptible to shirking. That is, if one actor reduces his efforts, both that individual and others will share the blame since output of each worker will decline. Therefore, under a tournament, incentives to free-ride increase with the externality as individuals will correctly perceive that shirking is less likely to result in loss of the tournament (Drago and Turnbull 1988).

Hypotheses about Users of Sales Contests

Based on our general review of the economics literature in the previous section, we now advance two sets of hypotheses for empirical study. The first set (Hypotheses Set A) pertains to the influence of variables specific to the *product-market and selling environment, sales force, sales force control system, and regular compensation plan* on the likelihood of a firm being a user of sales contests (closed- or open-ended). Then, Hypotheses Set B presents predictions about how the same independent variables influence the likelihood of a firm that does employ sales contests being a user of closed-ended contests. Previous research papers have examined the effects of these categories of independent variables on the proportion of pay at risk in the regular sales force compensation plan (e.g., John and Weitz 1989, Coughlan and Sen 1986). However regular compensation plan features appear as independent variables in the present research as we expect they can influence companies' use or non-use of sales contests.

Hypotheses Set A: Users vs. Non-Users of Sales Contests

Effects of Product-market and Selling Environment Characteristics. Two independent variables are included in this category, *degree of common uncertainty* in the selling environment and *length of the product selling cycle*. Conceptually, both these variables are related to environmental uncertainty which has been a key independent variable of interest in previous empirical analyses of regular sales force compensation plans (e.g., Joseph and Kalwani 1995, Eisenhardt 1988, John and Weitz 1989). As already explained, the degree of common uncertainty refers to the extent to which salespeople's outputs are affected by correlated disturbances. Tournament theorists assert that if uncertainty is common to all salespeople then closed-ended contests offer advantages over individualistic output-based commission plans (e.g., Green and Stokey 1983). Moreover, when the common disturbance present has an additive

effect on sales output, even an open-ended contest in which individuals compete against some appropriately set fixed quota can be a better motivator of desired levels of efforts than a regular commission plan (Lazear and Rosen 1981).

H_{AI}: Everything else being equal, the greater the common uncertainty affecting individual salespeople's outputs, the greater the likelihood that the firm is a sales contest (closed-ended and/or open-ended) user.

Next, the length of the firm's product selling cycle, e.g., the average number of weeks between the first sales call on a customer and close of a sale, can be viewed as a surrogate for the degree of localized uncertainty. This is because local random disturbances surrounding a salesperson's own ongoing selling efforts become more influential in determining the outcome than the uncontrollable effects of firm-level marketing efforts and macroeconomic conditions affecting all salespeople (see, e.g., Coughlan and Narasimhan 1992). In such circumstances where there is relatively little common noise to be eliminated by way of comparisons of salespeople's performances, closed-ended contests may not only be ineffective but also actually depress salespeople's efforts because they unnecessarily add other areas' local noises to the reward-effort relationship facing each salesperson. In general, greater noise depresses a worker's effort in a contest as it reduces the value of effort by reducing the probability of winning the prize (Lazear 1998). Obviously, this problem does not arise if salespeople are rewarded by way of an individualistic output-based incentive pay plan.

Additionally, the selling cycle length also reflects the complexity of the purchase decision for the customer from a technical and/or economic point of view. More complex products take longer to sell. Agency theorists, e.g., Fudenberg, Holmström and Milgrom (1990), have established that the incentive pay horizon should get longer as the selling cycle lengthens to ensure that the salesperson remains responsible for the result of his efforts, even when it may

take several months to see the outcome. This suggests that the duration of a sales contest should increase as the average selling cycle increases. However, there is then the danger that what started out as a competition between equally able participants with equal chances of winning may become unfair or asymmetric over time (e.g., OVZ 1984). This could occur, for example, if intermediate standings are posted (or become known through informal communications) as the contest progresses. Even if the contest appeared fair at the outset, it becomes effectively “unfair” once the intermediate results are posted—reducing motivation of both leaders and laggards. In summary, we can expect a lower likelihood of a firm being a user of closed-ended contests in situations involving long selling cycles.

We can also expect a lower likelihood of a firm being a user of open-ended contests when the selling cycle is long. First, the time horizon for such a contest has to be as long as the selling cycle. Second, sales may be closed during the contest period as a result of efforts started well before the contest. This would complicate the setting of individualistic quotas for the contest period. Therefore, rather than running a special short-term contest, we expect that when selling cycles are long, firms will choose to motivate their salespeople through an appropriately set annual individualistic sales quota-bonus mechanism combined with salary in the regular sales force compensation plan.

H_{A2}: Everything else being equal, the longer the selling cycle for a firm’s product, the lower the likelihood that the firm is a sales contest (closed-ended and/or open-ended) user.

Effects of Sales Force Characteristics. We include five independent variables in this category, namely, *sales force size, heterogeneity, annual turnover rate, average age and tenure*. Of these variables, the effects of sales force size and age on the salary - to - total pay ratio in the regular compensation plan have been examined by John and Weitz (1989) and Coughlan and

Narasimhan (1993) respectively. The other three independent variables we have included here seem relevant to consider in the light of our general review of the agency and tournament-theoretic literature.

First, as regards the effect of sales force size, as already explained, closed-ended contests are likely to involve lower output monitoring costs than those incurred in absolute output-based individualistic incentive schemes. To a lesser extent perhaps, even open-ended contests entail lower costs of monitoring outputs than a regular sales commission plan. This is because the contest requires sales management to only observe that a salesperson's output exceeds his/her quota to award the fixed bonus rather than track every unit of sales as would be necessary under a commission incentive scheme. These savings in the output monitoring costs are likely to become more significant as sales force size increases. Also, as already discussed, contests in general are more economical incentive pay mechanisms than piece rate plans and these economies increase as the sales force size increases.

H_{A3}: Everything else being equal, the larger a firm's sales forces size, the greater the likelihood that the firm is a sales contest (open-ended and/or closed-ended) user.

Second, considering sales force heterogeneity (in abilities as well as territory), closed-ended contests are likely to be poor motivators when selling abilities and sales territory potentials vary considerably across the sales force and salespeople are cognizant of these differences (OVZ 1984). Now, it may be possible to devise a system of handicaps or leagues for contestants of similar ability so that appropriate incentives are preserved for all (e.g., Lazear and Rosen, 1981). However, these solutions are costly to implement and also presume that managers know each contestant's ability. Alternatively, management could run an open-ended contest with appropriately set individualistic quotas that account for sales force heterogeneity (e.g., Raju and

Srinivasan, 1996). However, setting optimal sales quotas in conjunction with a uniform prize structure across the sales force is neither simple nor inexpensive (see, e.g., Mantrala, Sinha and Zoltners 1994). Further, even open-ended sales contests are accompanied by public announcements and fanfare associated with the presentation of awards to those who beat their quotas. In such circumstances, a semblance of equity is important to maintain the morale of those who failed to achieve their own sales goals. The severity of these problems can be mitigated as the sales force becomes more homogeneous.

H_{A4}: Everything else being equal, the greater the homogeneity in sales territories and/or selling abilities, the greater the likelihood that the firm is a sales contest (open-ended and/or closed-ended) user.

The third sales force characteristic of interest is sales force turnover. Assuming vacancies are filled every year, a higher turnover rate implies a higher proportion of new personnel in the sales force whose abilities and skills may not be clear to management. As already discussed, running closed-ended sales contests among entrants can be an efficient way for managers to learn more about new salespeople's abilities and which selling assignments they should receive (Lazear 1998). A series of open-ended contests in which managers monitor each salesperson's performances relative to individualistic quotas can also be a way for managers to learn about new salespeople's selling ability (see, e.g., Mantrala, Raman and Desiraju 1997). Further, having a high proportion of new salespeople every year diminishes the danger of collusion among salespeople because many do not know each other very well (e.g., Malcomson 1986). Reduced potential for collusion favors the use of contests.

H_{A5}: Everything else being equal, the higher the sales force turnover rate, the greater the likelihood that the firm is a sales contest (open-ended and/or closed-ended) user.

Fourth, as sales representatives' tenure (duration of stay) in the present job increases they become more experienced selling the firm's products in their territories and sales management becomes better informed about their respective selling abilities. While sales contests may not offer much informational benefits to sales managers in such circumstances, they can serve to stimulate experienced salespeople to alter their usual call and effort allocation patterns to meet special short-term management objectives. Being more well-informed about salespeople's past performances in their territories enables management to design more even and fairer contests that preserve incentives for all salespeople even when they are rather heterogeneous in their abilities (McLaughlin 1988, OVZ 1984). Also, it has been observed in practice that closed-ended contests are more effective incentive mechanism for seasoned rather than inexperienced salespeople.

