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**Thrill of Victory and Agony of Defeat:**

**Emotional Rewards and Sales Force Compensation**

Ying Yang

Department of Marketing and Entrepreneurship

University of Houston

Houston, TX 77204

Email: yyang24@uh.edu

Phone: 713-743-4586

Niladri B. Syam

Department of Marketing and Entrepreneurship

University of Houston

Houston, TX 77204

Email: nbsyam@uh.edu

Phone: 713-743-4568

James D. Hess\*

Department of Marketing and Entrepreneurship

University of Houston

Houston, TX 77204

Email: jhess@uh.edu

Phone: 713-743-4175

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Authors are listed in reverse alphabetical order and everyone contributed equally to this article.

**Thrill of Victory and Agony of Defeat:**

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**Abstract**

When sales territories are imbalanced, how do salespersons’ emotions-pride and disappointment in goal attainment-affect the choice between sales contests and sales quotas? First, profits in a quota system increase when pride in the weaker territory or disappointment in the stronger territory increase. In a sales contest, by contrast, feelings of disappointment reduce profits regardless of territory characteristics. Second, a simultaneous strengthening of pride and disappointment enhances the advantage of quota over contest created by territory imbalance. However, the interpersonal nature of the contest, pitting a salesperson against a known rival, may generate stronger emotions than a quota-system, with its impersonal sales targets. So, third, a contest may overcome the profit advantages of the quota-system. Fourth, if pride and disappointment are strongly felt because of territory imbalance, handicapping either contest or quota is unprofitable, but if pride and disappointment are greater in interpersonal situations, handicapping may be more detrimental to a contest than a sales quota-system.

**1.1 Introduction**

Sales contests and bonus-quota plans are frequently used to motivate salespeople, especially for achieving short-term sales goals (Murphy and Dacin 1998). In both the contest and the quota systems, salespeople win a prize if they surpass a sales threshold. The compensation systems differ in how the threshold is determined: in the contest, the threshold is the sales level of other salespeople, and in the quota, the threshold is a predetermined sales quota.

The economic aspects of quotas and contests have a long history. The theoretical literature on contests began with the pioneering work of Lazear and Rosen (1981), Nalebuff and Stiglitz (1983), and Green and Stokey (1983) in economics, and was continued in marketing by Kalra and Shi (2001). The theory of bonus-quota plans (a special case of piece-rate schemes) has been analyzed by Kim (1997) and Oyer (2000) in economics, and in marketing by scholars like Mantrala, Raman and Desiraju (1997), Mantrala, Sinha and Zoltners (1994) and Raju and Srinivasan (1996) etc. Some authors, notably Lazear and Rosen (1981) and Green and Stokey (1983) have also compared relative compensation schemes like contests with individual schemes like piece rates. Mantrala, Krafft and Weitz (1999) empirically investigate the choice between ‘open-ended’ contests, which require beating an individual target, versus ‘closed-ended’ contests in which success is relative to others.

A recent stream of research has pointed out the importance of emotions in understanding the behavior of economic agents (Rabin 1983; Holt and Sherman 1994; Elster 1998; Loewenstein 2000). Selling is a human activity and a complete investigation of the behavior of sales agents requires us to understand how they take into account their emotions like pride, disappointment, envy, compassion etc., when evaluating their sales results.

 The extant literature comparing a relative scheme (contest) with an individual scheme (quota) cited above has generally ignored sales agents’ emotions. Our goal is to compare these schemes when agents’ emotions are taken into account. While there is a small literature examining the effect of emotions in contests which we review below (Kräkel 2008a,c; Grund and Sliwka 2005; Chen, Ham and Lim 2011), there is no comparing contests and quotas under emotions. However, making the comparison of contests with quotas requires us to also analyze a quota scheme when agent emotions are incorporated. Just as in a contest, a quota scheme may also lead to pride or disappointment depending on whether sales exceeds the quota or not (Deci and Ryan, 1985, p.218-220; Latham, 2003).

The setting for our research is a situation where a firm is trying to design its compensation scheme when faced with sales territories that are imbalanced. Though managers try as best they can to balance the territories so that all have equivalent sales potential, as a practical matter this is not always feasible and maybe too costly. Many practitioners have commented on how unequal sales territories are in actual practice: “We have observed that sales managers are frequently surprised to learn how unequal their sales territories are,” (Zoltners and Lorimer 2000, p.139). Territory imbalance has the same effect as asymmetry among agents (different experience, costs, skill levels, etc.). Clearly any compensation scheme must take into account territory imbalance.

We have two research questions. First, when territories are imbalanced, how does a relative plan like the contest compare with an individual plan like the quota scheme when agents’ emotions of pride and disappointment are taken into account? Second, since there is imbalance between the territories, a natural question to ask is how handicapping the contest and quota scheme compare with the un-handicapped ones when agents have feelings of pride and disappointment.

**1.2 Overview of Results**

A major finding in this paper is that when territories are imbalanced, pride in winning the contest/making quota increases profits from both the contest and the quota but it benefits the contest more. As a contrast, note that when emotions are ignored territory imbalance decreases profits from both quota and the contest but it hurts the contest more (Syam, Hess and Yang 2012). In fact a major insight we provide is when and how emotions can counter the effects of territory imbalance.

If the emotionality is the same for both contests and quotas, a quota system is more profitable. However, there is ample evidence that the interpersonal character of a contest, pitting one salesperson against a known, personal rival, creates stronger feelings of pride and disappointment than the impersonal benchmark of the quota system (Kilduff et al. 2010). In that case the contest is more profitable. This result is new to the literature comparing compensation schemes, and also contrasts starkly with the case when agent’s emotions are ignored. The extant literature comparing relative and individual scheme finds that when emotions are ignored, the quota scheme is either more profitable or as profitable (vis-à-vis contests) with both balanced (Lazear and Rosen 1981; Green and Stokey 1983) and imbalanced territories (Syam, Hess and Yang 2012).

