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Voluntary Turnover and Job Performance: Curvilinearity and the Moderating Influences of Salary Growth, Promotions, and Labor Demand

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Keywords

human resource, human, resource, turnover, job, performance, salary, promotion, labor, demand, employee, industry, model, pay, perform, cost, promotion

Comments

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Abstract

In this study we investigated the relation between job performance and voluntary employee turnover for 5,143 exempt employees in a single firm in the petroleum industry. As hypothesized, we found support for Jackofsky's (1984) curvilinear hypothesis as turnover was higher for low and high performers than it was for average performers. Three potential moderators of this curvilinearity were examined in an attempt to explain conflicting results in the performance turnover literature and contradictory predictions from turnover models. As predicted, pay growth, promotions, and labor demand each differentially influenced the turnover patterns of low, average, and high performers. Most notably, paying high performers according to their performance predicted substantial decrements in turnover. A utility analysis indicated that the benefits of paying high performers according to their performance more than offset the costs and that such an approach was a superior strategy when compared to a more egalitarian pay growth policy.

The cost of voluntary employee turnover depends on many factors, including the relative supply and cost of replacements in either the internal or external labor market, the amount of training invested in the employee, and the performance level of the employee (Dalton, Todor, & Krackhardt, 1982; Boudreau & Berger, 1985; Hollenbeck & Williams, 1986). Where replacement costs are low and average performance of replacements is expected to be high, organizations can benefit from turnover of poor performers. In contrast, turnover of high performers is more likely to be dysfunctional for the organization (e.g., Park, Ofori-Dankworth, & Bishop, 1994; Schwab, 1991). Thus, it is important to identify the conditions under which high performers are most likely to voluntarily leave the organization.

This is especially true at higher job levels (i.e., salaried employees) of the organization, where, for several reasons, high performer turnover is more costly than at lower levels. For instance, because the standard deviation of performance tends to be greater in more complex jobs (Boudreau, 1992), top performer turnover in higher level jobs would result in greater performance losses than similar turnover in lower level jobs. Moreover, performance at higher job levels tends to have a larger impact on firm success and is more difficult and expensive to replace. Finally, turnover of top performers in higher level jobs may result in the loss of future leaders of the organization, suggesting that the importance of top performer turnover in the salaried ranks extends well beyond the short term performance losses associated with such withdrawal.

Review of the Literature

Theoretical Background

Despite the importance of developing an understanding of the relation between performance and turnover, theoretical models of voluntary employee turnover often yield no simple prediction concerning the link with employee performance (McEvoy & Cascio, 1987), and it is only through a somewhat more complex approach incorporating meaningful contingent factors that we can apply these models. For example, the March and Simon (1958) model, from which several other turnover models have been derived, suggests that turnover is a function of perceived ease of movement and perceived desirability of movement. The predicted interdependence between turnover, performance, and the ease of movement component is relatively straightforward. Performance would be expected to have a positive influence on ease of movement (both actual and perceived), resulting in a higher probability of turnover among high performers and a positive relation between turnover and performance (Jackofsky, 1984). Gerhart (1990b) found indirect evidence of the first link of this relationship as cognitive ability,

which is positively related to job performance (Hunter & Hunter, 1984), had a significant positive effect on perceived ease of movement.

When considering perceived desirability of movement, however, the expected impact of performance is less apparent, particularly without information on important contextual factors, such as the reward system. If the organization has a strong linkage between performance and pay growth, high performers should feel equitably treated and satisfied, assuming that internal equity is not compromised by being underpaid relative to the external market (Schwab, 1991). This satisfaction should contribute to low perceived desirability of movement and less probability of high performer turnover. In contrast, low performers might be more likely to leave because they could do better financially in organizations where pay was not tied closely to performance. Thus the pay for performance link should result in a negative relation between turnover and performance. When growth in pay is not tied to performance, low performers benefit by being over-rewarded, high performers are under-rewarded, and we might expect a positive relation between turnover and performance. The implication then is that the nature of the organization's reward system is likely to be an important contingency in determining low or high perceived desirability of movement, and subsequent turnover (Dreher, 1982; Gerhart & Milkovich, 1992; Jackofsky, 1984; Porter & Lawler, 1968; Schwab, 1991; Steers & Mowday, 1981).

Combining the effects of perceived ease of movement and perceived desirability of movement reveals further model equivocality to be resolved. The net relation between voluntary turnover and performance might be expected to be positive in cases where the pay-performance relation is weak because both perceived ease and desirability would be high for high performers. In contrast, cases where the pay-performance relation is strong offer no obvious prediction. Under this condition, high performers are subject to the countervailing forces of high perceived ease of movement and low perceived desirability. One might project that the net relation between performance and turnover would be near zero if the perceived ease and perceived desirability of movement factors offset each other. Such vague predictions are evidence that, as was the case in the utilization of contextual elements such as pay growth to better understand the role of movement desirability, a somewhat more complex approach to the performance-turnover relation was necessary for successful application of theoretical models of turnover.

Accordingly, Jackofsky (1984) suggested that there will often be a curvilinear relation between turnover and performance, such that turnover is most probable among both low performers and high performers. She argued that low performers may be "pushed out" because of "actual or perceived threat of administrative action" (p. 79). Steers and Mowday (1981) also

saw low performers as likely turnover candidates through low satisfaction with the job's intrinsic rewards. Thus, poor performers should have a high baseline turnover rate somewhat regardless of moderators such as the reward system. Additionally, Jackofsky characterized "adequate" performers as being allowed to remain with the firm and having relatively low turnover due to low ease of movement. However, this ease of movement attribution would seem to contradict the predicted high turnover of low performers, and in either case the ease of movement would seemingly be subject to labor market condition at the time. Finally, she maintained that high performers would enjoy numerous employment alternatives and, via the increased ease of movement, would separate more frequently.

Although we find the curvilinear model to be appealing, further contextual considerations appear to be necessary. For high performers, Jackofsky's model seems to assume that the (positive) effects of performance on ease of movement are unlikely to be counteracted by the (negative) effects of performance on perceived desirability of movement. In light of the March and Simon (1958) model, this assumption seems reasonable to the extent that pay growth and performance are not closely linked. Because high performers are of such critical importance to the firm (e.g., Boudreau & Berger, 1985), a crucial issue to be investigated here is whether or not the assumption holds when pay growth and performance are closely linked. Additionally, Jackofsky's ease of movement component is in need of clarification, particularly with regard to the effects of the labor market. In this study, we examine Jackofsky's proposed performance-turnover curvilinearity both alone and from the perspective of labor market condition and the reward system as its potential moderators.