H_{A6}: Everything else being equal, the greater the average tenure of salespeople at a firm, the greater the likelihood that the firm is a sales contest (open-ended and/or closed-ended) user.

Lastly, we consider the average age of the sales force. Drawing on the executive compensation literature from finance and accounting, Coughlan and Narasimhan (1992) suggest that executives approaching retirement, having relatively short employment horizons over which to discount the value of future earnings, will be less motivated by the promise of future salary increases than will be younger employees. Continued motivation for older salespeople would therefore require greater emphasis on incentive pay (i.e., regular incentive pay) in the optimal pay package. We can make an analogous argument in the case of contests. By definition, contests are short-term programs through which salespersons gain rewards as well as recognition from their supervisors. Such recognition may eventually lead to salary increases and/or promotions. However, older salespeople are likely to be less concerned about getting higher

salaries and/or promotions in the future and be more interested in maximizing their short-term income by way of regular incentive pay. That is, older salespeople are likely to be less motivated by special sales contests than by higher regular incentives. This economic argument is also consistent with Murphy and Sohi's (1995, p.61) observation in the behavioral sales management literature: "If the mainstay of the sales force consists of more senior salespeople, there is probably less reason for management to "overplay" the recognition aspects of award presentation." Therefore, we predict,

H_{A7}: Everything else being equal, the higher the average age of its sales force, the lower the likelihood that a firm is a sales contest (open-ended and/or closed-ended) user.

Effects of Sales Force Control Characteristics. Here, we focus on the following four sales force control characteristics: *adequacy of output measures; ease of monitoring inputs; average span of control* and *firm-specific know-how of the sales force*. Previously, the effect of span of control on the use of salaries or commissions for retail salespeople has been examined by Eisenhardt (1988) while the effects of the other three "control" variables on the salary – to – total pay ratio have been studied by John and Weitz (1988, 1989).

Proceeding to our hypotheses, first, just like other output-based incentive pay plans, to run an effective sales contest calls for sales outputs to be well-defined, easy to measure and agreed to by the contestants. That is, the output measure must be adequate for assessing a salesperson's performance (e.g., John and Weitz 1989). Therefore, we hypothesize,

H_{A8}: Everything else being equal, the more adequate the output measure for assessing salespeople's performances the greater the likelihood that the firm is a sales contest (open-ended and/or closed-ended) user.

On the other hand, in those situations where input effort can be easily and cheaply monitored, say via direct supervision and call reports, payment by a salary based on effort is

likely to be more efficient and effective than any output-based incentive scheme (e.g., Lazear 1986). More specifically, Drago and Turnbull (1988, p. 100) note: “Contest incentives fail if individual effort can be measured perfectly or precisely inferred from output.”

H_{A9}: Everything else being equal, the greater the ease of monitoring salespeople’s selling effort inputs, the lower the likelihood that the firm is a sales contest (open-ended and/or closed-ended) user.

One factor that affects a sales supervisor’s ability to monitor salespeople’s selling efforts is the number of salespeople that he has to supervise, i.e., his/her span of control. A small span of control implies closer supervision of salesperson behaviors and input efforts can be achieved. Effort-based salary payments can work quite well in such settings. On the other hand, for a supervisor with a large span of control, comparing each agent’s performance to those of others or a fixed individualistic quota is likely to be more efficient than assessing absolute performances (e.g., Eisenhardt 1988). Also, larger spans of control suggest there are fewer slots for promotion from the ranks. As already discussed, rank-order contests are an efficient way to sort through and eliminate contenders for the higher position.

H_{A10}: Everything else being equal, the larger a firm’s average span of control in its sales force management, the greater is the likelihood that the firm is a sales contest (open-ended and/or closed-ended) user.

The last sales force control-related characteristic of interest is the degree of firm-specific know-how required in the selling job. If salespeople must invest greatly in acquiring firm-specific know-how to sell effectively, they are in a sense locked in and cannot easily leave the firm. More precisely, this implies a lower opportunity cost of a salesperson’s time or a lower minimum payment requirement to stay with the firm (e.g., Coughlan and Narasimhan 1992). The tournament theory literature suggests that such circumstances favor the use of contests

because, first, participants who fail to win, despite their disappointment, are unlikely to quit the company — which is good news for the firm that values their firm-specific know-how. Second, given the absence of more attractive job alternatives outside the firm, salespeople are likely to strive harder in internal contests to win immediate additional financial rewards as well as recognition that can lead to higher compensation in the future. That is, contests elicit greater efforts from participants with firm-specific know-how (see, e.g., Dye 1984, McLaughlin 1988).

Based on these arguments, we hypothesize,

H_{A11}: Everything else being equal, the greater the firm-specific know-how of the sales force, the greater is the likelihood that the firm is a sales contest (open-ended and/or closed-ended) user.

Effects of Regular Compensation Plan Characteristics. The two independent variables we include here are the salary-to-total pay ratio and the total cash compensation. Consider first, the ratio of salary to total pay. Firms that offer higher proportion of total pay as salary are likely to be operating in selling environments where sales outputs are influenced less by salespeople's own selling efforts than by the company's reputation and marketing efforts, and random uncontrollable factors (Basu et al., 1985, Joseph and Kalwani 1995). In such settings, neither open-ended nor closed-ended contests are likely to be very effective in stimulating extra efforts as agents see these efforts as having little weight on short-term sales outcomes. Annual sales objective-based incentive plans are likely to be more effective in these circumstances.

H_{A12}: Everything else being equal, the higher the average proportion of salary to total pay across the sales force, the lower the likelihood that the firm is a sales contest (open-ended and/or closed-ended) user.

Next, we consider the level of total pay, i.e., average total cash income under the regular compensation plan. Whether it be a closed-ended or open-ended contest, the “spread” between winning and not winning is likely to be small when total pay is high. That is, contest-related

bonuses or prize values as a percentage of total pay are likely to be small. Now, according to tournament theory, it is the “spread” between the prizes for winning that affects the amount of effort that an individual is willing to put into a contest-related activity. The greater the spread, the more the induced effort (Lazear 1998). Conversely, when spreads are small, contests are unlikely to be strong motivators for sales forces with higher levels of average total pay.

H_{A13}: Everything else being equal, the higher the average total pay of a firm’s sales force, the lower the likelihood that the firm is a sales contest (open-ended and/or closed-ended) user.

Hypotheses Set B: Users vs Non-Users of Closed-ended Contests

How do product and selling environment factors, sales force characteristics, sales force control and regular compensation variables influence the likelihood of firms that employ sales contests being users of only open-ended contests (or non-users of closed-ended contests)? Below, we develop hypotheses about the effects of 8 out of the 13 independent variables figuring in Hypotheses Set A. The five variables dropped from this analysis are the *length of the selling cycle, average age, tenure, turnover rate* and *span of control*. These variables were dropped as we saw no theoretical reason for expecting them to affect one way or the other the likelihood of a contest-using firm being a non-user of closed-ended contests. We could develop firm hypotheses about the effects of the other 8 variables. These are described below.

Effects of Common Uncertainty. As already explained in previous sections, closed-ended contests are an effective way to eliminate the effects of common disturbances affecting all salespeople.

H_{B1}: Everything else being equal, the more individual salespeople’s outputs are subject to common uncertainty, the greater the likelihood that a firm that employs sales contests is a user of closed-ended contests.

Effects of Sales Force Characteristics (sales force size and homogeneity). First, the total expected payout amount under an open-ended contest is usually larger than for a closed-ended contest and the difference increases as the sales force size increases. Therefore, when sales incentive budgets are constrained as they usually are, closed-ended contests become an increasingly attractive option as the sales force size increases.

H_{B2}: Everything else being equal, the larger its sales force size the greater the likelihood that a firm that employs sales contests is a user of closed-ended contests.

Second, considering sales force heterogeneity, we have already argued that sales contests in general are not very effective motivators when there is significant sales force heterogeneity with respect to selling ability and sales territories. However, compared to a closed-ended contest, an open-ended contest with individualistic quotas can more effectively preserve incentives while accounting for sales force heterogeneity (see, e.g., Raju and Srinivasan 1996).

H_{B3}: Everything else being equal, the greater the heterogeneity in sales territories and/or selling abilities the lower the likelihood that a firm that employs sales contests is a user of closed-ended contests.

