Paper

Risk-Taking Tendencies and Fixed Salary/Commission Rates in Salesforce Compensation Arrangements: A Prospect-Agency-Theoretical Perspective

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Risk-Taking Tendencies and Fixed Salary/Commission Rates in Salesforce Compensation Arrangements: A Prospect-Agency-Theoretical Perspective

An analytical model for risk taking tendencies in salesforce compensation arrangements is developed that takes into account fixed salary levels and commission rates. The model demonstrates that a salesperson's preference for a particular compensation contract is contingent on his/her anticipated level of total compensation (fixed salary plus commission-based compensation) and his/her degree of loss aversion. The conceptualisation differs from known models and is based on an integration of agency and prospect theory.

Keywords: sales management, salesforce remuneration, agency theory

Introduction

The basic structure of salesforce remuneration arrangements can be either based on straight salary or straight commission only, or on a combination of both. Such arrangements have been explained theoretically using agency theoretic frameworks (e.g. Krafft, 1999; Srinivasan and Lal, 1993). The analogy of salesforce relationships to relationships analyzed in agency theory lies in viewing salespeople as agents who sell on behalf of organizations which are their principals. The focus of resultant arrangements between salespeople and their organizations in uncertain environments is on designing risk-sharing contracts, that are characterized by agents who are believed to have more information than principals, in order to minimize those costs to the principal that are caused through an agent who is believed to be motivated by self-interest.

While agency theory is built on rationality and self-interest, from behavioural psychological suggests that individuals do not necessarily behave rationally. As such behaviour of salespeople in salesforce relationships cannot necessarily be assumed to be rational. Several empirical findings demonstrate that agency theoretic assumptions and associated predictions for salesforce compensation arrangements do not hold under all circumstances. For example, Krafft (1999) and Lal, Outland and Staelin (1994) found that salespeople are not necessarily risk averse and more specifically, Albers and Krafft (1992) found that only 30 percent of salespeople are risk averse whereas 40 percent are risk neutral and 30 percent risk seeking. Moreover, contrary to agency theory predictions, Coughlan and Narasimhan (1992) and Krafft (1999) found that salespeople facing higher environmental uncertainty do not necessarily have a higher proportion of straight salary, as agency theoretic models would predict it. Further, there seems to be no empirical study which shows that salespeople intend to maximize their utility, but notwithstanding among practitioners it is assumed that salespeople have specific anticipated levels of total compensation and that they accordingly determine their overall level of effort to accomplish their anticipated level of total compensation. Those findings indicate that agency theory predictions that are based on agents that behave according to utility theory are not necessarily always accurate. Hence, traditional agency theoretic models are limited in predicting fixed salary components and commission rates in salesforce arrangements.

In this paper it proposed that a salesperson's behaviour can be examined in a prospect theoretic framework. Such an integration of agency theory and prospect theory synthesizes constructs from both the field of behavioural psychology and the field of economics to obtain a more realistic framework for understanding salesforce compensation arrangements. The aim is to develop predictions according to this integrative framework. More specifically, the objective is (1) to specify the structures of compensation arrangements that are more likely to

be accepted by salespeople and (2) to determine a compensation arrangement that is likely to optimise an organization's objectives. These predictions are assumed to improve the external validity and explanatory completeness of marketing theory for salesforce compensation agreements.

Salesforce Dependent Profits

We consider a setting wherein a salesperson creates profits for an organization based on costs reductions and revenue increases. We distinguish gross profits, Π_G, and net profits, Π_N. Gross profits are enhanced through costs reductions [improved profit margin, α (e.g., efficiencies based on salesperson effort)], increases in revenues, R [e.g., sales effectiveness based on salesperson effort], or both. Net profits are the difference between gross profits and total remuneration, c, to the salesperson. This can be formally stated as:

$$\Pi_N = \alpha R - c \quad [1]$$

with:

$$\Pi_N = \Pi_G - c \quad [2]$$

$$\Pi_G = \alpha R \quad [3]$$

In this paper, we assume that profit margins are fixed and not influenced by a salesperson. Accordingly, an organization's net profits depend on revenues and total remuneration to the salesperson. In a salesforce context, revenues are modelled as a function of the agent's effort, b. Total remuneration to the salesperson consists of a fixed salary component, c_f, and a commission-based component, c_v. The latter component is contracted on gross profits, as those are observable. For ease in exposition, we assume that the amount of commission-based payments is linear in gross profits. This assumption is consistent with prior work that shows that linear relationships may be optimal in dynamic settings (e.g., Srinivasan and Lal, 1993). Hence, total remuneration is:

$$c = c_f + \mu \alpha \beta b \quad [4]$$

with:

$$c = c_f + c_v \quad [5]$$

$$c_v = \mu \Pi_G \quad \text{for } 0 < \mu \leq 1 \quad [6]$$

$$R = \beta b \quad \text{for } \beta > 0 \quad [7]$$

where, μ = commission rate, and β = productivity of agent effort.