The Reward System as a Moderator

Based on the preceding discussion of the movement desirability effects of a pay for performance relation, we can extend Jackofsky's curvilinear model to predict performance level specific turnover under such a reward system. At the high end of the performance continuum, a synthesis of the Jackofsky (1984), March and Simon (1958), and pay for performance implications seems to suggest that the diminished perceived desirability of movement stemming from a strong pay-performance link will result in relatively lower high performer turnover (compared to the weak pay-performance case) and a less pronounced curvilinearity. That is, in the presence of performance based rewards, the turnover of high performers should resemble the low movement tendencies of average performers as the increased ease of movement is offset by decreased desirability of movement. Because this is in direct contrast to turnover predictions in the absence of such rewards, where both ease and desirability of movement are high, we argue that reward system features such as pay growth according to performance may

have substantial impact on an organization's ability to retain its highest, most valuable performers.

Thus, a central question is "What is the typical relation between pay and performance?" A common response seems to be "small" (e.g., Lawler, 1981, 1989; Teel, 1986; Milkovich & Newman, 1993; see Heneman, 1990 for a review). For example, Lawler (1989, p. 151) comments that "All too often only a few percentage points separate the raises given good performers from those given poor performers." Similarly, he mentions the problem of "topping out," which refers to the fact that many organizations use merit increase guidelines that reduce the size of the merit increase for employees higher in salary range or grade as a means of controlling costs (Milkovich & Newman, 1993). Moreover, some merit increase guidelines also reduce the frequency of within-grade pay increases for employees near the top of the range (Milkovich & Newman, 1993), further reducing the pay-performance relation.

These types of factors may contribute to the perception of a weak relation between pay and performance. A survey by the Hay Group (Garelik, 1984), for example, found that less than one-half of middle managers and less than one-third of professionals thought that "better performers" received "higher pay increases than average or poor performers" (p. 14). These results were replicated in a more recent Hay Group (1994) survey. Where the perception is of a weak pay-performance link, pay satisfaction among high performers may be low. Dyer and Theriault (1976) did, in fact, report lower pay satisfaction among high performers, although they did not report information on the nature of the reward system in their study.

Of course, merit pay increases (i.e., within-grade increases) are only one factor contributing to overall salary growth over time. Promotions (i.e., between-grade increases) are another major determinant (Gerhart & Milkovich, 1989). In fact, promotions often have a twofold effect. First, there is typically a pay increase that goes with a promotion. Second, however, the employee usually moves to a new pay grade where they will most likely be in a lower relative position, thereby having the opportunity to earn larger and perhaps more frequent within-grade increases. Thus, the impact of performance on promotions will have significant consequences for the magnitude of the relation between performance and total pay growth (Gerhart & Milkovich, 1992).

In some cases, promotions may be more closely related to performance than are within-grade pay increases (e.g., in union or civil service jobs where within job pay differences can be small or nonexistent). In other cases (e.g., private sector managerial and professional jobs), however, promotion decisions may be less closely linked to current and past performance than to other factors such as potential, breadth of experience, or area of expertise.' Although these

can be justified as legitimate factors in promotion decisions, high performing employees who have been passed over and find themselves at the top of the salary range with little opportunity for salary growth may perceive pay inequity and entertain the possibility of leaving (i.e., an increase in perceived desirability of movement). Indeed, in the only turnover studies to date that utilized actual promotions (as opposed to promotion satisfaction or opportunities), Stumpf and Dawley (1981) and Dreher (1982) predicted and found significant negative associations between promotions and employee turnover.

In contrast to this view of a lack of promotions as contributing to turnover, there is also reason to believe that receiving promotions might increase employee movement. Schwab (1991) maintained that indicators of performance that are visible to the external market may play a large role in the ability to acquire a different job. Specifically, signals that can be communicated as evidence of individual employee worth may increase actual ease of movement. It is reasonable to expect that promotions, which can be listed on one's resume along with the accompanying new job titles, qualify as one of Schwab's externally visible indicators and, hence, may influence turnover separately from the effects of pay growth.

Further conceptual support for a positive promotion-turnover relation exists in the economic literature. Authors from this field have maintained that promotions reduce the informational gap between the current and alternative employers (Rican i Costa, 1988), enhance labor market visibility (Milgrom & Oster, 1987), and signal worker productivity to other potential employers (Waldman, 1990). Lazear (1986) argued that competing employers, when better informed about worker quality in other firms, are more likely to hire those employees away. Accordingly, Bernhardt and Scoones (1993) developed a model of strategic promotion and wage decisions based in part upon the assumption that promotions induce turnover by communicating employee value to competing firms.

We suggest that these visibility and signaling arguments can be reconciled with the seemingly contradictory negative associations between promotion and turnover found in the Stumpf and Dawley (1981) and Dreher (1982) studies. The two studies did not control for pay growth, which can be closely tied to promotions (Gerhart & Milkovich, 1989). Because we hypothesize that pay growth is also related to turnover, we suggest that it is likely that the reported associations between promotions and turnover may in fact have been driven by pay growth's relation with both variables. Therefore, it appears that the net impact of promotions alone (i.e., controlling for pay growth), which would seem to pit decreased perceived desirability of movement against increased actual ease of movement, has not been studied empirically in organizational research. Although we recognize that pay growth and promotions can at times be

highly correlated, we suggest that their conceptual distinction and predicted opposing influences on turnover warrant examining independent effects.

In addition, similar to pay growth, promotions may moderate the effect of performance on turnover. If including promotions in Schwab's (1991) framework is valid, it could be argued that promotions would be of relatively greater importance to low performers as external indicators of performance because these employees lack alternative indicators with which to communicate their competence to outside firms. Compared to high performers, these employees would have less access to recommendations, fewer successful experiences to relate, and the liability of being unable to truthfully portray themselves in the market.

Thus, reward system factors such as pay for performance and promotions are important for providing a more comprehensive understanding of the effects of job performance on voluntary turnover. To date, however, only a limited number of individual studies have examined reward system influence on the performance-turnover relation. This relative lack of attention is surprising given the debate on performance and turnover, the research on the correspondence between compensation and performance (e.g., Gerhart, Milkovich, & Murray, 1992; Milkovich & Wigdor, 1991), and, to a lesser extent, extant work on compensation and turnover (e.g., Lakhani, 1988), which generally indicates that higher pay reduces turnover.