Effects of Sales Force Control Characteristics (adequacy of outputs, ease of monitoring inputs and firm-specific know-how). First, it becomes more feasible to run closed-ended contests that base rewards on direct comparisons of participants' outputs as the adequacy of output measures for assessing performances increases. When output measures are adequate, closed-ended contests involving simple ordinal comparisons of agents' outputs are also cheaper to run than open-ended contests for reasons discussed in earlier sections.

H_{B4}: Everything else being equal, the more adequate output measures are for assessing salespeople's performances, the greater the likelihood that a firm that employs sales contests is a user of closed-ended contests.

On the other hand, as the ease of monitoring salespeople's input efforts increases, the ability of sales managers increases to run open-ended contests involving individualistic performance and/or activity objectives, e.g., number of calls on prospects, number of promotional displays set up at customers' locations etc. As discussed in the agency-theoretic literature, tying compensation more directly to relevant input efforts when they can be observed is moving toward the "first-best" solution.

H_{B5}: Everything else being equal, the greater the ease of monitoring salespeople's selling effort inputs, the lower the likelihood that a firm that is a sales contest user is a user of closed-ended contests.

Next, salespeople with greater firm-specific know-how have limited job opportunities outside of the firm. Consequently, there is less danger of a "turnover of losers" upon running a closed-ended contest (Dye 1984, McLaughlin 1988). Also, given their limited options in the outside job marketplace, more promotions from the ranks are expected and closed-ended contests are an effective way to sort through contenders for higher management positions and higher salaries (Lazear 1998).

H_{B6}: Everything else being equal, the greater the firm-specific know-how of the sales force, the greater is the likelihood that the firm that is a sales contest user is a user of closed-ended contests.

Earlier, we had noted that salespeople with higher proportions of total pay as salary are likely to be operating in more uncertain selling environments (see, e.g., Basu et al. 1985, Joseph and Kalwani 1995). Closed-ended contests based on outputs are likely to be less effective in situations where the probability of winning depends primarily on factors other than the contestants' efforts. When the link between output and reward becomes weaker, worker effort

declines (Lazear 1998). An open-ended contest, where the rep has to beat some individualistic activity or non-sales quotas to win a prize may be more effective.

H_{B7}: Everything else being equal, the higher the average proportion of salary to total pay across the sales force, the lower the likelihood that the firm that is a contest user is a user of closed-ended contests.

Lastly, as noted by Coughlan and Narasimhan (1992), higher total pay implies higher marginal productivity of sales effort calling for a higher incentive to total pay ratio to stimulate additional effort. Salespeople who are more productive, and whose effort is important to the outcome, are likely to have higher total pay and a higher ratio of regular incentive to total pay. It is unlikely that these people will be stimulated by closed-ended contests where only a few can win. Therefore:

H_{B8}: Everything else being equal, the higher the average total pay of a firm's sales force, the lower the likelihood that a firm that is a sales contest user is a user of closed-ended contests.

Method

Data

The empirical analyses in this section are based upon 118 observations from a cross-sectional survey of US firms in various industries and 270 observations from a similar survey conducted in Germany. The US data was collected using a mailing list provided by the Alexander Group. The German data stem from a cross-sectional study among National Sales Managers.

Dependent Variable Measures

Users vs. non-users of sales contests. In both the US and the German sample, we asked for the number of sales contests that were conducted last year. Since our interest is to investigate the use versus non-use of sales contests, we generated a dichotomous variable (CONTEST) based on

whether companies ran any kind of contests in the previous year (CONTEST = 1) or no contests at all (CONTEST = 0).

Users vs non-users of closed-ended contests (among sales contest users). In the German survey, the respondents using sales contests were asked to report whether those contests were closed-ended (Did your salespeople compete with each other?) or open-ended (Did your salespeople have to fulfill individual quotas?). In the US survey, the respondents reported the number of sales contests where salespeople had to compete with each other (closed-ended) or had to exceed individual sales quotas (open-ended). The dependent variable was computed by creating a new variable (CEC) that takes a value of 1 if companies primarily use closed-ended contests, otherwise 0.

Independent Variable Measures

As described in the Appendix Table A-1 and Table A-2, the independent variables in both surveys were operationalized using multiple-item measures and the usual construct validation techniques.

Data Analysis

Table 2 provides descriptive data on users and non-users of contests among the surveyed sales force organizations in the US and Germany. Consistent with our initial hypotheses, sales forces that use sales contests appear to have a larger span of control, are larger in size, have shorter selling cycles, and a higher annual turnover of salespeople.

Table 3 provides the correlation matrices for all the independent variables. The German data correlation matrix reveals a fairly high correlation of 0.58 between AGE and TENURE. All

other magnitudes of intercorrelations between pairs of variables are below 0.5 in the German as well as in the US data correlation matrices.

Table 2: Data on Users vs Non-users of Sales Contests from German and US Surveys

Variable	Country	Users of contests	Non-users of contests
Salary (in %)	GER	53.45 %	66.65 %
	USA	41.16 %	56.69 %
Sales force size (number of salespeople)	GER	387.91	47.71
	USA	73.61	28.91
Total (annual) Compensation	GER	86,062 DM	95,684 DM
	USA	42,890 US-\$	41,680 US-\$
Average tenure of Salespeople (in years)	GER	7.6 years	8.2 years
	USA	6.6 years	6.0 years
Average age of Salespeople (in years)	GER	41.2	42.0
	USA	35.7	38.5
Span of Control	GER	9.5	8.3
	USA	7.5	5.8
Annual turnover of Salespeople	GER	7.4 %	4.0 %
	USA	7.1 %	5.7 %
Length of selling cycle	GER	7.9 weeks	18.8 weeks
	USA	7.1 weeks	13.3 weeks
Total (in mill. DM) sales (in mill. US-\$)	GER	367.27	229.83
	USA	130.19	40.43
Number of Observations	GER	169	101
	USA	49	66

Technique. The dependent variable in both sets of hypotheses is dichotomous. Applying OLS linear regression would be inappropriate as its basic premise of normally distributed residuals is violated with a dichotomous dependent variable, rendering any statistical inference tests meaningless, see e.g., Aldrich and Nelson (1984, pp. 13 f.). Although two-group discriminant analysis might be applied, this method makes two assumptions that often are violated, namely, multivariate normality of the independent variables and equality of variance-covariance matrices in the two groups. Therefore, similar to Anderson (1985), Anderson and Coughlan (1987), we choose to use logistic regression to examine our hypotheses. Logistic regression requires fewer

assumptions than discriminant analysis and also has the advantage that it provides meaningful asymptotic t-distributed test statistics. In contrast, confidence intervals as given in discriminant analysis cannot be interpreted (see, e.g., Morrison (1969, p. 162).

Results

Users vs Non-Users of Sales Contests: Empirical Model and Results

Hypotheses Set A (H_{A1} - H_{A13}) implies the following empirical logistic regression equation for the probability of a firm being a user of sales contests, $prob(user_{sc})$:

$$\begin{aligned} \text{Log} [prob(user_{sc}) / prob(non-user_{sc})] = & b_0 + b_1 \cdot \text{COMMON} + b_2 \cdot \text{SELLCYCLE} \\ & + b_3 \cdot \text{SALES FORCE SIZE} + b_4 \cdot \text{HOMOGENEITY} + b_5 \cdot \text{TURNOVER} \\ & + b_6 \cdot \text{TENURE} + b_7 \cdot \text{AGE} + b_8 \cdot \text{OUTPUTS} + b_9 \cdot \text{INPUTS} \\ & + b_{10} \cdot \text{SPAN OF CONTROL} + b_{11} \cdot \text{KNOWHOW} \\ & + b_{12} \cdot \text{SALARY/TOTAL PAY} + b_{13} \cdot \text{TOTAL PAY} \end{aligned}$$

The results obtained upon estimation of this model on the US and German datasets are reported in Table 4. Below, we first discuss the results obtained from the US data and then those based on the German data.

US Data Analysis. Initially, 108 out of 115 cases were available for the analysis. The remaining seven cases were dropped due to several missing observations. Subsequently, two outliers or influential observations were detected and also excluded from the analyses. As shown in Table 4, the fit of the model with all independent variables included is quite good. Specifically, as indicated by the current "model χ^2 " value of 51.06 ($p < .0005$), the value of the statistic -2 times the log of the likelihood (-2LL) of the observed results given the parameter estimates is significantly lower than its value for the model containing only the constant term. Further, in terms of the number of cases correctly classified into the "users" and "non-users" groups, the overall hit rate of the hypothesized model is 77.4% which is substantially better than the 50.6% classification using the proportional chance criterion of (see, e.g., Hair et al. 1998).