The primary reason why contests may be desirable was provided by Green and Stokey (1983), who show that relative plans (contest) can dominate individual plans (quotas) when there are sizeable common shocks. We have uncovered a new rationale for contests to dominate quotas *even* in the absence of common shocks. Since emotions play an important role in the behavior of economic actors, our results can help explain the enormous popularity of contests, especially in the sales setting.

Another salient finding in the current paper is that, when agents’ emotions are incorporated the firm may find it better *not to handicap* the contest and quota scheme. In contrast, when agents’ emotions are ignored, then it is optimal to handicap the contest and quota scheme since handicapping can overcome the deleterious effects of territory imbalance (or agent asymmetry), and the contest and quota become as profitable as in the case with balanced territories. The reason for our novel finding about the non-optimality of handicapping when emotions are accounted for is that handicapping has two contrasting effects. On the one hand, it removes the negative effect of territory imbalance, but it also removes the impetus for agents’ emotions to take effect. Since it is precisely the imbalance between territories that opens the door for pride and disappointment, negating the imbalance also removes the source of these emotions. Since the firm’s profit increases in these emotions, this is a negative effect of handicapping. We show that when the emotions are strong enough the firm is better off without handicapping.

Incidentally, our results provide one rationale why we see so few handicapped contests in practice, even though they have been theoretically investigated and have been shown to increase firm profits from a purely economic standpoint (Lazear and Rosen 1981). It has been argued that from a practical standpoint a firm may eschew handicapping since it may not be able to handicap properly and this would give rise to concerns of fairness, equity etc. We show that handicapping may be undesirable even if the firm were able to handicap optimally to avoid the deleterious effects of territory imbalance.

As already mentioned, because the contest involves interpersonal comparisons with other active participants it is likely to generate stronger emotions than quotas, which are impersonal accounting standards. In that case the firm will prefer not to handicap the contest even in situations where it chooses to handicap the quota by setting territory-specific quota schemes. This may explain why handicapped contests are much rarer than handicapped quotas.

**1.3 Literature Review**

The extant work incorporating emotions in compensation schemes involves contests. First, Kräkel (2008a) has investigated the emotions that come into play when agents compare their own performance with the performance of other agents. Such interpersonal comparisons engender feelings of pride (positive emotion) if one wins the contest, and feelings of disappointment (negative emotion) if one loses. With heterogeneous agents who differ in their innate abilities, the author finds that *given* exogenously defined prizes the agents’ efforts are increasing in both pride and disappointment. This result rationalizes the empirical fact that agents are found to overexert themselves compared to the predictions of standard tournament theory. He has also endogenized the prize structure. Kräkel (2008b) carried out a similar analysis of salary and commission. Though known asymmetry among agents could induce the firm to offer handicapped contests as an optimal mechanism (Lazear and Rosen 1981), unlike us Kräkel (2008a) does not investigate handicapping.

Second, Grund and Sliwka (2005) investigate envy and compassion in contests. Compassion is felt by the winner of the contest and envy is felt by the loser. Both emotions come into play because of the agents’ aversion to inequity, which is felt because a contest always has a winner and a loser. Indeed, the amount of inequity is operationalized via the difference between the winning and losing prizes. They find that, in the partial equilibrium where prizes are exogenously defined, the optimal efforts are higher in a contest with inequity-averse agents compared to a standard contest where agents only have self-regarding preferences. However, in the full equilibrium with endogenous prizes chosen by the principal, the effort in a contest with inequity-averse agents is smaller compared to a standard contests. Moreover, the principal’s profit is smaller in tournaments with inequity-averse agents than in tournaments where agents have self-regarding preferences.

Third, Gill and Stone (2010) study tournaments where agents like to receive ‘just deserts’ for their efforts. If an agent exerts more effort than his rival, then he feels that he deserves more, and an agent’s utility is the sum of his monetary payoff and a comparison of this payoff with an endogenous reference point that depends on both agents’ efforts. The authors’ main goal is to demonstrate that when agents care about receiving just deserts, then a tournament with symmetric agents can give rise to asymmetric efforts in equilibrium, contrary to standard tournament theory.

Fourth, Chen, Ham and Lim (2011) experimentally investigate agent emotions in a multi-person tournament with asymmetric agents. Like Kräkel (2008a) they too find that incorporating emotions in tournaments allows researchers to rationalize the over-exertion of effort in the laboratory compared to the prediction of standard tournament theory. They also investigate how changing the number of prizes in a multi-person tournament changes the efforts exerted by the agents. However, they do not derive nor use optimal prizes in their experiments and their results are derived using exogenously given prizes.

We assume some salespeople have advantages owing to working in the better territory. Thus there are feelings of pride when the agent in the weaker territory wins the contest and feelings of disappointment when the agent in the stronger territory loses the contest. Similarly, there are feelings of pride when the agent in the weaker territory makes quota and feelings of disappointment when the agent in the stronger territory fails to make quota (Deci and Ryan, 1985, p.218-220; Latham, 2003).

Our contributions to the literature are, first, to analyze the effect of emotions on both quota and contest and to contrast the resulting differences in the profits of the two compensation systems (see Table 1). Second, we also contribute by investigating the effects of handicapping the contest and quota when agents are asymmetric and their emotions are taken into account.