However, the small body of applicable research does suggest that the reward system may be an important moderator. For example, Zenger (1992) found that turnover intentions were greatest among moderately high and extremely low performers in two firms with strong ties between pay and extreme performance. Park, Ofori-Dankworth, and Bishop (1994) reported that only poor performer turnover was associated (positively) with the presence of individual incentives. However, both of these studies were unable to directly measure individual turnover, with Zenger utilizing turnover intention and Park et al. surveying small firm personnel directors to determine the estimated portion of voluntary leavers who were of various performance levels.

In summary, reward system factors such as pay growth and promotions may moderate the performance-turnover relation. Pay growth may not always be closely related to performance. The result may be an increased risk of losing high performers. Consequently, Jackofsky's curvilinear proposition (i.e., higher turnover for low and high performers) frequently may be applicable, as may its implicit assumption that high performers' perceived ease of movement will not be counteracted by negative effects of performance on perceived desirability of movement. Curvilinearity may also result in part from the impact of promotions on low performers, who may be increasingly likely to separate due to a signaling effect that facilitates actual ease of movement. Examining different levels of pay growth and promotions may provide

a more refined picture of this proposed curvilinear performance-turnover relation, as well as help explain conflicting results from performance-turnover research.

Labor Market Condition as a Moderator

In addition to the pay growth and promotion aspects of the reward system, another contingency factor that may help explain the conditions under which turnover is more likely among high performers is the condition of the labor market. Carsten and Spector (1987) report that high unemployment rates reduce voluntary turnover. In addition, job dissatisfaction and intentions to leave appear less likely to translate into turnover when unemployment rates are high (Gerhart, 1990b). Neither of these studies, however, examined whether turnover of low and high performers was equally influenced by labor market conditions. One hypothesis is that low performers may not have many attractive alternative job opportunities unless there is a shortage of workers in the labor market. In contrast, it may be that companies are always in the market for "star" performers, regardless of overall employment demand in the market or in their organization (Keller, 1984; McEvoy & Cascio, 1987). If so, the linkage between labor market conditions and turnover might be strongest among low performers. In contrast, turnover among high performers would be less responsive to labor market conditions.

Curvilinearity

Two studies have found support for a curvilinear relation consistent with Jackofsky's (1984) model, such that low performers and high performers were more likely to leave than average performers (Jackofsky, Ferris, & Breckenridge, 1986; Mossholder, Bedeian, Norris, Giles, & Feild, 1988). Neither of these studies, however, reported on the extent to which the two possible contingency factors, (a) the reward system and (b) the labor market, contributed to their findings. Apparently complicating the issue of curvilinearity are recent studies that explicitly tested for but failed to find this relation. Yet, closer examination reveals that each could be interpreted as supporting this study's reconceptualization of Jackofsky's (1984) curvilinearity model in a more flexible framework, where extreme moderator levels can determine the degree and even the existence of nonlinearity.

Birnbaum and Summers (1993) reported no evidence of either a curvilinear or linear relationship between performance and voluntary turnover in a sample of 142 nurses. However, this profession's extremely high market demand and low supply in the study's setting, which were cited by the authors, may be at the heart of performance's apparent lack of impact on turnover. Such an unusual supply and demand imbalance could well result in high ease of movement and high turnover throughout the job performance range, particularly considering that bidding wars might inflate movement desirability for all performance levels as well. The fact that

35 percent of the nursing sample voluntarily separated in an interval of only 21 months supports this contention.

A second study (Wright & Bonett, 1993) that failed to find a curvilinear relation concluded that the job performance of 93 human services supervisors was positively linearly associated with voluntary turnover. This result also is not surprising given the authors' notation of the virtual absence of any actual or illusory correspondence between pay and performance. Hence, one might expect large numbers of poor performers to take advantage (low movement desirability) by staying and high performers to seek more equitable treatment (high movement desirability) elsewhere, essentially flattening the hypothesized curve and resulting in the positive linear association. Additionally, considering that this study totaled only 27 actual "leavers," it may well be that there simply was not enough statistical power with which to detect any deviations from turnover linearity at the ends of the performance range. Hence, neither of the two studies provides convincing evidence contradicting Jackofsky's (1984) curvilinearity hypothesis. Moreover, careful examination of the labor market condition and reward system moderators in terms of movement ease and desirability recasts the respective results as unsurprising, if not expected.

Meta-analytic Evidence

Although there is little research that has directly examined how the reward system and the labor market affect the relation between performance and turnover, recent meta-analytic research has begun to focus the discussion in this direction. McEvoy and Cascio (1987), Bycio, Hackett, and Alvares (1990), and Williams and Livingstone (1994) report weighted uncorrected correlations of -.22, -.17, and -.16, respectively, in meta-analyses of voluntary performance and turnover. Given the mounting evidence for the negative linear relation, efforts must now advance from a debate over conflicting findings of positive and negative linear associations to the potentially more informative issues of nonlinearity and potential moderators. McEvoy and Cascio (1987) recognized the importance of examining the curvilinearity hypothesis and the effect of labor market conditions, but data limitations hindered their efforts, leading them to call for future research on those issues.

The Williams and Livingstone (1994) meta-analysis attempted to test as moderators the pay-performance link and the labor market condition. However, Williams and Livingstone acknowledged that data limitations precluded strong conclusions and they called for individual studies of the type reported here. Regarding the reward system, because the studies incorporated into the meta-analysis did not tend to be concerned with rewards, coding for the moderator was done by virtue of any mention in the study of reward contingency. Even though

the authors reported high inter-rater reliability, this does not dismiss the validity concerns, particularly given the looseness with which the concept of pay for performance tends to be referred to in studies. However, given that many of the studies were of sales representatives (where reward contingencies are more likely), the finding of a stronger negative performance-turnover relation when reward contingencies were present suggests that further inquiry into rewards as moderators is worthwhile.

Williams and Livingstone (1994) again faced data constraints in their analysis of the moderating effect of labor market condition, which they operationalized as unemployment rate. The authors looked for moderator effects for each of the national, industrial, occupational, state and city unemployment rates across studies, only finding an effect at the state level. However, it is likely that the most appropriate type of unemployment rate for each study will differ on the basis of industry, occupation, and so forth (Malm, 1954). Moreover, it was not possible for them to control error sources such as labor market structural shifts from different years. Norming each study's appropriate unemployment rate against that rate's distribution for the year in question would be one possibility. Alternatively, tracking one organization with a large sample size, as was done in the present study, provides an opportunity for increased precision in studying labor market effects.