Table 3a: Construct intercorrelations, means, and standard deviations for the German sample (270 observations)

Variable	A	B	C	D	E	F	G	H	I	J	K	L	M
COMMON (A)	1.00												
SELLCYCLE (B)	.21	1.00											
SALES FORCE SIZE (C)	.02	-.17	1.00										
HOMOGENEITY (D)	-.24	-.06	-.08	1.00									
TURNOVER (E)	.07	-.18	.46	-.18	1.00								
TENURE (F)	-.23	.12	-.14	.07	-.30	1.00							
AGE (G)	-.19	.05	-.07	-.05	-.24	.58	1.00						
OUTPUTS (H)	-.05	-.12	.05	-.09	-.01	-.04	-.03	1.00					
INPUTS (I)	-.05	-.02	-.11	.09	-.20	.06	-.01	.17	1.00				
SPAN OF CONTROL (J)	-.01	-.11	.38	-.09	.13	.01	.07	.05	-.05	1.00			
REPLACE (K)	.14	.22	-.04	-.16	.04	.01	.03	-.06	-.07	-.08	1.00		
SALARY / TOTAL PAY (L)	.05	.23	-.38	.20	-.41	.15	-.04	-.08	.10	-.23	.00	1.00	
TOTAL PAY (M)	.25	.26	-.11	-.16	-.11	.08	-.02	-.04	.07	-.07	-.26	.06	1.00
MEAN	6.96	12.19	260.02	28.72	6.11	7.82	41.51	.49	.57	9.06	8.09	58.13	89,637
SD	2.54	16.30	724.01	18.52	6.11	3.01	4.43	.20	.22	6.38	4.03	32.30	26,979

Table 3b: Construct intercorrelations, means, and standard deviations for the US sample (118 observations)

Variable	A	B	C	D	E	F	G	H	I	J	K	L	M
COMMON (A)	1.00												
SELLCYCLE (B)	.34	1.00											
SALES FORCE SIZE (C)	-.20	-.15	1.00										
HOMOGENEITY (D)	-.17	-.08	-.03	1.00									
TURNOVER (E)	-.03	-.05	.25	-.23	1.00								
TENURE (F)	-.14	.05	-.03	.07	-.43	1.00							
AGE (G)	.29	.14	-.14	-.01	-.30	.41	1.00						
OUTPUTS (H)	-.46	-.31	.20	-.07	-.00	-.04	-.27	1.00					
INPUTS (I)	-.25	-.11	-.09	.09	-.14	.06	-.19	.43	1.00				
SPAN OF CONTROL (J)	-.33	-.05	.25	-.17	.14	.17	-.13	.29	-.01	1.00			
REPLACE (K)	.26	.17	-.07	-.14	.14	-.10	.01	-.18	-.23	-.08	1.00		
SALARY / TOTAL PAY (L)	.13	.14	-.08	.06	.01	-.24	-.09	-.03	.22	-.29	.04	1.00	
TOTAL PAY (M)	.18	.13	-.02	-.06	-.01	.12	.26	-.04	-.12	.11	.12	-.10	1.00
MEAN	4.05	10.56	48.81	3.34	2.95	3.65	2.98	4.76	5.03	2.88	4.49	50.16	47,500
SD	1.24	10.31	87.09	.81	1.84	1.47	1.09	1.23	1.20	1.40	1.30	34.20	31,972

Bold letters if correlation significant at .05 or lower

A: Common uncertainty

D: Homogeneity of the sales force

G: Average age of salespeople in sales force

J: Span of control

M: Total cash paid to the salesperson

B: Length of selling cycle (time to close a sale)

E: Turnover rate of salespeople

H: Adequacy of output measures

K: Difficulty of replacing salespeople

C: Size of the sales force

F: Tenure (duration at company)

I: Ease of measuring inputs

L: Proportion of salary to total pay

We note that the classification of non-users of contests (49 out of 59 or 83.1 % correctly classified) is slightly better than that of users of contests (33 out of 47 or 70.2 %). Lastly, the Nagelkerke R² (a pseudo-R² measure) of 51.2 % also indicates that the overall model fit is good.

Table 4: Results of Users (Y= 1) vs. Non-users (Y= 0) of Sales Contests

Variable/Construct	Hypothesis	B coefficients (Sig)	
		USA	GERMANY
Product and Selling Environment:			
COMMON	+	-.2955 n.s.	.0450 n.s.
SELLCYCLE	-	-.0753 ***	-.0382 ***
Sales Force Characteristics:			
SALES FORCE SIZE	+	.0081 *	.0177 ***
HOMOGENEITY	-	-.1265 n.s.	.0144 n.s.
TURNOVER	+	.3012 **	.0256 n.s.
TENURE	+	.3379 *	.0084 n.s.
AGE	-	-.7779 **	-.0052 n.s.
Sales Force Control:			
OUTPUTS	+	.4880 *	3.1171 ***
INPUTS	-	.2003 n.s.	-.8396 n.s.
SPAN OF CONTROL	+	-.1950 n.s.	-.0155 n.s.
KNOWHOW	+	.2386 n.s.	.0752 **
Sales Force Compensation:			
SALARY / TOTAL PAY	-	-.0203 **	.0036 n.s.
TOTAL PAY	-	-.0038 n.s.	-.000003 n.s.
Constant		-.7784 n.s.	-1.6844 n.s.
-2 Log Likelihood		94.526	227.247
Model χ^2 (significance)		51.060 (<.0005)	97.668 (<.0005)
Nagelkerke R ²		51.2 %	44.6 %
Hit rate (versus proportional chance crit.)		77.4 % (50.6%)	77.8 % (53.8%)
Number of cases included		106 cases	248 cases

Hypothesis / significance levels:

+	Higher likelihood to use contests	*	p < .10 (one-tailed)
-	Lower likelihood to use contests	**	p < .05 (one-tailed)
n.s.	Not significant	***	p < .01 (one-tailed)

Turning to the estimated coefficients of the independent variables, we see that 7 out of 13 are significant. Note that Table 4 reports one-tailed significance levels since we have directed hypotheses for every variable included in our model. The signs of the coefficients indicate whether the corresponding variables positively or negatively impact the likelihood of a firm being a user of sales contests. Upon examining the signs of the significant coefficients, we observe that this likelihood increases with SALES FORCE SIZE, TURNOVER, TENURE and OUTPUTS. On the other hand, the likelihood of being a contest user decreases as SELLCYCLE, AGE and SALARY/TOTAL PAY increase. All of these results are consistent with our *a priori* hypotheses H_{A2} , H_{A3} , H_{A5} , H_{A6} , H_{A7} , H_{A8} , and H_{A12} . Among these, the asymptotic significance levels indicate that the SELLCYCLE variable has the greatest impact on the likelihood of being a sales contest user.

German Data Analysis. This analysis started with 248 out of 263 cases. 14 cases were excluded because of missing data. Subsequently, one case was deleted because it is an influential observation. Similar to the US results, the overall fit of the model was satisfactory as indicated by the model χ^2 value of 97.67 ($p < .0005$). The overall hit rate of 77.8 % is substantially better than the proportional chance criterion classification of 53.8 %. The Nagelkerke R^2 of 44.6 % is indicative of a satisfactory model fit. However, in terms of our specific hypotheses, only 4 out of 13 variables show significant coefficients (based on one-tailed tests of significance). Specifically, the likelihood of a firm being a contest user is positively impacted by OUTPUTS, SALES FORCE SIZE and KNOWHOW and negatively impacted by SELLCYCLE. These four effects, however, are in line with our predictions in hypotheses H_{A2} , H_{A3} , H_{A8} and H_{A11} .

Summary discussion of US and German data-based analyses. Overall, the hypothesized model fits the US and German data about equally well with 77% correct classification of users of

contests in both datasets. It is encouraging to see that the coefficients of the variables SELLCYCLE, SALES FORCE SIZE and OUTPUTS are significant and have the same signs in both the US and German analyses. In particular, we observe that SELLCYCLE has a highly significant negative impact on the likelihood of being a sales contest user in both analyses. Four of the remaining variables (SALARY/TOTAL PAY, TENURE, AGE, TURNOVER) are significant in the US but not the German analysis while the last KNOWHOW is significant in the German but not in the US study. Lastly, only four of the selected independent variables, COMMON, HOMOGENEITY, INPUTS, TOTAL PAY, and SPAN OF CONTROL, do not have significant effects in either analysis.