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|  | Homogeneous Sales Response | Heterogeneous Sales Response |
| Optimal Payment Based Upon: | OnlyFinancial Rewards | Emotional and Financial Rewards | OnlyFinancial Rewards | Emotional and Financial Rewards |
| **Contest** | Lazear & Rosen (1981)Green & Stokey (1983)Nalebuff & Stiglitz (1983)Kalra and Shi (2001)Syam, Hess, & Yang (2012) | Grund & Sliwka (2005)Gill & Stone (2010)**This paper** | Lazear & Rosen (1981)Meyer (1992)Syam, Hess, & Yang (2012) | Kräkel (2008a)Gill & Stone (2010)**This paper** |
| Handicapped Contest | Syam, Hess, & Yang (2012) | **This****paper** | Syam, Hess, & Yang (2012) | **This****paper** |
|  |  |  |  |  |
| **Quota or Commission** | Lazear & Rosen (1981)Green & Stokey (1983)Nalebuff & Stiglitz (1983)Kim (1997)Syam, Hess, & Yang (2012) | Kräkel (2008b)**This** **paper** | Syam, Hess, & Yang (2012) | **This****paper** |
| Handicapped Quota | Syam, Hess, & Yang (2012) | **This****paper** |  | **This****paper** |
|  |  |  |  |  |
| Comparisons |  |  |  |  |
| **Contest vs. Quota** | Syam, Hess, & Yang (2012) | **This****paper** | Syam, Hess, & Yang (2012) | **This****paper** |
| C**ontest vs. Commission** | Lazear & Rosen (1981)Green & Stokey (1983)Nalebuff & Stiglitz (1983)Syam, Hess, & Yang (2012) |  | Syam, Hess, & Yang (2012) |  |

**Table1. Models of Multi-Agent Payment Systems:**

**Asymmetric Sales Reponses and Emotional Rewards**

**2. Sales Quota and Sales Contest**

Suppose a risk-neutral firm employs two risk-neutral salespersons who will exert efforts to sell the firm’s goods. Each salesperson is assigned to a separate territory, i=1, 2. The firm cannot observe the levels of salespersons’ effort, ei, but can observe dollar sales, si. The sales in a territory depend not only on the salesperson’s level of effort but also on the territory potential. Without loss of generality, we assume territory 1 is the stronger territory. In particular, the sales in territory 1 is , and the sales in territory 2 is , where 0<k<½ is the advantage of territory 1 over territory 2, ei is the effort level of salesperson in territory i, and a random component of sales, i, is uniformly distributed on the interval [- ½ , ½ ]. The functional forms of the sales response functions are exactly as in Kräkel (2008a) who interprets the exogenous constant as agents’ ability, whereas we interpret it as territory imbalance. Sales in territory 1 are shifted up by k and the sales in territory 2 are shifted down by the same amount; we limit the imbalance k to ½ so that sales are never below baseline with certainty. The reader could think of an average level of sales across the two territories with one territory enjoying an advantage over the other.

The random variable, i, independent and identically distributed across different territories, reflects the sales influenced by territory-specific environmental shocks outside the salespersons’ control. The assumption of independence is chosen to level the playing field to focus just on territory imbalance. If there were common shocks, they would cancel in a comparison of sales in a contest but would not disappear in a quota system.

**2.1 Bonus-Quota**

 Consider a quota payment system. In a quota system the salesperson is entitled to a bonus B only if sales exceeds a pre-specified quota, Q, and not otherwise:

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The quota payment in (1) gives the firm two facets to control, B and Q, the same number as the winning and losing prizes in a sales contest, as analyzed in the next subsection.

In this section, we assume that the firm sets the same payment plan in each territory. This is not uncommon in practice where the costs of developing complex plans and managing ex post conflict amongst salespeople often induce managers to offer common plans. As noted by Misra, et al. (2012), “While reasons are varied, full or partial uniformity is an ubiquitous feature of real-world salesforce compensation.”[[1]](#footnote-1)

The salesperson derives extrinsic benefits from the income received for working, but may also have intrinsic utility from a job well-done. Specifically, if the salesperson is able to achieve the quota there is pride, a positive emotion felt when a sales goal is accomplished. On the other hand, if the salesperson fails to earn a sales bonus there is disappointment, a negative emotion felt when there is failure to achieve a goal. This operationalization of emotions is the same as in Kräkel (2008a) who investigated only emotions in contests whereas we analyze emotions in both a contest and a quota scheme. Throughout this paper we will mnemonically denote the utility associated with pride by the symbol  and the utility associated with disappointment by . The salesperson in the stronger territory 1 may have different emotions than the salesperson in the weaker territory 2, so we will include a subscript in pride and disappointment to indicate the territory. Finally, it is possible that the emotions depend on whether the goal is to achieve a firm given quota or to outsell a fellow salesperson, so we will add a superscript to indicate whether the case is quota or sales contest.

 The combination of extrinsic financial reward and intrinsic emotional reward leads to utility in a quota:

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Efforts are costly to the salespeople and rise quadratically with effort in our model, ½ ei2.

 Achieving quota is never certain. The probability that the salesperson assigned the stronger territory 1 can make the sales quota is P1=½ + k - Q + e1, while the probability in territory 2 is smaller, P2=½ - k - Q + e2. The expected net utility of the salesperson assigned to territory i is EUi=(B+iQ)Pi+(0-iQ)(1-Pi)–½ei2. Notice that in the expected utility the agent fully anticipates the emotions that will be felt in the future depending upon success or failure in achieving quota. Such affective forecasts have been studied in other contexts (Syam et. al. 2008).

 The efforts that maximize these expected net utilities in the two territories are

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Notice that while these partial equilibrium efforts increase with emotional rewards (obtaining pride or avoiding disappointment), they do not depend on the quota or the degree of imbalance between territories. This is because added effort improves sales the same amount whether the current sales are near or far from the quota.