While the moderator analyses performed by Williams and Livingstone (1994) suffered to some extent from the lack of individual studies examining reward contingency and labor market condition as moderators, investigation of the curvilinear hypothesis simply may not belong at the meta-analytic level. As Schwab (1991) suggests, meta-analysis may lead to faulty conclusions when looking at complex moderator relationships, such as those likely to comprise the performance-turnover relation. Though they do interpret their meta-analysis of quadratic senu-partial correlations as supporting the curvilinear hypothesis, Williams and Livingstone acknowledge that interpretation and explanation of this relationship is best made on a study-by-study basis. Similarly, McEvoy and Cascio (1987) attempted an indirect test of curvilinearity in their meta-analysis and cited the need for more research on this issue.

Hypotheses

We have argued on conceptual grounds that curvilinearity, the reward system (including both pay growth relative to performance and promotions), and labor market condition are essential to attaining a more comprehensive understanding of the performance-turnover relation. Moreover, the two definitive meta-analyses of performance and turnover (McEvoy & Cascio, 1987; Williams & Livingstone, 1994) have recognized the importance of and attempted

to examine these issues. In each case, their attempts have been severely undermined by the relative dearth of applicable empirical research.

Their insightful works do provide some tentative conclusions regarding curvilinearity, the reward system, and labor market condition, but they also make a valuable contribution in suggesting how researchers might better design future studies of these issues. For example, we extend the ambitious attempt by Williams and Livingstone (1994) by examining not only moderators and curvilinearity, but also moderators of curvilinearity. In addition to the meta-analyses indicating the research gaps in the study of performance and turnover, Schwab (1991) discussed contextual factors such as organizational rewards and the external market as potential moderators and noted that these complex relationships are best examined by individual investigations. We respond here to these calls for such studies.

The present study asks the following questions. First, which performance groups are most likely to leave an organization? Based on the literature reviewed above, we hypothesize that

> **H1**: There is a curvilinear relation between performance and turnover. Specifically, turnover will be highest among low and high performers, lower among average performers.

Second, what contextual factors might help explain whether it is low, average, or high performers that are most likely to leave? To begin to answer this question in terms of possible reward system moderators, we make use of a model (Gerhart, 1990a) that specifies total salary growth to be largely a function of factors measured after the time of hire, such as average performance rating (thereby potentially incorporating a pay-performance link) and length of service with the organization. Given that we assume a negative main effect of salary growth on turnover, the implication is that while low pay growth (i.e., relatively low average annual pay increase) should increase turnover through increasing desirability of movement, this effect will be stronger as performance and the subsequent ease of movement increases. Thus, the curvilinear nature of the performance-turnover relation (higher turnover for low and high, versus average, performers) should be more pronounced on the high performance end for employees with low pay growth than for those with high pay growth. With high pay growth, as performance and perceived ease of movement increase, perceived desirability of movement is somewhat diminished, and the tendency to turnover should not increase to the same degree.

> **H2:** The negative effect of salary growth on turnover will be greatest at high performance levels. More specifically, at high performance levels turnover will be more strongly

positively related to performance among employees with low salary growth than among employees with high salary growth.

The second reward system element of interest in this study is promotions. Because the role of promotions has been relatively neglected in turnover research, we also include a main effect hypothesis for this proposed moderator. High promotions may increase the desirability of staying with the firm, due to the immediate salary growth, its potential growth in the future, and perhaps such factors as increased recognition, challenge, and job satisfaction. On the other hand, promotions also provide the employee with relatively objective evidence of ability that can be used in the external job market. We argue that the majority of promotions' potential negative effect on turnover is tied to salary growth and, once this is controlled for, the positive effect of promotions on ease of movement will outweigh its negative effects on movement desirability.

H3: After controlling for salary growth, promotions will be positively related to turnover.

In addition to this main effect, there is reason to be believe that promotions moderate the performance-turnover relation. As noted earlier, while promotions should enhance the ease of movement for all employees, this should be especially true at the lower levels of performance, where employees have fewer indicators of worth which can be demonstrated to the external job market. Thus, the curvilinear nature of the performance-turnover relation should be more pronounced on the low performance end for employees with high promotions than for those with low promotions.

H4: The positive effect of promotions on turnover (controlling for salary growth) will be greatest at low performance levels. More specifically, at low performance levels turnover will be more strongly negatively related to performance among employees with high promotions than among employees with low promotions.

In addition to reward system factors influencing turnover, there is clearly a need to include the status of available outside opportunities. These opportunities are a major component in perceived and actual ease of movement and are conceptualized here as labor demand. When labor demand is low it is logical that high performers will experience greater success on the job market. Poor performers, in contrast, may need the assistance of a less restrictive job market to find alternative employment.

H5: Turnover will be more strongly positively related to labor demand among low performers than among high performers.

Because all of our hypotheses are predicated on the belief that turnover can be dysfunctional for the organization, particularly when high performers separate, it is useful to more closely examine the validity of that belief and the relative efficacy of strategies designed to

mitigate turnover. Hence, as an extension of our prediction that salary growth not only influences turnover, but does so differentially according to performance, we are interested in the costs and benefits associated with various performance based pay policies. However, projecting the value of such strategies is not straightforward. Linking pay growth and performance should precipitate increased separations among low performers, producing higher turnover rates and commensurately higher movement costs (incurred to administer the separation and acquisition process). Also, increasing pay for high performers will increase compensation and related costs (e.g., benefits) to some degree. These two costs are likely to be relatively visible to most organizations, perhaps suggesting that linking pay growth to performance is too costly. However, these cost factors should be assessed in light of the potentially increased value of the work force, created by the retention of more high performers and fewer low performers. Researchers or managers considering the implications of the present findings require a method of aggregation that allows these various effects to be placed on a common scale.

Traditionally, utility analysis has been used to aggregate diverse effects into a common dollar-valued scale (Boudreau, 1991). Utility analysis applications exist for selection, training and performance feedback, but not for compensation (Boudreau, 1991; Gerhart & Milkovich, 1992; Gerhart, Trevor, & Graham, in press). Yet, compensation strategy decisions present similar challenges due to the diverse measurement scales for the various outcomes. Because prior utility analysis research has produced models for estimating the value of separation and acquisition patterns (Boudreau & Berger, 1985; Boudreau, 1991), we can use the Boudreau and Berger separation/acquisition utility model to illustrate the dollar value implications of alternative compensation policies as they affect separations and acquisitions over time and differentially by performance level. Although we do not suggest that the resulting model is a definitive treatment of the utility of compensation strategies, the application provides a starting point that we hope will encourage others to build further.