Users vs Non-Users of Closed-ended Contests: Empirical Model and Results

This analysis is focused on the subset of firms that do report use of sales contests and, as implied by Hypotheses Set B, (H_{B1} - H_{B8}), assumes that the probability of a firm being a user of closed-ended contests, $prob(user_{cec})$ is given by the following logistic regression equation:

$$\begin{aligned} \text{Log} [prob(user_{cec})/ prob(non-user_{cec})] = & b_0 + b_1 \cdot \text{COMMON} + b_2 \cdot \text{SALES FORCE SIZE} \\ & + b_3 \cdot \text{HOMOGENEITY} + b_4 \cdot \text{OUTPUTS} + b_5 \cdot \text{INPUTS} \\ & + b_6 \cdot \text{KNOWHOW} + b_7 \cdot \text{SALARY/TOTAL PAY} + b_8 \cdot \text{TOTAL PAY} \end{aligned}$$

Table 5 displays the estimated coefficients of this model based on the data from firms in the US and German surveys that reported use of sales contests during the previous 12 months.

US Data Results. 47 respondents to the US survey who had used sales contests during the previous year were included in this analysis. Subsequently, one influential observation was detected and excluded. As shown in Table 5, the model including all of the selected independent variables fits the data quite well. The model χ^2 test ($p = .003$) is significant, the Nagelkerke R^2 is 53.8 % and, the model correctly classifies 76.1% of the cases into the users and non-users groups compared to 52.4% with the proportional chance criterion.

Table 5: Empirical Analyses of Users vs Non-Users of Closed-ended Contests

Variable/Construct	Hypo-thesis	B coefficients (Sig)	
		USA	GERMANY
Product and Selling Environment:			
COMMON	+	.8628 **	-.0396 n.s.
Sales Force Characteristics:			
SALES FORCE SIZE	+	.0019 n.s.	.0011 ***
HOMOGENEITY	-	-1.4521 **	.0193 **
Sales Force Control:			
OUTPUTS	+	2.4053 ***	1.0059 n.s.
INPUTS	-	.6103 n.s.	-1.2737 *
KNOWHOW	+	1.4456 ***	-.0211 n.s.
Sales Force Compensation:			
SALARY / TOTAL PAY	-	-.0219 *	.0255 ***
TOTAL PAY	-	-.0370 *	.000003 n.s.
Constant		-27.0028 ***	-2.5036 **
<hr/>			
-2 Log Likelihood		38.313	182.488
Model χ^2 (significance)		23.265 (.0030)	21.527 (.0059)
Nagelkerke R ²		53.8 %	17.8 %
Hit rate (versus proportional chance crit.)		76.1 % (52.4%)	68.2 % (53.0%)
Number of cases included		46 cases	154 cases
Hypothesis / significance levels:			
+	higher likelihood to use rank-order contests	*	p < .10 (one-tailed)
-	lower likelihood to use rank-order contests	**	p < .05 (one-tailed)
n.s.	not significant	***	p < .01 (one-tailed)

Next, 6 out of 8 independent variables have significant coefficients using the one-tailed tests.

The non-significant variables are SALES FORCE SIZE and INPUTS. Focusing on these significant variables, we observe that the likelihood of being a closed-ended contest user is affected positively by COMMON, OUTPUTS and KNOWHOW and negatively by SALARY/TOTAL PAY, and TOTAL PAY. These results are consistent with our hypotheses H_{B1}, H_{B4}, H_{B6}, H_{B7}, H_{B8}. Interestingly, unlike in the previous analyses, COMMON now has a

significant positive coefficient as hypothesized. However, the negative sign of the significant coefficient for HOMOGENEITY contradicts our hypothesis H_{B3} that the likelihood of being a closed-ended contest user increases as the sales force becomes more homogeneous. Recall, however, that closed-ended contests can offer informational benefits to managers of heterogeneous sales forces by way of their *sorting* function. That is, a closed-ended contest can help to identify salespeople better suited for some special assignments, promotions etc. If firms give more weight to closed-ended contests' informational benefits than to their potential negative effects on agents' motivation then the likelihood of using these mechanisms could increase as sales force heterogeneity increases.

German Data Results. The 158 cases that had been classified as "users of contests" were included in this analysis. Subsequently, four cases were detected to be outliers and dropped from the analysis. As shown in Table 5, the overall fit of the model to the data is acceptable (model χ^2 test of improvement or decrease in the value of the $-2LL$ statistic is significant with $p = .0059$). However, the overall correct classification hit rate of 68.2 % is lower than that obtained with the US data. Still, this is substantially better than the classification as indicated by the proportional chance criterion of 53.0 %. The Nagelkerke R^2 of 17.8% also indicates that the overall goodness of fit of this model is just moderate. The lower overall fit is also due to the larger sample.

Next, the estimated coefficients of 4 out of the 8 variables are significant. As expected according to H_{B2} , H_{B3} and H_{B6} , we observe that the likelihood of being a closed-ended contest user increases with SALES FORCE SIZE and HOMOGENEITY but decreases with INPUTS. However, the positive sign of the significant coefficient for SALARY/TOTAL PAY contradicts hypothesis H_{B7} . We had argued that high SALARY/TOTAL PAY is associated with high environmental uncertainty that would lower the probability of being a closed-ended contest user.

However, if the disturbances affecting sales outputs are rather diffuse and correlated across the sales force then closed-ended contests may be preferred.

Summary discussion of US and German Results. Comparing the results from both surveys, our results here are decidedly more mixed than in the previous analysis. While all the selected variables are significant in one or the other of these sets of results, we find only two, HOMOGENEITY and SALARY/TOTAL PAY are significant in both the US and German data-based analyses but, interestingly, have the opposite signs. There may be some underlying national and/or cultural difference at work here (see, e.g., Albers, Krafft, and Bielert 1998) but pursuing this line of inquiry lies outside the scope of the present research. It is noteworthy, however, that there is no variable that is not significant in either the US or German data-based analyses.

Conclusions

Overall Summary of Results

The major findings of the two sets of empirical analyses, each involving two independent sets of data, that we have performed, are as follows. First, the overall fits of the estimated models to the data from the US and German sources were all quite good and compare very favorably with those obtained in previous empirical analyses of sales force incentives (e.g., John and Weitz 1989, Coughlan and Narasimhan 1992.) Second, considering the US data-based results, the estimated coefficients of the majority of the selected independent variables (7 out of 13 variables in the “users vs non-users of sales contests” analysis and 6 out of 8 in the “users vs non-users of closed-ended contests” study) were found to be significant. Moreover, all but one of these significant coefficients had the anticipated signs. Third, although fewer estimated coefficients were significant in the German data-based analyses (4 in each of the two analyses),

all but one had the expected sign. That is, the majority of our agency- and tournament-theoretic hypotheses received empirical support from one or both sets of data. In particular, in the “users vs non-users of sales contests” analysis, both sets of data revealed that the likelihood of a firm being a sales contest user increases as sales force size and adequacy of output measures increase, and decreases as the selling cycle length increases (Table 4). Further inspection of these results reveals that *sales force characteristics* (sales force size, turnover, tenure, and age) have more influence on the likelihood of using sales contests than *sales force control and compensation variables*, as measured by their Wald statistics. Independent variables belonging to the sales force control and compensation categories (OUTPUTS, KNOWHOW, SALARY/TOTAL PAY, TOTAL PAY), however, appear to play a more significant role when it comes to the choice between closed-ended and open-ended contests by firms that do use sales contests (see Table 5). Overall, the research results are encouraging as regards the usefulness of the economic agency- and tournament-theoretic perspectives for understanding the use of sales contests.

Lastly, we do observe some interesting differences between US and German data-based results which may be due to country-specific differences (e.g., Albers, Krafft, and Bielert 1998, Krafft 1999). For example, while COMMON has a significant positive coefficient in the US analysis of users of closed-ended contests, it has a non-significant effect according to the German data (see Table 5). This may be because German sales forces have relatively high average proportions of salary to total compensation (58 % in Germany against 50 % in USA). That is, uncertainty is already taken into account in the regular payments in Germany. This may also be an effect of different degrees of uncertainty avoidance in the US and Germany: While German salespeople are considered to be moderately risk-averse, US salespeople show only a weak tendency of uncertainty avoidance (see Albers, Krafft and Bielert 1998). In general, more

focused research on how national cultural differences may moderate the predictions of economic theories of contracts is needed.