 Chen et al. (2011, p.872) say, “For favorites, we assume that they expect themselves

and other favorites to win. Hence, receiving a prize does not provide favorites any additional psychological utility gains… Underdogs, on the other hand, are assumed to expect to lose because they compete with an initial disadvantage. Hence, losing in the tournament

does not bring any psychological disutility.” Kräkel (2008a, p. 209) agrees with this when he says, “If, for example, agents do not feel strong emotions when losing (winning) against more (less)able opponents as this outcome is the most likely one, then the only emotions that matter arise when strong contestants lose against less able ones and when low able agents win against predominant opponents.” As a consequence, we will reduce the mathematical notation from this point forward by assuming that in the stronger territory 1 the salesperson feels no pride from making quota, 1Q =0, and that in the weaker territory 2 the salesperson feels no disappointment, 2Q =0.

 With the efforts of (3), the probability of making quota is higher in the strong territory 1 if and only if

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Inequality (4) states that differences in intrinsic emotional rewards across territories are not so strong as to reverse the basic economics of territorial imbalance. Emotions associated with the job accomplishments tend to increase the advantage in the strong territory and reduce the disadvantage in the weak territory. That is, *intrinsic emotions in the strong territory implicitly increase imbalance while emotions in the weak territory implicitly reduce imbalance.* The psychology of decision making (Kahneman and Tversky 1979 and Thaler 1985) suggests that losses are felt more deeply than gains; in our context this would imply that. Finally, while emotions of pride and disappointment may be significant, we assume that the economic issues are not dominated by the emotional matters;  and. Either of these assumptions immediately imply inequality (4).

 The maximum utility in the weaker territory 2 is

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Inequality (4) implies that the agent in territory 2 has a smaller utility than in territory 1 and it is appropriate for the firm to focus on getting participation by this agent. Setting EU2 to zero and solving for the quota that motivates participation in the weaker territory gives. Because it is more difficult to motivate participation in the weaker territory, the quota depends upon pride in the weaker territory.[[2]](#footnote-2) Greater emotions in the other, stronger, territory have no direct effect on quota. The probability that both salespeople make quota is , which after substituting the above quota reduces to .

 We can write profit only as a function of the bonus:

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Maximizing profit, the optimal bonus is

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The bonus is reduced if there is greater disappointment in the strong territory because this leads to greater effort in that territory and thus more frequent payouts of the bonus. On the other hand greater pride in the weaker territory is neutralized by an increase in quota, so the bonus is independent of 2C.

Back substitution gives profits, efforts and quotas in the full equilibrium:

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 The envelope theorem says that emotions have a direct effect on profits, , and an indirect effect, , but this indirect effect vanishes because the bonus is optimally chosen to have zero marginal profits. As a result it is easy to see from (6) that the direct effect of pride is 1 and the direct effect of disappointment is 1-B, both of which must be positive. This follows because effort rises directly with emotions in (3) and the probability of paying the bonus rises with disappointment. Finally, suppose that emotions rise an equal amount  in both territories,  and . By the envelope theorem, the direct effect of increases in emotionality  is 2-B and this will be greater than 1. Proofs are in the Appendix.

**Proposition 1**: In the optimal bonus and quota plan:

1. Profits increase in pride in the weaker territory and disappointment in the stronger territory.
2. If pride and disappointment increase by an equal amount in both territories, profits rise by a multiple of greater than 1.

**2.2 Sales Contest**

Now consider a sales contest between two salespersons with a bonus paid to the one with the higher sales:

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The contest has two prizes, L and L+B, with L given to the contest loser and L+B given to the contest winner.[[3]](#footnote-3)

 The combination of extrinsic financial and intrinsic emotional reward leads to utility in a

contest of

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Winning the sales contest is not certain because of the random components of sales. The probability that the salesperson in territory 1 wins the sales contest is Probability(s1≥s2) = P1 =

1-½(1+e2-e1-2k)2, given e1-(1-2k) ≤e2≤e1+2k. As a result the expected net utility of the salesperson assigned to territory 1 is

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|  | EU1=L-1C+(B+1C+1C)P1- ½ e12. | ( |

The expected net utility in territory 2 is

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|  | EU2=L-2C+(B+2C+2C)(1-P1)- ½ e22. | ( |

 Nash equilibrium efforts by the two rival salespeople are found by simultaneously setting the derivatives of the expected utility with respect to the appropriate effort equal to zero and

solving the two equations to get

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 Notice that emotions effect effort in two ways. First, both salespersons’ efforts tend to increase with their own emotions (see term in square brackets on the right hand side). This is akin to the ‘main’ effect of emotions, adding an intrinsic reward to the extrinsic financial reward from winning, B. Second, efforts are also dependent on total imbalance of the territories correcting for intrinsic emotions. This can be thought of as the ‘strategic effect’ of emotions which affects effort through its implicit effect on territory imbalance. Specifically, the term in curly braces in the denominator, {(k+1C+1C) – (-k+2C+2C)}, is the measure of the ‘emotion-adjusted’ territorial imbalance (see inequality (4)), as opposed to k - (-k) = 2k, the ‘real’ economic territorial imbalance. One can show that both efforts decrease as territories become more imbalanced. The salesperson in the weaker territory is discouraged by greater imbalance; the salesperson in the stronger territory mimics the other’s effort and depends on the sales advantage to win the contest. However, emotions may or may not exacerbate the emotion-adjusted imbalance, because this depends upon the difference (1C+1C) – (2C+2C).

 The full equilibrium efforts must take into account the optimal bonus, B\*, which remains to be solved for. As we did in the analysis of the quota, we will again assume that in the stronger territory the salesperson feels no pride from winning a contest because he is the favorite and that in the weaker territory the salesperson feels no disappointment in losing because he is the underdog. The prior assumptions on levels of emotions imply that territory 1 is the stronger territory including intrinsic motivation.