Substituting R and c in Equation 1 by the terms in equations 4 and 7 allows us to model net profits as follows:

$$\Pi_N = \alpha \beta b - (c_f + \mu \alpha \beta b) \quad \text{or} \quad [8]$$

$$\Pi_N = (1-\mu) \alpha \beta b - c_f \quad [9]$$

The fixed salary component has the inherent properties of adverse selection and moral hazard in the relationship between the salesperson and the organization. As suggested in traditional agency theoretic models, an organization would try to reduce the fixed salary component as to not overpay the salesperson, if gross profits are not maximized. However, the principal has to design a compensation structure in which the fixed salary and commission-based components are acceptable to the salesperson.

Salespeople Preferences

Here, we propose that salespeople form their preferences for a given compensation structure based on prospect theory (e.g., Kahneman and Tversky, 1979). A salesperson's perceived foreseen state of well-being at the time of evaluating a remuneration arrangement is characterized by his/ her reference point: a reference point that, we propose, represents the

anticipated total level of remuneration. The prospect theory-typical shape of the value function suggests that a salesperson who has secured a level of income below his/her anticipated level of total income has a greater risk-taking tendency, whereas the same one, when he/she has secured an income level above the anticipated total level of remuneration is likely to be risk averse.

For salespeople who only receive straight fixed salary component their anticipated level of total remuneration will be equal to that fixed salary component. Whereas, for those who receive a fixed salary component plus a commission-based component or commission-based component only their anticipated total level of remuneration will be based on their judgment of an aggregation of their fixed salary component and their probable commission-based component. We argue that the difference between the level of fixed salary and anticipated total remuneration manifests a loss for the salesperson. Thus, salespeople who have a level of secured income below their anticipated total level of income perceive a loss and, accordingly, are likely to take greater risk, whereas those who have generated income levels above their anticipated levels perceive a gain and are likely to avoid risk. This might explain some empirical findings of Coughlan and Narasimhan (1992) and Krafft (1999) that unveiled that salespeople facing higher environmental uncertainty do not necessarily have a higher proportion of straight salary, as traditional agency theoretic models would predict it.

As has been taken into account in previous studies, we will analyse both a salesperson's utility for remuneration and for effort expended to the selling task. We will now state these value functions [$v_c(c)$ for remuneration and $v_b(b)$ for effort]; taking into account a value function with a reference point, RP, and a loss aversion l, standardized to the interval [-l, 1] with n as a standardization parameter and z, for $z > 0$, representing $z = 2 \cdot \ln\left(\frac{1}{k} - 1\right)$, with k as a parameter capturing the diminishing sensitivity of the function. k expresses the marginal increase in perceived value for k in the interval [0.5, 1]. If k = 1, the value function has a linear shape (von Nitzsch, 1998).

$$v_c(c) = \begin{cases} \dfrac{1 - e^{-z_c \cdot \left(\frac{c_f - c_e}{n_c}\right)}}{1 - e^{-z_c}} & \text{, if } c_f > c_e \\ -l_c \cdot \left(\dfrac{1 - e^{-z_c \cdot \left(\frac{c_e - c_f}{n_c}\right)}}{1 - e^{-z_c}} \right) & \text{, if } c_f \le c_e \end{cases}$$

where, $v_c(c)$ = perceived value for remuneration, c_f = fixed salary level, c_e = anticipated total remuneration, l_c = loss aversion parameter [compensation function], n_c = standardization parameter [compensation function], and z_c = diminishing sensitivity parameter [remuneration function].

$$v_b(b) = \begin{cases} \dfrac{1 - e^{-z_b \cdot \left(\frac{b_f - b_e}{n_b}\right)}}{1 - e^{-z_b}} & \text{, if } b_f > b_e \\ -l_b \cdot \left(\dfrac{1 - e^{-z_b \cdot \left(\frac{b_e - b_f}{n_b}\right)}}{1 - e^{-z_b}} \right) & \text{, if } b_f \le b_e \end{cases}$$

$$\frac{1-e^{-z_b\left(\frac{b_e-b_f}{n_b}\right)}}{1-e^{-z_b}} \qquad \text{, if } b_f \le b_e$$

where, $c_b(b)$ = perceived value [reduction] for effort expended, b_f = effort which corresponds to fixed salary level, b_e = anticipated total effort expended, l_b = loss aversion parameter [effort function], n_b = standardization parameter [effort function], z_b = diminishing sensitivity parameter [effort function] .