Limitations

Our research findings are subject to the usual limitations of cross-sectional survey-based research. Specifically, it is difficult to distinguish between causes and effects in a cross-sectional study and some of our results could be reversed. For example, it could be that using sales contests increases the sales force's turnover since losers become frustrated over time. In Table 4, we assumed the opposite relationship. Clearly, a more rigorous test of our hypotheses would be provided by a longitudinal study of sales organizations using sales contests over time. Next, although our results are promising, we still observe some variance that cannot be explained by the selected independent variables. Obviously, other factors in addition to those identified by economic agency and tournament theory influence companies' use of sales contests. For example, a more powerful theoretical framework may be one which merges hypotheses drawn from these economic theories with those based on behavioral motivation and process theories (e.g., Churchill et al. 1997).

Managerial Implications

Following the logic of Darwinian economics, it may be assumed that firms represented in our samples are survivors and over time have learnt the conditions under which the use of certain sales force incentive mechanisms is appropriate and advantageous. Based on this reasoning, and keeping in mind the above limitations, our research findings suggest some useful guidelines for sales managers considering the use of sales contests. Specifically, our results indicate that the use of sales contests is most appropriate for sales forces that are relatively large, experiencing higher than average turnover rates, and composed of seasoned salespeople who, however, are

relatively young, i.e., not close to retirement. Our results also suggest that sales contests are less appropriate for sales forces selling products with long selling cycles, sales forces operating in settings where measures of individual outputs are inadequate, and salespeople who receive a relatively high proportion of their total cash compensation in the form of salary. Lastly, our research findings indicate that sales managers who plan to use sales contests should not immediately rule out the use of a closed-ended contest in favor of an open-ended format as is often prescribed in the popular literature (e.g., Cohen 1996). More specifically, our results indicate that the use of closed-ended contests can be advantageous in a selling environment where salespeople's input efforts are hard to track while output measures are adequate but affected by a correlated or common random disturbance. Also, conducive to the use of closed-ended contests are a sales force that is relatively large, salespeople with high firm-specific know-how, a sales force earning relatively low total pay on average, and a regular sales force compensation plan with a relatively high incentive – to – total pay ratio.

Summary of Contributions and Directions for Future Research

The extant sales contests research literature has been driven largely by behavioral science perspectives (see, e.g., Murphy and Sohi 1995, Murphy and Dacin 1998). The present paper is the first to introduce economic agency and tournament theory-based rationales for companies' use of sales contests. Based on these rationales, hypotheses related to the conditions of a company's product and selling environment, sales force, sales force control system and regular compensation plan favoring the use of sales contests were constructed and tested on two independent sets of survey data. The results appear promising as regards the applicability of these economic theories to understanding the use of contests relative to other incentive mechanisms. The results also provide several managerial guidelines for when to use sales

contests in general and closed-ended contests in particular that have heretofore not been mentioned anywhere in the literature. In these respects, the present research not only contributes to the behavioral theory-based literature on sales contests but also complements extant empirical analyses of economics theory-based hypotheses in the general sales force compensation research literature (e.g., Coughlan and Narasimhan 1992).

There is much more work to be done in this area. For example, from a managerial point of view, it would be interesting to know whether companies that choose sales contests in accordance with our hypotheses are doing better than others or not. In other words, can a company increase its sales organization's profits by following the normative implications of our framework? Our present data sets do not allow us to quantify the effects of running certain kinds of contests given certain contingency factors. Future research should refer to contingency approaches in order to simultaneously testing antecedents, properties, and consequences of sales contests. Next, the actual design of sales contests, e.g., the number of prizes and spreads between them etc., remains largely an art in practice. The extant sales management literature does not provide much guidance on these issues beyond the standard lists of qualitative “do’s and don’ts” one sees in text-books. Considering the resources expended on contests and their potential impact, there is a great need and opportunity for developing models for the optimal design of contests. The economic theories we have examined in this paper appear to be a promising basis for such normative model-building. We hope our work stimulates future research along these directions.

Appendices

Table A-1: Description of Independent Variables in the US Survey

Construct (Cronbach's α), Operationalizations (inter-item correlations), <i>Remarks</i>
<p>Product and Selling Environment</p> <p>Common uncertainty [COMMON] ($\alpha = .76$) <i>Seven-point items from 'strongly disagree' (1) to 'strongly agree' (7)</i></p> <ul style="list-style-type: none"> We have difficulty forecasting our total sales (.55) Our sales are affected greatly by factors beyond our control (.62) Our sales vary a lot due to economic conditions (.51) It is difficult for us to predict how sales will vary from year to year (.54) <p>Length of selling cycle [SELLCYCLE]</p> <p>What is the typical time between an initial contact concerning a product and the ultimate placement of an order? <i>(six categories spanning from "less than two weeks" to "over six months")</i></p>
<p>Sales Force Characteristics</p> <p>Sales force size [SALES FORCE SIZE]</p> <p>How many salespeople are in the sales force?</p> <p>Homogeneity [HOMOGENEITY] ($\alpha = .62$) <i>Seven-point items from 'strongly disagree' (1) to 'strongly agree' (7)</i></p> <ul style="list-style-type: none"> The level of competitive activity is about the same in all of our sales territories (.24) The type of customers we sell to does not vary much from one territory to another (.31) The sales of specific products can vary substantially from territory to territory* (.26) The number of calls per day made by salespeople varies a lot across territories* (.30) Our salespeople vary greatly in terms of their abilities and motivation* (.26) Our sales territories are quite similar in terms of sales potential (.40) The sales quotas for our salespeople vary greatly from one territory to another* (.29) Our salespeople all have about the same amount of selling experience with our company (.38) Our salespeople are very similar in terms of their abilities in selling (.30) <p>Turnover rate of salespeople [TURNOVER]</p> <p>During the last 12 months, what was the turnover in the sales force? (What percentage of the salespeople at the beginning of the year were no longer in the sales force at the end of the year?) <i>(six categories spanning from "less than 1 %" to "over 15 %")</i></p> <p>Tenure (duration at company) [TENURE]</p> <p>How long has the typical salesperson been working in sales at your company? <i>(six categories spanning from "less than two years" to "over 10 years")</i></p> <p>Age [AGE]</p> <p>What is the average age of a salesperson in the sales force? <i>(five categories spanning from "under 30" to "over 45")</i></p>
<p>Sales Force Control</p> <p>Adequacy of output measures [OUTPUTS] ($\alpha = .69$) <i>Seven-point items from 'strongly disagree' (1) to 'strongly agree' (7)</i></p> <ul style="list-style-type: none"> Our sales records by territory are very useful for evaluating the performance of a salesperson (.35) We can set very realistic quotas for each territory (.57) We do not know what level of sales should be generated in a territory* (.59) <p>Ease of measuring inputs [INPUTS]($\alpha = .71$) <i>Seven-point items from 'strongly disagree' (1) to 'strongly</i></p>

agree' (7)

We have accurate activity reports for each of our salespeople (.44)

Our sales supervisors contact each of their salespeople frequently (.56)

We can easily determine who is working hard and who is not (.61)

It is difficult for us to determine how much effort any salesperson puts into selling* (.39)

Span of control [SPAN OF CONTROL]

How many first-line salespeople typically report to a first-line sales supervisor?

(five categories spanning from "1 to 3" to "over 10 salespeople")

Firm Specific Know-how [KNOWHOW] ($\alpha = .66$) *Seven-point items from 'strongly disagree' (1) to 'strongly agree' (7)*

We have a difficult time hiring good salespeople (.51)

It takes a long time for a newly hired salesperson to learn the ins and outs of our firm (.48)

When a salesperson quits, it is easy for us to replace him or her* (.43)

Sales Force Compensation

Proportion of salary to total pay [SALARY/TOTAL PAY]

Please break down the total money and value of rewards given to salespeople in the sales force during the last year into the following categories:

- Direct or base salary – all compensation paid to salespeople that was guaranteed, independent of performance%
- ...

Total compensation paid to the salesperson [TOTAL PAY]

Approximately, what is the average overall total cash compensation for a salesperson annually?