 The resulting probability that salesperson in territory 1 wins the contest is

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This is independent of the bonus because extrinsic rewards drive both salespeople equivalently. Given this and the efforts (16), the expected utility of the salesperson in the weaker territory 2 is

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The participation of this salesperson requires that this be at least zero.[[4]](#footnote-4) Solving for the losing prize that is just sufficient for participation gives:

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 The expected profit consists to the total expected efforts (terms k and –k cancel and the expected value of i is zero) minus two salaries and one bonus (only one salesperson wins the contest). This permits us to write profit as a function of the bonus for winning the contest:

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The expected profit maximizing bonus is therefore

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If disappointment in the strong territory is stronger, this implicitly increases imbalance and, as seen above, discourages effort. The firm has less incentive to pay a bonus in this less effective contest. If pride in the weaker territory is stronger, there are two effects: a direct reward effect and a territory balancing effect. Because the intrinsic reward (pride) is greater in territory 2, the firm can reduce its extrinsic reward B without fear of losing the employee. On the other hand, stronger emotions in the weaker territory implicitly makes the territories more balanced and as discussed above, this tends to encourage effort and hence give the firm an incentive to pay a larger bonus. The net effect on the bonus is indeterminate.

 Back substitution from the optimal bonus in (21) gives the full equilibrium efforts:

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Substituting the efforts, the optimal maximized profits with a contest equals,

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Consider the equilibrium efforts in (22) and (23). Notice that they depend upon the difference between the disappointment in the strong territory and the pride in the weak territory. Hence a uniform increase in the emotional utility of salespeople will have no effect on their effort choices. What about independent changes of the emotions in the two territories? If disappointment in the strong territory increases, the motivation to avoid the loss of the contest tends to increase effort in territory 1 but more imbalanced territories tend to reduce effort (recall that emotions in the strong territory increase emotion-adjusted imbalance). One can show that so long as the implicit imbalance remains (see inequality (2)), the latter dominates and effort decreases in territory 1. It is also clear that the increased implicit imbalance discourages effort in the weaker territory 2. Thus, greater disappointment in the strong territory decreases effort in both territories. If pride in the weak territory increases, then effort goes up in that territory as the salesperson seeks the stronger emotional rewards in a more implicitly balanced contest (increased pride in the weak territory reduces emotion-adjusted imbalance). The salesperson in the stronger territory needs to match his rival, counting on territorial imbalance to win the contest. That is, greater pride in the weak territory stokes effort in both territories.

Turning to profits, notice that the first term in the profit formula (24) is 2C. This appears because the firm needs to convince the salesperson in the weak territory 2 to participate. If this salesperson has intrinsic pride from winning the contest (that is, 2C), the firm need not provide as large a financial reward to maintain participation and this cost reduction increases profits. We can show that an increase in pride in territory 2 increases profits in the contest. Disappointment in the strong territory only indirectly influences profits by implicitly increasing the emotion-adjusted imbalance of the territories: (k+1C)-(-k+2C) increases with disappointment. In a model with territory imbalance but no emotions, Syam, Hess and Yang (2012) show that profits in a contest fall with imbalance because this discourages sales effort. This carries over for disappointment in the strong territory and an increase in 1C reduces profits when k is not too large. If both disappointment and pride increase equally, this has no effect on emotion-adjusted territory imbalance, but the firm can reduce the bonus without losing the salesperson in the weak territory; this improves the firm’s profits. Thus we have the following.

**Proposition 2**: In the optimal contest,

1. Profits increase in pride in the weaker territory and decrease in disappointment in the stronger territory (if imbalance is not too large).
2. If pride and disappointment increase by an equal amount in both territories, profits rise by the same amount.

It is important to point out two significant differences between our results and those in the extant literature which incorporates emotions in contests. First, Chen, Ham and Lim (2011) find that the agents’ efforts depend on emotions. However, they have only focused on the agent’s efforts *given* *exogenous prizes* and have not endogenized the prizes offered by the principal. In other words, they have looked at the equivalent of the partial equilibrium equation (16) rather than full equilibrium equations (22)-(23). In the full equilibrium, after accounting for optimization of the prizes by the firm, the efforts of both salespeople increase in the pride in the weaker territory and decrease in the disappointment in the stronger territory. However, an equal change in emotional utility in both territories has no effect on the efforts expended.

Second, Kräkel (2008a) has endogenized tournament prizes, but all he says is that pride and disappointment may or may not improve the firm’s profits (Proposition 2, p.210). Essentially his result says that anything can happen and so is very non-specific. Improving on Kräkel’s result, we can provide sharper predictions regarding the effect of emotions on profits from the contest: increase in pride in territory 2 increases profits in the contest whereas increase in disappointment in territory 1 decreases profits.

**3. Comparing Contest and Quota Under Pride and Disappointment**

 The expected profits for quota and contest have been expressed in equations (8) and (24), respectively, as functions of territory imbalance, k, disappointment in the strong territory and pride in the weak territory. To simplify exposition we will begin the comparison by assuming that pride of winning the contest is equally strong as pride in making quota,  and similarly for disappointment, . It is very plausible that emotions are stronger in a contest, where a salesperson is trying to outsell someone that they know personally, than in a quota system where a salesperson is just trying to achieve a sales target set by the firm (Kilduff et al. 2010). Later we will address the situation where pride and disappointment are larger in a contest than in a quota.

 Let us begin by assuming there are no intrinsic emotional motivations. The simplified profits of quota and contest are  and . Clearly, when there is no thrill of victory or agony of defeat with imbalanced territories, the quota is more profitable than the contest. This was previously reported in Syam, Hess and Yang (2012). Their basic logic was that with imbalanced territories, the salesperson in the stronger territory cannot see how he could lose and the salesperson in the weaker territory cannot imagine how he can win a sales contest. All the salesperson in the stronger territory needs to do is to mimic the effort exerted by the agent in the weaker territory and simply allow the territorial advantage to win the contest. On the other hand, such imitation plays no role if the bonus is rewarded for independently achieving a predetermined quota.