In sum, research suggests that the performance-turnover relation is negative when constrained to a linear association but may in fact be curvilinear. Additionally, authors of recent turnover studies have begun to recognize that contextual factors may moderate the effect of performance on turnover. Consequently, in this investigation we attempted to test whether the performance-turnover relation is curvilinear and whether salary growth, promotions, and labor demand are important contextual elements for understanding the performance-turnover dynamic. Moreover, we emphasize that our hypothesized interactions involving salary growth and promotions pose these contingencies as moderators of a curvilinear relationship. Finally, through examining various pay strategies' effects on turnover and the projected work forces'

performance distributions, we attempted to assess the strategies' costs and benefits in dollar terms.

Method

Sample

The sample was composed of all (N = 5,143) exempt employees hired between 1983 and 1988 who were either (a) still employed in the organization as of January 1, 1990 (N = 3,635), (b) had voluntarily resigned prior to that date (N = 1,188), or (c) had separated involuntarily (N = 320). Because our sample included all exempt hires in a large organization, a broad spectrum of job types is represented. Included employees were distributed across a number of different divisions and locations, but in each case, the product or service was tied to the petroleum industry.

Measures

Voluntary turnover. This variable was coded "1" if the employee had resigned voluntarily as of January 1, 1990. It was coded as "0" if the employee was still employed with the organization as of that date. Involuntary terminations were also coded as "0", allowing the proportional hazards model to utilize the fact that these employees did not voluntarily separate during their tenure. Failure to include involuntary terminations may result in bias and significant loss of information (Morita, Lee, & Mowday, 1993).

Average performance rating. This variable represents the average of all supervisor performance ratings received subsequent to the hire date. Supervisors utilized global rating scales in assessing employee performance. In several of the models, average performance level categories were created to capture any nonlinear relations or to examine possible interactions with other variables. The performance scale ranged from "1" (lowest) to "5" (highest), with "3" as the omitted level.

Salary growth. Average annual salary growth was defined as the change from the starting salary to the last observed salary, divided by the time interval between the two salaries. As such, it reflects salary growth stemming from both within- and between-grade (promotion) increases. In computing salary growth, we first transformed salary levels by using the consumer price index to adjust for inflation and by taking the natural logarithm. The mean amount of time between first and last salary observations was 3.09 years. The mean annual average salary increase was 9.8% (6.1% adjusted for cost of living changes). In 1989 dollars, the mean starting salary was $31,824 and the last observed salary was $38,185. Salary growth is related to pay for performance to the extent that it correlates with performance.

Promotions. The promotions variable was constructed by dividing an employees total number of promotions by years of tenure. This operationalization presumes that, in terms of signaling the external market, the raw number of promotions would not be as informative as a time indexed measure. For example, two promotions in six years would be less appealing to a prospective new employer than would two promotions in three years.

Labor demand. This was measured using information available in the annual Recruiting Trends report issued by Michigan State University Placement Services (e.g., Shingleton & Scheetz, 1983). Somewhere between 600 and 1,000 organizations respond to the survey each year regarding their college recruiting practices and plans. The key question used here for assessing labor demand is "This year, what change, if any, does your organization anticipate in the hiring of new college graduates?" The responses are summarized to yield an expected percentage change in hiring plans. Moreover, responses are reported separately for different categories of employers. The data used in the present study pertain to hiring plans among employers reporting themselves to be in the petroleum industry. Industry specific labor demand was used because exempt employees likely acquire industry specific competencies which would make the petroleum industry a relevant external market. Additionally, perceived ease of movement may be formulated by individuals on the basis of the most readily salient labor market indicator, which could be whether their own company is hiring. The construct validity of the hiring plans measure is supported by the fact that it correlated .73 ($p < .05$, one-tailed test) over a 5-year period with actual hiring in the organization studied.

Control variables. Several factors which could reasonably be expected to be related to turnover and the predictors of interest were controlled for in the study. Except when models were stratified by hire year (see Analyses below), dummy variables were included for year of hire to adjust for the nature of the labor market and unmeasured industry factors present in the year each cohort was hired. In these equations 1983 was the comparison year. Salary level was included in the models and defined as the final pay level on each employee's record; thus, this variable denotes salary at time of turnover for those who left the firm, and 1989 salary for those who stayed. Additionally, we controlled for marital status and age.

Analyses

Data on tenure with the organization were treated as survival time (also known as failure time) data (Kalbfleisch & Prentice, 1980). To estimate the influence of the independent variables on the survival probabilities, a proportional hazards rate model was used (Cox, 1972). For statistical software we utilized SAS's (SAS Institute, 1991) PHIZEG procedure. Applications of the proportional hazards model to the study of employee turnover (Judge & Watanabe, 1995;

Morita, Lee, & Mowday, 1989; Morita, Lee, & Mowday, 1993; Sheridan, 1992) and employee absenteeism (Fichman, 1989; Harrison & Hulin, 1989) are available. This model is partially parametric in the following sense. It does not impose any distributional assumptions on the data. However, it does assume that hazard functions (i.e., the probability of turnover, conditional on tenure) at different levels of an independent variable are proportional to some unknown baseline hazard function.

One advantage of proportional hazards modeling is its use of information on survival time (i.e., tenure), rather than relying solely on a simple dichotomous turnover dependent variable. This provides a vehicle for partially accounting for censored data, such as that resulting from the tenure of employees who are involuntarily terminated. That is, because the dependent variable is voluntary turnover conditional on tenure, the model incorporates information on the tenure of involuntary terminations coupled with the fact that there was no voluntary turnover during that tenure. Additionally, employees who resign one day into the study are differentiated from those that terminate two years into the study's investigation window. Such information can be lost when treating turnover simply as a dichotomous outcome, which may result in conflicting findings from the two approaches, the potential for which was empirically demonstrated by Morita, Lee, and Mowday (1993).