\$ thousands

*: Reversed coding

Table A-2: Description of Independent Variables in the German Survey

Construct (Cronbach's α), Operationalizations (inter-item correlations), <i>Remarks</i>	
Product and Selling Environment	
Common uncertainty [COMMON] ($\alpha = .70$) <i>5-point semantic differential scale ($\pm 0-5\%$, $\pm 5-10\%$, $\pm 10-15\%$, $\pm 15-20\%$, $> \pm 20\%$)</i>	
How much did the market volume of your industry vary on average over the last five years? (.56)	
How much did overall sales of your entire salesforce vary on average over the last five years? (.60)	
How much did your actual overall sales differ from your expected overall sales? (.42)	
Length of selling cycle [SELLCYCLE]	
How many weeks pass on average between the first sales call and finally closing a sale (in case of first purchases) about weeks	
Sales Force Characteristics	
Sales force size [SALES FORCE SIZE]	
How many salespeople (employed and independent representatives) are primarily working for your sales organization (without sales management)? salespeople	
Homogeneity [HOMOGENEITY]	
Please specify to which extent do the performance of top salespersons and low performers deviate from the performance of an average salesperson, and how many of your salespeople belong to these three groups!	
	Performance Percent
Top salespeople	+ % (TOP_PERF) % (PERC_TOP)
Average salespeople	100 % % (PERC_AVG)
Low performers	- % (LOW_PERF) <u>..... %</u> (PERC_LOW)
	<u>100 %</u>
<i>A measure of heterogeneity of the sales force was computed via the formula ... (still to be added). Our measure of the homogeneity of a company's sales force was computed by multiplying the measure of heterogeneity by -1.</i>	
Turnover rate of salespeople [TURNOVER]	
What percentage of your salespersons leave your company every year? %	
Tenure [TENURE]	..... % less than one year, (TENURE_1)
	..... % one to less than three years, (TENURE13)
	..... % three to less than five years, (TENURE35)
	..... % five to less than ten years, resp. (TENURE5_)
	..... % ten years or longer (TENURE10)
<i>TENURE was computed as</i>	
$(.5*(TENURE_1/100))+(2*(TENURE13/100))+(4*(TENURE35/100))+(7.5*(TENURE5_/100))+(15*(TENURE10/100))$	
Age [AGE]	How many of your salespeople are
	..... % younger than 25, (AGETO25)
	..... % 25 to < 35, (AGE25_35)
	..... % 35 to < 45, (AGE35_45)
	..... % 45 to < 55, (AGE45_55)
	..... % older than 55? (AGE55PLU)
<i>AGE was computed as</i>	
$(20*(AGETO25/100))+(30*(AGE25_35/100))+(40*(AGE35_45/100))+(50*(AGE45_55/100))+(60*(AGE55PLU/100))$	
Sales Force Control	
Adequacy of output measures [OUTPUTS] ($\alpha = .67$) <i>7-point semantic differential scale</i>	
How precisely can you infer the actual individual selling effort from the outcome measures? [not at all – precisely] (.61)	
Using outcome measures how precisely do they represent the actual effort? [imprecisely – precisely] (.58)	
How many factors beyond the control of your salespersons do influence the selling outcome? * [few – many] (.29)	
Ease of measuring inputs [INPUTS] ($\alpha = .69$) <i>Seven-point items from 'strongly disagree' (1) to 'strongly agree' (7)</i>	
It is just not possible to supervise our salespeople closely * (.52)	

Our salespeople travel so much that close supervision is impossible * (.45)

It is difficult to evaluate how much effort any individual in this group really puts into his job * (.49)

It is easy for these salespeople to turn in falsified sales call reports if they want to * (.40)

Span of control [SPAN OF CONTROL]

How many salespeople does a first level sales manager supervise? salespeople

Firm Specific Know-how [KNOWHOW] ($\alpha = .61$) *Seven-point items from 'strongly disagree' (1) to 'strongly agree' (7)*

It is easy for us to replace good salespeople in case they quit * (.30)

Our products can be explained easily towards our accounts, such that salespeople could sell them already after a short training time * (.51)

The products offered by our salespeople are complex (.49)

Sales Force Compensation

Proportion of salary to total pay [SALARY/TOTAL PAY]

How many of your salespeople are compensated by the following plans ?

- Straight salary%
- Straight commission (COMMONLY)%
- A combination plan, such as
 - salary plus commission (SALCOM)%
 - commission and drawing account (COMMDRAW)%
 - salary plus bonus (SALBON)%
 - commission plus bonus (COMMBON)%
 - salary plus commission plus bonus (SACOBO)%

If you are offering combination plans, what level does the proportion of variable income to total pay typically reach? % (VARPERC)

(The variable proportion was computed via the formula:

COMMONLY+COMMDRAW+COMMBON+(VARPERC((SALCOM+SALBON+SACOBO)/100)). The 'proportion of salary to total pay' is then the complement to 100%.*

Total compensation paid to the salesperson [TOTAL PAY]

What is the total annual income (salary plus variable income) that you pay for an average salesperson ? DM

*: Reversed coding

References

- Albers, Sönke (1996), "Optimization Models for Salesforce Compensation," *European Journal of Operational Research* 89, 1-17.
- Albers, Sönke, Manfred Krafft and Wilhelm Bielert (1998), "Global Salesforce Management: Comparing German and U.S. Practices," in *Emerging Trends in Sales Thought and Practice*, Bauer, Gerald J., Mark S. Baunchalk, Thomas Ingram and Raymond W. LaForge, eds. Quorum Books, 302-332.
- Aldrich, John H. / Nelson, Forrest D. (1984): *Linear Probability, Logit and Probit Models*. Newbury Park/London/New Delhi: Sage Publications (University Paper Series on Quantitative Applications in the Social Sciences; 07-045)
- Alonzo, Vincent (1996), "Selling Changes," *Incentive*, Vol 170, No. 9, 45-46.
- Alonzo, Vincent (1997), "Getting the Best Out of 'Em," *Sales and Marketing Management* Vol 14, no. 11 (October), 34-38.
- Anderson, Erin (1985), "The Salesperson as Outside Agent or Employee: A Transaction Cost Analysis," *Marketing Science*, Vol. 4, pp. 234-254.
- Anderson, Erin and Anne T. Coughlan (1987), "International Market Entry and Expansion via Independent or Integrated Channels of Distribution," *Journal of Marketing*, Vol. 51 (1987), October, pp. 71-82.
- Basu, Amiya K. and Gurumurthy Kalyanaram (1990), "On the Relative Performance of Linear versus Nonlinear Compensation Plans," *International Journal of Research in Marketing* 7, 171-178.
- Basu, Amiya K., Rajiv Lal, V. Srinivasan and Richard Staelin (1985), "Sales Force Compensation Plans: An Agency Theoretic Perspective," *Marketing Science* 4, Fall, 267-291.
- Berger, Melanie (1997), "When Their Ship Comes In," *Sales and Marketing Management* Vol 149 No 4, 60
- Beltramini, Richard F. and Kenneth R. Evans (1988), "Salesperson Motivation to Perform and Job Satisfaction: A Sales Contest Participant Perspective," *Journal of Personal Selling & Sales Management*, 8, August, 35-42.
- Chrapek, D. (1989), "Sales Incentive Expenditures Top \$7.8 Billion in 1988," *Premium Incentive Business*, (June), 3.
- Churchill, Jr., Gilbert A., Neil M. Ford and Orville C. Walker, Jr. (1997), *Sales Force Management*. 5th edition, Chicago et al.: Irwin.

Colletti, Jerome A., David J. Cichelli, S. Doug Linser, John F. Martin, D. Susan Schattinger, Gary S. Tubridy (1988), *Current Practices in Sales Incentives*, New York: The Alexander Group, Inc.

Colt Jr., Stockton B. (1998), *The Sales Compensation Handbook*, New York: AMACOM

Coughlan, Anne T. (1993), "Salesforce Compensation: A Review of MS/OR Advances," in *Marketing*, J. Eliashberg and G. L. Lilien, eds. Amsterdam et al.: North-Holland (Handbooks in Operations Research and Management Science; Vol. 5), 611-651.

Coughlan, Anne T. and Chakravarthi Narasimhan (1992), "An Empirical Analysis of Sales-Force Compensation Plans," *Journal of Business Research* 65, 93-121.

Coughlan, Anne. T. and Subrata K. Sen (1986), *Salesforce Compensation: Insights from Management Science*. Report no. 86-101. Cambridge, Mass.: Marketing Science Institute. March.

Coughlan, Anne. T. and Subrata K. Sen (1989), "Salesforce Compensation: Theory and Managerial Implications," *Marketing Science*, 8 (Fall), 324-42.

Darmon, René Y. (1979), "Setting Sales Quotas with Conjoint Analysis," *Journal of Marketing Research*, 16, 133-140.

Drago, Robert and Geoffrey K. Turnbull (1988), "The Incentive Effects of Tournaments with Positive Externalities Among Workers," *Southern Economic Journal* 55, 100-106.

Drago, Robert and Geoffrey K. Turnbull (1991), "Competition and Cooperation in the Workplace," *Journal of Economic Behavior and Organization*, 15, 347-364.