 What happens to these profits if the emotions associated with winning or avoiding losing are stronger? As seen in Propositions 1 and 2, if the salesperson in the strong territory is more strongly disappointed in not achieving their goal, the profit of the quota goes up and the profit of the contest goes down. The basic intuition for this is that increasing disappointment in the strong territory implicitly makes the two territories more imbalanced and this has a greater negative impact when one territory’s sales are contrasted to the other (contest), rather than to a predetermined standard (quota). Because the quota system begins with an imbalance-induced advantage, an increase in disappointment makes the advantage even greater.

 One the other hand, if the salesperson in the weak territory is more strongly proud profits rise in both the quota and the contest. In the contest there are two complementary driving forces: increased intrinsic rewards and improved balance of the territories (recall that pride reduces implicit imbalance). These two positive forces amplify each other and so increased pride has a larger effect in a contest compared to a quota. As a result, as 2 increases, the advantage of the quota due to territory imbalance shrinks. However, for all practical levels of pride, the quota’s imbalance-generated advantage is not completely overcome by emotional rewards.

 Finally, what happens to quota’s advantage if pride and disappointment increase in equal amounts? This gives a differential benefit to the quota, enlarging its imbalance-based advantage. The reason is that an equal increase in 2 and 1 has no effect on the emotion-adjusted territorial imbalance, (k+1)-(-k+2). This reduces the impact of pride in the contest and thus the gap between contest and quota widens.

**Proposition 3**: If emotional levels are independent of the payment system and territories are imbalanced then,

1. The profit advantage of the quota over the contest decreases with an increase in pride in the weaker territory
2. The profit advantage of the quota over the contest increases with an increase in disappointment in the stronger territory.
3. If pride and disappointment increase by an equal amount in both territories, the gap between quota and contest profits widens.

The result in Proposition 3 is new since the extant literature comparing different schemes has ignored emotions. Part (a) says that pride in the weaker territory increases profits for both the contest and the quota but it benefits the contest more. In contrast Syam, Hess and Yang (2012) find that when emotions are ignored, territory imbalance decreases profits for the contest and the quota but it hurts the contest more.

 So far we have assumed in this section that the emotions in a contest are just as strong as those in a quota. However, contrary to the classic line from the movies, “It’s not personal; it’s strictly business,” a sales contest can be very personal. One might expect that beating a notable colleague in a sales contest is likely to give rise to stronger emotions than merely exceeding an impersonal sales quota: “I really want to win the contest to show Tom who is the better salesperson!” In fact, from a relational point view of competition, rivalry between two individuals can magnify competitors’ psychological stakes independent of objectives stakes (Kilduff et al. 2010). If so, can the advantage of the quota due to imbalanced territories be overcome by intrinsic emotional motivations? The answer is, “Yes.” Suppose we begin without emotions at point 0 in Figure 1, and allow pride and disappointment to intensify only in the contest.[[5]](#footnote-5) It is straightforward to show that the profits of the contest can exceed the profits of the quota without emotions. For example, if k=0.1, , and , then .

**Proposition 4**: Suppose the contest engenders significantly stronger pride and disappointment than does a quota. Even though the quota system has a natural advantage with imbalanced territories, the emotional motivations of the contest can make it the more profitable compensation system.

This result is also new to the literature. In the absence of emotions, the extant literature comparing relative and absolute schemes finds that the quota is either equivalent to the contest or dominates it (Lazear and Rosen 1981; Green and Stokey 1983; Syam, Hess and Yang 2012), unless there are sizeable common shocks. We have shown that when agents’ emotions are properly accounted for in compensation plans, the contest can dominate the quota *even* in the absence of common shocks. Of course, if there are common shocks this advantage of the contest will be even more pronounced.

 The above comparison of contests and quotas naturally leads one to ask how this comparison would be affected if the territories could be handicapped so that the imbalance is contractually eliminated. Handicapping of the contest can be done if the firm compares the sales from the two territories, explicitly accounting for the fact that territory 2 is disadvantaged, a la Lazear and Rosen (1981). Handicapping of the quota can be done simply by setting territory-specific quotas. It can be shown that optimally handicapping the contest and quota neutralizes the effect of imbalance, and the agents’ efforts and firm’s profits are those that would obtain if territories were balanced (see Syam, Hess and Yang 2012).

However, this may have an unintended consequence of eliminating the strong emotions associated with the job, since it is the imbalanced nature of the territories that engenders the strong emotions as alluded to in Sections 2 and 3. Imbalance in territories creates an underdog versus favorite situation and gives rise to stronger emotions associated with winning or losing compared to a situation of no imbalance (see also Kräkel 2008a). There can be pride associated with winning the contest even when the territories are balanced, but this pride will be stronger if the territories are imbalanced and the agent who has won is in the weaker territory and had to overcome a serious disadvantage. Similarly, the disappointment of losing will be stronger if there is imbalance and the agent who has lost is in the stronger territory, compared to a situation where there is no imbalance and the losing agent had a territory of similar potential as the winning agent. Thus, and can be thought of as the strong emotions of pride and disappointment engendered by territorial imbalance. Suppose that the firm can eliminate imbalance and set k=0 at the consequence of also setting a common emotionality  equal to zero. The profits in a contest change from  to 1. Similarly, the profits in the quota system would change from  to 1 if the territories were balanced by a handicapped quota system. In both cases, the firm’s profit would be larger without handicapping than with it if the emotions are large.[[6]](#footnote-6) As seen in Figure 1a and 1b, for large emotions, it does not pay to handicap a sales contest or a quota. This provides a new rationale for why we sometimes observe common compensation schemes even when agents are heterogeneous. Moreover, as far as bonus-quota schemes are concerned, firms often offer uniform bonuses but set different quotas across territories. We show that it may actually be optimal to also set uniform quotas, which are also simpler to manage, when agents’ emotions are taken into account.

Territory

Imbalance, k

Emotionality, C

0.8

0.20

Unprofitable to Handicap **Contest**

Emotionality, Q

0.8

0.20

Unprofitable to Handicap **Quota**

Territory

Imbalance, k

a.

b.