We stratified our proportional hazards analyses by hire year, which allows each hire year cohort to be in proportion to potentially different baseline hazard functions. This decision was made after examining the graphs of natural logarithms of the cumulative baseline hazard functions for each hire year cohort as a check of the proportionality assumption (Andersen, 1982). Although the functions appeared to be proportional to each other, with each new hire year one year of potential tenure is lost because 1989 is the final year of data for all hire year cohorts. Thus, we could not be sure that each year's baseline function would remain proportional over the entire tenure domain and we took the more conservative stratification approach. Hence, our proportional hazards regression model, prior to adding interactions, was:

$h_i(t;x) = h_i(t)\ \exp[B_j(X_{controls})+B_2(X_{performance})+B_3(X_{salarygrowth})+B_4(x_{promos})]$,

where

$h_i(t;x)$ = the hazard function (i.e., conditional probability of turnover) at time *t,* for employees hired in year i with predictors x,

$h_i(t)$ = the baseline hazard function for individuals hired in year i,

B's = the estimated regression weights,

X's = the explanatory variables.

While this main effects model is conceptually correct, we note that in most models performance is treated as a nine level categorical variable and B2 is actually a vector of eight regression weights.

Testing for and illustrating interactions was somewhat complicated by our conception of a curvilinear performance-turnover relation. In the cases of salary growth and promotions as potential moderators, we took the standard approach of including the cross product terms (i.e., the categorical performance by interval salary growth and promotions measures each yielded nine cross product terms, one of which was omitted) in the model to statistically test for interaction significance. We then graphed survival probabilities by average performance ratings for various levels of the moderator, which allowed interpretation of potential changes in the curvilinearity.

In testing for an interaction between labor demand and performance, we were unable to simply include an individual labor demand score for each observation. Such attempts as utilizing labor demand from an individual's last year with the firm or creating an average labor demand proved to be problematic. For example, last year labor demand would assign the identical value (1989 labor demand) to all of the stayers and would neglect the labor demand levels in years that the leavers did not separate. Average labor demand as a potential measure suffered from several shortcomings, including the distribution of the labor demand values over the time of the study. Because the two highest years of labor demand were the final two years of the study, all stayers would have high years included in the average computation, though those hired late in the study would never face low demand years. Similarly, late hired leavers would never have faced low demand.

As a result of these types of problems, the following approach was used to test for an interaction between labor demand and average performance rating. First, hazard rates were estimated for each year of hire cohort and tenure level combination. Second, the potential turnover year corresponding to each year of hire and tenure level combination was identified by adding the years of tenure to the hire year. Third, the labor demand data (described above) for each potential year of turnover were arrayed in a matrix along with the corresponding hazard rate for that year. This approach was taken separately for each performance category. Thus, the matrix for each performance category would appear as follows:

Hire Year	Tenure	Potential Year of Turnover	Hazard Rate	Labor Demand
1983	1	1984	h_1	LD_1
1983	2	1985	h_2	LD_2
1983	3	1986	h_3	LD_3
1983	4	1987	h_4	LD_4
1983	5	1988	h_5	LD_5
1983	6	1989	h_6	LD_6
1984	1	1985	h_7	LD_2
1984	2	1986	h_8	LD_3
1984	3	1987	h_9	LD_4
1984	4	1988	h_{10}	LD_5
1984	5	1989	h_{11}	LD_6
1985	1	1986	h_{12}	LD_3
1985	2	1987	h_{13}	LD_4
1985	3	1988	h_{14}	LD_5
1985	4	1989	h_{15}	LD_6
1986	1	1987	h_{16}	LD_4
1986	2	1988	h_{17}	LD_5
1986	3	1989	h_{18}	LD_6
1987	1	1988	h_{19}	LD_5
1987	2	1989	h20	LD6
1988	1	1989	h21	LD6

Because hazard rate is a function of tenure level, formal testing for labor demand effects on the performance-turnover relation was confined to one tenure level at a time. Tenure level equal to one year provided the largest sample size (n=6) and the greatest variance in labor demand for conducting examination of a possible labor demand moderator (in this context, tenure equal to one year actually represents anywhere from one to two years of company experience). This examination was accomplished through correlating labor demand and hazard rate for each performance category.

Utility Analysis

In order to estimate the dollar value implications of different approaches to pay growth, we adapted the Boudreau and Berger (1985) separation/acquisition utility model, which estimates three components in each relevant time period: (1) the movement costs associated with separations and acquisitions; (2) the service costs (pay, benefits, and associated expenses) required to support the work force; and (3) the service value, or dollar value of the goods and services produced by the work force. The dollar-valued implications of different separation and acquisition patterns over time was estimated by summing the stream of service value levels, and then subtracting the stream of service costs and movement costs. Boudreau and Berger applied this model to examine effects of changes in selection validity and the correlation between separations and performance levels. Although the three fundamental components apply just as well to the present study, this case differs in that we consider alternative pay strategies (which may or may not affect the validity of employee selection) and we do not assume a linear relation (correlation) between separations and performance, perhaps providing a more precise characterization of the relation.

Using our data on the four-year survival probabilities of employees hired between the years 1983 and 1988, we applied the Boudreau and Berger (1985) model to a four-year period. We modeled the investment decision as follows. In 1989, this organization might have chosen pay growth strategies that would or would not link pay to performance. Each potential strategy would lead to a change in separation and retention patterns over the four years (1990 through 1993). In 1993, after the four-year effects, the organization would possess a work force reflecting the performance distribution produced by the previous pay strategies. Thus, by calculating the change in movement costs, service costs and service value between 1989 and 1993, and assuming that the intervening changes were linear, we estimated the cumulative effects of a pay strategy over the four-year period. Hence, we used predicted survival probabilities to estimate the changes in the performance distribution over four years under different pay strategies and we then attached a dollar value to those changes by subtracting the associated movement costs and service costs from service value.

We chose three pay strategies to span a continuum from very conservative to very aggressive in linking pay to performance. There is little empirical data on the distribution of specific pay-growth policies across pay levels, so we constructed three hypothetical, but realistic, strategies. That is, each pay strategy was constructed from the sample's actual mean and standard deviation of pay growth over the study period. Then, pay strategies were constructed as deviations from the mean. Specifically, Pay Strategy 1 was to give employees in

all performance categories average pay increases (for their particular performance category) over the four-year period. Pay Strategy 2 gave average pay increases to most employees, but those in the three highest performance categories (performance ratings 4, 4.5, and 5) were given yearly increases equal to one standard deviation above the mean for their respective performance category. Pay Strategy 3 was similar to Pay Strategy 2, except that we added a low-pay component, in which those in the lowest two performance categories (performance ratings 1 and 1.5) were given yearly pay increases equal to one standard deviation below the mean for their particular performance category.3 We then assessed the dollar-value implications related to each strategy's implementation.