Dye, Ronald (1984), "The Trouble with Tournaments," *Economic Inquiry* 22, January, 147-149.

Eisenhardt, Kathleen M. (1988), "Agency- and Institutional-Theory Explanations: The Case of Retail Sales Compensation," *Academy of Management Journal*, Vol. 31, No. 3, 488-511

Eisman, Regina (1993), "Justifying Your Incentive Program," *Sales and Marketing Management*, (April), 43.

Farley, John U. (1964), "An Optimal Plan for Salesmen's Compensation," *Journal of Marketing Research*, 1 (May), 39-43.

Fudenberg, Drew, Bengt Holmström and Paul Milgrom (1990), "Short-term Contracts and Long-Term Agency Relationships," *Journal of Economic Theory*, Vol. 51 No. 1 (June), 1-31.

Gonik, Jacob (1978), "Tie Salesman's Bonuses to Their Forecasts," *Harvard Business Review*, 56/3, 116-123.

Green, J. R. and N. L. Stokey (1983), "A Comparison of Tournaments and Contracts," *Journal of Political Economy* 91, June, 349-364.

Hair, Joseph F., Jr., Rolph E. Anderson, Ronald L. Tatham and William C. Black (1998), *Multivariate Data Analysis*, 5th edition, Upper Saddle River: Prentice-Hall.

Hart, Sandra H., William C. Moncrief III and A. Parasuraman (1989), "An Empirical Investigation of Salespeople's Performance, Effort and Selling Method During a Sales Contest," *Journal of Academy of Marketing Sciences*, 17 (Winter), 29-39.

Holmström, Bengt (1979), "Moral Hazard and Observability," *Bell Journal of Economics*, 10, Spring, 74-91.

Holmström, Bengt (1982), "Moral Hazard in Teams," *Bell Journal of Economics*, 13, No. 2 (Autumn), 324-340.

Ingram, Thomas N., Raymond W. LaForge and Charles H. Schwepker, Jr. (1997), *Sales Management: Analysis and Decision Making*, 3rd edition, Fort Worth et al.: The Dryden Press.

John, George and Barton A. Weitz (1988), "Explaining Variations in sales Compensation Plans: Empirical Evidence for the Basu et al. Model," Working Paper, Minneapolis: University of Minnesota, July.

John, George and Barton A. Weitz (1989), "Salesforce Compensation: An Empirical Investigation of Factors Related to Use of Salary Versus Incentive Compensation," *Journal of Marketing Research* 26, 1-14.

Joseph, Kissan and Manohar Kalwani (1995), "The Impact of Environmental Uncertainty on the Design of Salesforce Compensation Plans," *Marketing Letters*, 6, 183-97.

Jucha, Patti Fielding (1997), "Bon Voyage, Top Producers," *Mortgage Banking*, Vol. 58, No. 2 (November), 70-75.

Kaydo, Chad (1998), "Marriott's Incentives Strike Gold," *Sales & Marketing Management*, Vol. 15, No. 12 (November), 97.

Kienbaum Vergütungsberatung (1998), *Vergütung 1998 - Führungs- und Fachkräfte im Außendienst* (Compensation 1998 - Managers and Qualified Personell in Salesforces), Gummersbach (Germany): Kienbaum Personalberatung.

Krafft, Manfred (1999), "An Empirical Investigation of the Antecedents of Salesforce Control Systems," *Journal of Marketing* (July) 63, 120-134.

Krafft, Manfred, Rajiv Lal and Soenke Albers (1996), "Relative Explanatory Power of Agency Theory and Transaction Cost Analysis in German Salesforces." Working paper, Stanford Graduate School of Business.

Lal, Rajiv and Richard Staelin (1986), "Salesforce Compensation Plans in Environments with Asymmetric information," *Marketing Science*, 5/3, 179-198.

Lal, Rajiv and V. Srinivasan (1993), "Compensation Plans for Single- and Multi-product Salesforces: An Application of the Holmstrom-Milgrom Model," *Management Science* 39, 777-793.

Lazear, Edward P. (1986), "Salaries and Piece Rates," *Journal of Business*, Vol. 59 No. 3 (July), 405-432.

Lazear, Edward P. (1989), "Pay Equality and Industrial Politics," *Journal of Political Economy* 97, 561-580.

Lazear, Edward P. (1998) *Personnel Economics for Managers*, New York: John Wiley & Sons, Inc.

Lazear, Edward P. and Sherwin Rosen (1981), "Rank-Order Tournaments as Optimum Labor Contracts," *Journal of Political Economy* 89, October, 841-864.

Malcomson, James M. (1984), "Work Incentives, Hierarchy and Internal Labor Markets," *Journal of Political Economy*, 92, 486-507.

Malcomson, James M. (1986), "Rank-Order Contracts for a Principal with Many Agents," *Review of Economic Studies*, (October), 807-817.

Mantrala, Murali K. and Kalyan Raman (1990), "Analysis of a Salesforce Incentive Plan for Accurate Sales Forecasting and Performance," *International Journal of Research in Marketing* 7, 189-202.

Mantrala, Murali K., Kalyan Raman and Ramarao Desiraju (1997), "Sales Quota Plans: Mechanisms for Adaptive Learning," *Marketing Letters*, 8, 4, 393-405.

Mantrala, Murali K., Prabhakant Sinha, and Andris A. Zoltners (1994), "Structuring A Multiproduct Sales Quota-Bonus Plan For A Heterogeneous Sales Force: A Practical Model Based Approach," *Marketing Science* 13 (2), 121-144.

McLaughlin, Kenneth. J. (1988), "Aspects of Tournament Models: A Survey," in *Research in Labor Economics*, R. Ehrenberg, ed. Greenwich, CT: JAI Press.

Moncrief III, William C., Sandra H. Hart and Daniel Robertson (1988), "Sales Contests: A New Look at an Old Management Tool," *Journal of Personal Selling & Sales Management* 8, November, 55-61.

Morrall, Katherine (1996), "Motivating Sales Staff with Rewards," *Bank Marketing*, Vol. 28 (July), 32-38.

- Morrison, Donald G. (1969), "On the Interpretation of Discriminant Analysis," *Journal of Marketing Research*, Vol. 6, pp. 156-163.
- Murphy, William H. and Ravipreet S. Sohi (1995), "Salesperson's Perceptions about Sales Contests," *European Journal of Marketing*, Vol 29 No. 13, 42-66.
- Murphy, William H. and Peter A. Dacin (1998), "Sales Contests: A Research Agenda," *Journal of Personal Selling and Sales Management*, Vol 18 No. 1 (Winter), 1-16.
- Nalebuff, Barry and Joseph Stiglitz (1983), "Prizes and Incentives: Towards a General Theory of Compensation and Competition," *Bell Journal of Economics* 14, Spring, 21-43.
- O'Keefe, M., N. Viscusi and R. Zeckhauser (1984), "Economic Contests: Comparative Reward Schemes," *Journal of Labor Economics* 2, January, 27-56.
- Raju, Jagmohan and V. Srinivasan (1996), "Quota-Based Compensation Plans for Multi-Territory Heterogeneous Salesforces," *Management Science*, 42 (10), 1454-1462.
- Rao, Ram C. (1990), "Compensating Heterogeneous Salesforces: Some Explicit Solutions," *Marketing Science* 9, 319-341.
- Rosen, Sherwin, (1986), "Prizes and Incentives in Elimination Tournaments," *American Economic Review* 76, September, 701-715.
- Salerno, S. (1985), "The New Sales Contest," *Republic*, (November), 60-62.
- Srinivasan, V. (1981), "An Investigation of the Equal Commission Rate Policy for Multiproduct Salesforces," *Management Science*, 27 (July), 731-756.
- Stanton, William J., Richard H. Buskirk and Rosann L. Spiro (1995), *Management of a Sales Force*, 9th edition, Chicago et al.: Irwin.
- Wildt, Albert R., James D. Parker and Clyde E. Harris, Jr. (1980-1981), "Sales Contests: What We Know and What We Need to Know," *Journal of Personal Selling & Sales Management* 1, Fall and Winter, 57-64.
- Wildt, Albert R., James D. Parker and Clyde E. Harris, Jr. (1987) "Assessing the Impact of Sales Force Contests: An Application," *Journal of Business Research* 15, 145-155.
- Wotruba, T. R. and D. Schoel (1983) "Evaluation of Salesforce Contest Performance," *Journal of Personal Selling & Sales Management* 4, May, 1-10.