Optimisation Problem

Assuming that the salesperson gets a fixed salary component for b = 0, any reduction in value for additional effort devoted must be matched by an equal or greater increase in value for remuneration received. As such, the aggregation of an increase in value for remuneration received and reduction of value for additional effort expended must be equal or greater than the aggregation of the perceived value for an initial remuneration (fixed salary c_f) and initial effort expended (b = 0). This constraint can be stated as follows:

$$v(c, b) \ge v(c_f, 0)$$

For an organization this would be optimal, if the values are equal. Thus, we can re-write this constraint as:

$$v_c(c) + v_b(b) = v_c(c_f) + v_b(0)$$

or $$v_c(c) - v_c(c_f) = v_b(0) - v_b(b)$$

This is the only constraint that the organization has to take into account for designing an optimal compensation arrangement structure. This can be formalized as follows:

$$Max(\Pi_G - c) \qquad \text{subject to} \qquad [10]$$

$v_c(c) - v_c(c_f) = v_b(0) - v_b(b)$

The reference points c_e and b_e allow for eight (2^3) combinations of (c_f, c, b) as each parameter can be below or above the reference point. Here, we assume that $c_f < c$. This, in turn, makes the two combinations with c_f being greater than c_e and c being lower c_e infeasible. Hence, for the examination of the influence of the parameters c_e, c_f, z_c and l_c on μ for given values of the parameters c, n_c, z_b, n_b, l_b and b we assume that c_f is below c_e, c is above c_e and b is above b_e. Based on these assumptions the following constraint can be stated:

$$\frac{1-e^{-z_c\left(\frac{c_f+\mu\alpha\beta b-c_e}{n_c}\right)}}{1-e^{-z_c}} + l_c \cdot \left(\frac{1-e^{-z_c\left(\frac{c_e-c_f}{n_c}\right)}}{1-e^{-z_c}} \right) = \frac{1-e^{-z_b\left(\frac{b_e-0}{n_b}\right)}}{1-e^{-z_b}} + l_b \cdot \left(\frac{1-e^{-z_b\left(\frac{b-b_e}{n_b}\right)}}{1-e^{-z_b}} \right) \qquad [11]$$

with, $$\frac{1-e^{-z_b\left(\frac{b_e-0}{n_b}\right)}}{1-e^{-z_b}} = 1 \ ,$$

$$\frac{1-e^{-z_c\left(\frac{c_f+\mu\alpha\beta b-c_e}{n_c}\right)}}{1-e^{-z_c}} + l_c \cdot \left(\frac{1-e^{-z_c\left(\frac{c_e-c_f}{n_c}\right)}}{1-e^{-z_c}} \right) = 1 + l_b \cdot \left(\frac{1-e^{-z_b\left(\frac{b-b_e}{n_b}\right)}}{1-e^{-z_b}} \right) \qquad [12]$$

This can be solved for μ:

$$\mu = -\frac{n_c}{z_c \cdot \alpha \cdot \beta \cdot b} \cdot \ln\left[1-(1-e^{-z_c})\cdot\left(1+l_b\cdot\frac{1-e^{-z_b\left(\frac{b-b_e}{n_b}\right)}}{1-e^{-z_b}}-l_c\cdot\frac{1-e^{-z_c\left(\frac{c_e-c_f}{n_c}\right)}}{1-e^{-z_c}}\right)\right]+\frac{c_e-c_f}{\alpha\cdot\beta\cdot b}$$

[13]

Equation 13 shows that the commission rate, μ, decreases with increasing levels of fixed salary. Assuming that the anticipated total remuneration is known to the organization, a remuneration arrangement – combination of commission rate and fixed salary component – needs to decided upon that will optimise net profits. We will now substitute μ in equation [10] by the right term in equation [13]. This allows us to state the optimisation problem as follows:

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$$Max((1-\mu)\alpha\beta b)-c_f$$

or

$$Max\left(\alpha\beta b - c_e + \left(\frac{n_c}{z_c}\ln\left(1-(1-(1-\exp(-z_c)))\left(1+l_b\frac{1-\exp\left(-z_b\frac{b-b_e}{n_b}\right)}{1-\exp(-z_b)}-l_c\frac{1-\exp\left(-z_c\frac{c_e-c_f}{n_c}\right)}{1-\exp(-z_c)}\right)\right)\right)\right)$$

[14]

The optimal fixed salary level is given for $\Pi_N'(c_f) = 0$ and for $\Pi_N''(c_f) > 0$. $\Pi_N'(c_f)$ can be stated as follows:

$$\frac{d}{dc_f} = l_c \frac{-\exp\left(-z_c\frac{c_e-c_f}{n_c}\right)+\exp\left(\frac{-z_c c_e - z_c c_f + n_c z_b}{n_c}\right)}{\exp(-z_c)-\exp(-z_b-z_c)-l_b+l_b\exp\left(-z_b\frac{b-b_e}{n_b}\right)-l_b\exp\left(-\frac{z_b b - z_b b_e + z_c n_b}{n_b}\right)}$$
$$+l_c - l_c\exp(-z_c) - l_c\left(z_c\frac{c_e-c_f}{n}\right)+l_c\exp\left(-\frac{z_c c_e - z_c c_f + n_c z_b}{n_c}\right)$$

[15]

Conclusions

An analytical model for risk taking tendencies in salesforce compensation arrangements is developed that takes into account fixed salary levels and commission rates. The model demonstrates that a salesperson's preference for a particular compensation contract is contingent on his/her anticipated level of total compensation (fixed salary plus commission-based compensation) and his/her degree of loss aversion. Moreover, our model allows calculating an optimal level of fixed salary for a given anticipated level of total remuneration. The conceptualisation differs from known models and is based on an integration of agency and prospect theory.

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