Results

Means, standard deviations, and correlations for the study's variables are presented in Table 1. As expected, the zero-order linear relationship between performance and turnover was negative, replicating the results of the three recent meta-analyses (Bycio, Hackett, & Alvares, 1990; McEvoy & Cascio, 1987; Williams & Livingstone, 1994). Also of interest in these correlational results, promotions were negatively related to turnover, seemingly in opposition to H4. However, as will be discussed, partialling out the effects of salary growth reveals an entirely different conclusion regarding promotions and turnover.

Table 1
Means. Standard Deviations, and Correlations[a]

Variables	Means	s.d.	1	2	3	4	5	6	7	8	9
1. Turnover	0.23	0.42									
2. Tenure	3.40	1.64	-.31								
3. Performance	2.74	0.66	-.20	.19							
4. Salary growth	0.06	0.05	-.21	.05	.15						
5. Promotions	0.41	0.45	-.11	.00	.05	.80					
6. Salary	10.47	0.39	-.22	.19	.28	.06	-.02				
7. Age	33.16	7.42	-.07	.18	.06	-.33	-.33	.15			
8. Marital status	0.54	0.50	-.06	.14	.11	-.19	-.18	.17	31		
9. Hire year	1985.71	1.65	-.20	-.66	.03	.12	.10	.05	-.21	-.11	

Note. Correlations above +.05 are significant at $p < .001$, two-tailed test.

[a]n = 5,143

Proportional Hazards Analyses

To begin to test the first hypothesis, that the relation between voluntary turnover and performance is curvilinear, we applied the multiple regression procedure advocated by Cohen and Cohen (1983) to the proportional hazards regression case. This was done by testing a model with the continuous performance variable (rather than the categorical performance variable), and then adding its squared term. As evidence of curvilinearity, the squared term coefficient and the increase in model fit were significant (see Table 2).

We then examined the validity of this study's approach to assessing curvilinearity in the performance-turnover relation with a nine level categorical performance measure. Substituting this measure for the continuous performance measure and its square provided eight performance coefficients, five of which were significant. We found this model to be a significantly better fit to the data than the nested model without performance. By computing D statistics, which are similar to the R2 values in more common regression models (Hintze, 1989), we were able to directly compare the categorical performance model with the quadratic continuous performance model. The D statistics in Table 2 reveal that the categorical performance model accounts for more conditional turnover variance than does the quadratic model (by a factor of 1.077, or 7.7 percent). Thus, performance-turnover curvilinearity and the use of a categorical performance measure in its assessment were supported.

Table 2: Comparison of Proportional Hazard Regression Analyses of Voluntary Turnover for Continuous and Categorical Performance Measures

		Continuous Performance		Categorical
Independent Variables	Baseline	Linear	Quadratic	Performance
Promotions	.763***	.737***	.743***	.703***
Salary Growth	-22.343***	-19.985***	-19.321***	-18.912***
Average Performance		-.406***	-2.20***	
Squared Average Performance			.341***	
Average Performance = 1.0				1.676***
Average Performance = 1.5				0.241
Average Performance = 2.0				0.640***
Average Performance = 2.5				-0.223*
Average Performance = 3.0				---
Average Performance = 3.5				-0.399**
Average Performance = 4.0				0.094
Average Performance = 4.5				0.011
Average Performance = 5.0				1.644***
Change in Model Chi-square		56.878***	52.827***	195.340***
D	.1383	.1464	.1539	.1658

Note. Equations also include salary level, marital status, and age. Performance ranges from 1 (lowest) to 5 (highest).
*p<.05 **p<.01 ***p<.001

As Sheridan (1992) noted, the magnitude of the *D* statistic from proportional hazards models will generally be smaller than variance explained statistics from regressions that only predict turnover probability. This is a result of the dependent variable in proportional hazards being turnover conditional on tenure. That is, we are attempting to explain turnover probability at specific times, not simply whether or not turnover occurred (Peters & Sheridan, 1988). As a point of reference, however, Sheridan's (1992) turnover study with proportional hazards modeling accounted for less variance (D = .09) than the present study *(D = .17*).

In order to illustrate and interpret the performance-turnover curvilinearity, we plotted survival probabilities based on the proportional hazards model. As Figure 1 indicates, the performance-turnover relation does indeed appear to be curvilinear (note that the vertical axis represents survival probability, and is thus the inverse of turnover probability). For comparison purposes, the relation was plotted for three separate tenure levels. The probability of remaining employed throughout each of the tenure levels initially increases with performance, but then levels off. In all three scenarios, survival probabilities sharply decrease in the highest performance rating category. Furthermore, comparisons with plots of the predicted values from the equations imposing linearity revealed that the most dramatic differences between linear and nonlinear representations were at the highest performance rating category. In sum, these findings strongly suggest that the relation between turnover and performance in this sample is not linear, but rather is approximated better by the curvilinear function described in Hl. This curvilinearity appears to be robust with regard to tenure.

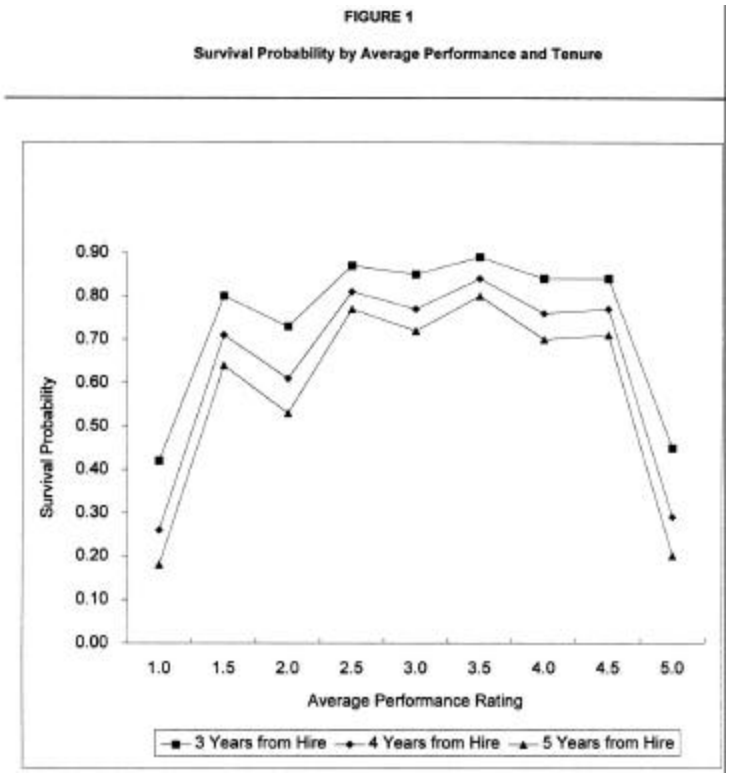

Figure 1. Survival probability by average performance rating and tenure.