**Figure 1: Region of Unprofitable Handicapping of Contest and Quota**

**as a Function of Emotions and Territory Imbalance**

 As already mentioned, it is conceivable that the contest engenders stronger emotions compared to the quota. If so, it is possible that the firm would want to handicap a quota system, but not a contest.

**Proposition 5**: If pride and disappointment are large, then handicapping the territories is unprofitable for either contest or quota. If, in addition, the interpersonal character of the contest makes the strength of pride and disappointment greater in contests than in the quota, the firm may profit from handicapping a quota but not from handicapping a contest.

Thus, by incorporating agents’ emotions into contests and quotas, our theory provides a rationale for each of two commonly observed anecdotal practices regarding handicapping of compensation systems: first, we do not see handicapped contests or quotas as often as un-handicapped ones and second, when we do see them, it is much more common to see handicapped quotas rather than handicapped contests. Of course, if the emotionality is small, the firm will still find it optimal to handicap the territories.

**4. Conclusion**

 In this research we examined the effect of pride and disappointment in the choice between sales contests and quotas when sales territories are imbalanced. Since an agent in a stronger territory is expected to do well, she feels disappointment if she loses a contest or fails to make quota. Similarly, an agent in a weaker territory feels pride if she wins a contest or makes quota.

 Our major result is that emotions can make a contest more profitable than a quota system. This result is novel because in the absence of common shocks quotas generally dominate contests on purely economic grounds.

 We also show that when emotions are strong, handicapping to reduce territory imbalance may be counterproductive. The reason is that territory imbalance enhances agents’ and agents’ emotions increase profits. Since we expect emotions to run higher in contests than in quota systems, this result implies that the firm will be better off not handicap a contest even while it finds it optimal to handicap a quota system. Thus our analysis provides a new rational for why common (non-handicapped) compensation schemes, especially contest, are often uniform, even when agents are heterogeneous.

(This is a newly added paragraph by Dr. Syam.)As far as handicapping is concerned, our results have two practical implications. First, our analysis provides a new rationale for why we sometimes see common (non-handicapped) compensation schemes even when agents are heterogeneous. Second, when it comes to bonus-quota schemes, firms often offer uniform bonuses but have different quotas across territories. We show that it may actually be optimal to also set uniform quotas, which are also simpler to manage, when agents’ emotions are taken into account. We also provide a rationale for why we see more instances of handicapped quotas compared to handicapped contests.

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**Appendix**

**Quota**

Achieving quota is never certain. The probability that the salesperson assigned the stronger territory 1 can make the sales quota is P1=½ + k - Q + e1, while the probability in territory 2 is smaller, P2=½ - k - Q + e2. The expected net utility of the salesperson assigned to territory i is EUi=(B+i)Pi+(0-i)(1-Pi)– ½ei2. Specifically, EU1=(B)P1+(0-1)(1-P1)– ½e12 =-1+(B+1)(½ + k - Q + e1) – ½ei2. Take the derivative and set to zero, , to get the optimal effort e1=B+1. Similarly for territory 2, EU2=(B+2)P2+0(1-P2)– ½e22=(B+2)( ½ - k - Q + e2)– ½e22 and the first order condition is  and the resulting effort is e2=B+2.

Back substituting in territory 2 give .

Solve for Q: . Substituting Q gives the expected profit is



The first order condition , yields the bonus B=1-k -½ δ, and back substituting gives



|  |
| --- |
|  , |
| , |
| ,, .Note that we have to restrict k, 1, and 2 so that efforts, bonus, quota, probability of making quota are all sensible. First, we need P1<1 or . We also need P2<1 or . Finally we need  for territory 1 to be stronger. Note that the first two inequalities cross at 1=2(1-k). But the first and third inequalities also cross at this point. Since the third inequality is stricter than the second, we can ignore the second.  |

**Contest**

Expected utilities are of the form EU2=L+(B+2)(1-P1)- ½ e22 while probability of winning the contest are Prob(s1≥s2) = P1= 1-½(1+e2-e1-2k)2. The utility maximizing efforts of both salespeople are .
Back substituting gives



Solving this for losing prize L and substituting into the expected profits gives,

The first order condition for the bonus is





Hence the optimal bonus isMaximized profit is



which can be simplified to



|  |
| --- |
|  , |
| . |

**Proof of Proposition 1.**

**a.** Taking derivatives gives and>0, so this derivative with respect to  is positive.

**b.** Suppose that . Then



**Proof of Proposition 2.**

*Proof that EC increases with 2*: The expected profit is ,which can be simplified by writing . Thus, expected profit is . The total derivative with respect to 2 can be thought of as having a direct and indirect part: . The partial derivative with respect to Z is , which can be factored as . The requirements that  and that P1Q≤1 (from Section 2.1 this is ≥-(1-3k)+3/2 1) means that pride and disappointment must be in the shaded region in Figure 2. We also assume that e2C>0 when there are no emotions, which implies that . For the purpose of the proof we also consider values where 1=0 and 2 is below zero but above –(2/3-2k).



**Figure 2**

Suppose that 1=0 and 2=-(2/3-2k). This implies that . Given the factorization of the total derivative given above, if Z<2.11, then the derivative is greater than 1, i.e.  But this inequality is equivalent to  Thus for k < 0.2 we have that  The second derivative of the profit function with respect to 2 is . The second partial derivative with respect to Z is  This implies that the derivative  starts above 1 and gets larger as 2 increases in the interval [-(2/3-2k), 2k].

Suppose that we begin at a disappointment and pride (0, 20) and then increase each value by an equal amount to that we reach a new value (, 20+). The value of Z does not change, but 2 becomes progressively larger. Each point in the shaded region could be increased by a small amount holding 1 constant. That is, we move from (1, 2) to (1, 2+d2). This could be thought of as decomposed into (1, 2) = (, 20) +(, ) and (1, 2+d2) = (, 20+d)+(, ). The upward change improves profits and the equal displacement in emotional utility leaves this improvement unaffected. Hence, when the only change is an increase in pride in the weaker territory 2, the profits must increase, as was to be shown.

*Proof that EC decreases with 1*. As above the total derivative with respect to 1 is . As above, . Let us limit ourselves to 2=0 and start at 1=0, where Z=1/(1-2k). The term Z-2.11 is negative if k<(2.11-1)/2×2.11=.26. Suppose that you go to 1=2/3-2k. Then Z-2.11 is negative if k<1/2 – 1/(3×(2.11-1))=.20. Since Z is linear in 1, if k<.20,  for all 1∈[0, 2/3-2k]. By expanding each such point by (, ), this shows that for k<0, the negative effect occurs in the cross hatched region in Figure 3. To get the remainder of the region, we would have to start with negative 1. Let 1=-2k, so that Z=1. Then clearly Z-2.11<0. Again because Z is linear in 1, this implies that for k<.20,  for all 1∈[-2k, 2/3-2k]. Hence, for k<.20, this implies that profit decreases in disappointment for all legitimate emotion levels.



**Figure 3**

**Proof of Proposition 3.** Start with 1=0, so profits are andwhere .

When 2=2k, Z=1 and  > . At 2=0, Z=1/(1-2k) and  > .



**Figure 4**

At 2=-(2/3-2k), this implies that .

As seen above the derivative of EC is  where . At 2k, this gives . The second derivative is . Hence, the profit curve lies below the chord connecting the profits at 0 and 2k, and hence EQ≥EC for all reasonable 2 when 1=0 as seen in Figure 4.

 When 1=0, the gap between EQ and EC is maximized when 2 is the value where. This occurs when Z=2.11. At 2=-2/3+2k, this requires k<0.20. Hence if this is true of k and 1=0, as 2 increases the gap between contest and quota shrinks. Now free 1 to be positive. Any location can be reached by starting at (0, 2) and adding (,) to it. As we have seen this causes the gap to widen, but if you fix 1 and increase 2 the effect on the gap is driven by the effect at (0, 2). For any 1, increase in 2 shrinks the gap.

**Proof of Proposition 5.**

Contest with Handicapping:

Because of the known advantage of territory 1 over territory 2, it seems unfair for the contest to compare sales that are in part beyond the control of the salespeople. Suppose instead that the weaker territory 2 is given an accounting head start in an amount h. That is, for the purposes of the contest, sales are treated as though they were are s1-h and s2+h. Let the handicapped imbalance be denoted K≡k-h. The equilibrium effort levels that result are . The maximum efforts are achieved at K=0. By deducting this implied handicap h=k from territory 1 and adding it to territory 2, the problem reduces to the balanced case. For the handicapped contest the efforts are, , and the profit is.

Quota with Handicapping (Dual Quota Plans):

Consider territory-specific quotas. The quota for territory 1, Q1, is greater than the quota for territory 2, Q2, due to the territory imbalance. The sales of territory 1 are  and the sales of territory 2 are . The probabilities of making quotas respectively The efforts in terms of bonus are . Binding at both participation constraints, quotas in terms of bonus are  and . So we rewrite the expected profit in terms of B only,  This gives B=1 and the equilibrium, quotas, effort levels, and firm’s profit are easily obtained. The equilibrium effort levels are , and the firm’s profit for the dual quota are given as.

 Thus handicapping of the contest and quota correct for territory imbalance and the agents’ efforts and firm’s profit are those that would be obtained if territories were balanced.

Suppose that k≤0.2 and that intensity of emotions are at point A where C=2(1-3k). This satisfies if . The roots of this inequality are 0.202 and above, so for all assumed k, this inequality holds and handicapping the contest reduces the expected profits. In the context of quotas, for any value of k all one needs to start with emotions near zero and handicapping will help balance the territories with only a small reduction in emotional motivation.

1. We have also analyzed a situation wherein the principal sets territory specific quotas, called ‘handicapped’ quotas, and contests which account for territory imbalance, called ‘handicapped’ contests. A major result of our paper is to point out the non-optimality of handicapping quotas and contests when agents’ strong emotions are taken into account. See the discussion at the end of Section 3. [↑](#footnote-ref-1)
2. It can be shown that the firm will sell in both territories rather than only in the stronger territory 1 as long as the imbalance is not too large. Specifically, we can show that the sufficient condition for the firm to sell to both territories is: . This condition does not conflict with any of our other parametric restrictions. [↑](#footnote-ref-2)
3. Our comparison of a contest and a quota is best seen a comparison of *short-term* incentives. It is assumed that the short-term incentive sits on top of a base salary that is outside of our model. In both the contest and a quota the agents get a bonus if they beat the other rival or if they exceed quota. The L in the contest case given in equation (12) should be interpreted as the losing prize (and not as the base salary). Thus both the contest and the quota have the same number of decision variables: L and B for the contest and Q and B for the quota. [↑](#footnote-ref-3)
4. It can be shown that it is rational to focus on participation by the weaker territory 2 as long as the emotions are not so strong as to overturn the basic economics of territory imbalance. Specifically, a sufficient condition for it to be rational to bind EU2 is that: δ1C <2k and π2C <2k. This is consistent with our assumption for the Bonus-Quota case as given in Section 2.1. [↑](#footnote-ref-4)
5. The emotions in the quota are set to zero only for analytical simplicity. Clearly our result will hold as long as the contest engenders sufficiently stronger emotions compared to the quota. [↑](#footnote-ref-5)
6. Profit with a contest would be higher without handicapping if , and profit with a quota would be higher without handicapping if . [↑](#footnote-ref-6)