One possible explanation for this finding would be a weak relation between performance and salary growth. Table 3 reports two sets of estimates from regressing salary growth on performance. The first equation treats the relation between salary growth and performance as linear and depicts a significant positive association between the two. However, the second equation uses performance categories to allow for a possible nonlinear relation. Of particular interest from this equation is the fact that, when compared to the omitted performance rating category 3, top performance (average rating = 5) is not related to salary growth. While all other performance levels, excepting 2.5, are significantly tied to salary growth, the most valuable employees do not appear to be paid according to their performance.

Table 3: Regression Analyses of Average Annual Salary Growth on Continuous and Categorical Average Performance Ratings

	Equation 1		Equation 2	
Independent Variables	Coefficient	S.E.	Coefficient	SE.
Average Performance	.0088***	.0007		
Average Performance = 1.0			-.0238***	.0040
Average Performance = 1.5			-.0171***	.0032
Average Performance = 2.0			-.0080***	.0012
Average Performance = 2.5			.0008	.0012
Average Performance = 3.0			----	---
Average Performance = 3.5			.0056***	.0014
Average Performance = 4.0			.0108***	.0019
Average Performance = 4.5			.0147**	.0046
Average Performance = 5.0			.0098	.0064
Promotions	.0891***	.0010	.0887***	.0010
Salary Level	.0082***	.0012	.0078***	.0012
Marital Status	-.0050***	.0009	-.0050***	.0009
Age	-.0006***	.0001	-.0006***	.0001
Intercept	-.0648***	.0117	-.03 61**	.0122
R^2	.66		.67	

Note. Equations also include dummy variables for year of hire. Performance ranges from 1 (lowest) to 5 (highest).

*p < .05 **p < .01 ***p < .001

The predicted values obtained from each equation appear in Figure 2 and appear to confirm the inequitable salary growth of top performers. Salary growth does increase as a function of performance up through performance rating 4.5. However, analysis of the predicted values reveals that salary growth increases approximately 2.4 times quicker (i.e., the slope is 2.4 times greater) between performance levels 1 and 2.5 than between performance levels 2.5 and 4.5, suggesting a declining pay-performance relation as pay increases. Moreover, predicted salary growth actually decreases as average performance increases from 4.5 to 5. To the extent that high performing employees are aware of this fact, they may not feel equitably treated and movement may become increasingly desirable. This could well be the case as these diminishing returns to high performance correspond almost perfectly with the diminishing top performer survival probabilities depicted in Figure 1.

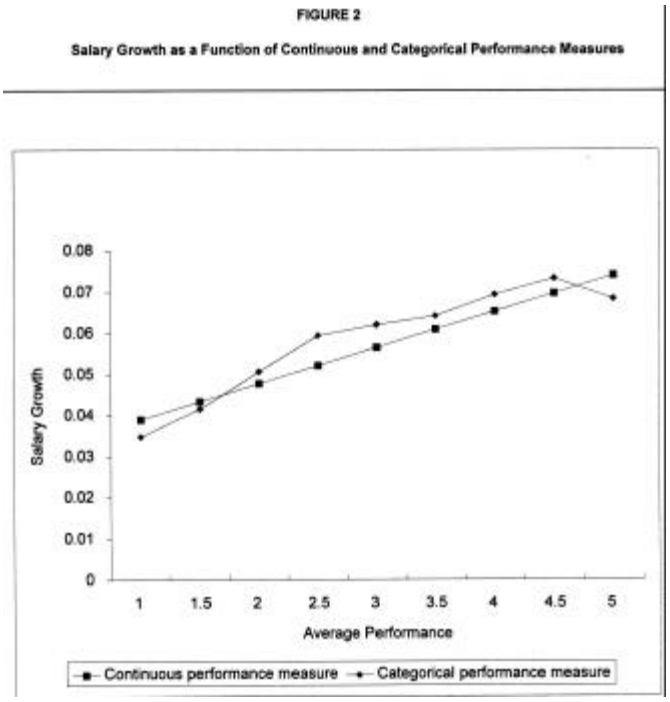

Figure 2. Salary growth as a function of continuous and categorical performance measures.

As a more formal test of the possible interaction between salary growth and performance, two equations were estimated. The first contained only main effects for performance, salary growth, promotions and the controls. The second equation added eight terms for the cross-products of salary growth and the performance categories. Comparison of the two equations revealed a statistically significant improvement in the model and, consequently, a significant interaction between salary growth and performance (see Table 4). Although the individual term representing the top performance (5.0) by salary growth cross-product is not strictly significant, it does approach significance (p = . 115) even though it is limited by low statistical power (n=23). (In an unreported analysis, we recreated the top performance by salary growth term by combining performance categories 4.5 and 5.0 in order to gain power, which resulted in a cross-product term significant at the .01 level.)

Table 4: Results of Proportional Hazard Regression Analyses of Voluntary Turnover

Independent Variables	Main Effects Model	Salary Growth Interaction Model	Promotions Interaction Model
Salary Level	-0.717***	-0.700***	-0.715***
Age	-0.050***	-0.052***	-0.051***
Marital Status (1 = married)	-0.191**	-0.190**	-0.199**
Average Performance = 1.0	1.676***	1.359***	1.412***
Average Performance = 1.5	0.241	-0.157	-0.046
Average Performance = 2.0	0.640***	0. 218[t]	0.422***
Average Performance = 2.5	-0.223*	-0.518***	-0.345**
Average Performance = 3.5	-0.399**	-0.5191	-0.426*
Average Performance = 4.0	0.094	0.5151	0.424[t]
Average Performance = 4.5	0.011	1.436*	0.074
Average Performance = 5.0	1.644***	2.549***	1.885***
Salary Growth	-18.912***	-24.827***	-19.788***
Promotions	0.703***	0.634***	0.422*
Salary Growth X (Performance = 1.0)		15.481	
Salary Growth X (Performance = 1.5)		13.364**	
Salary Growth X (Performance = 2.0)		10.156***	
Salary Growth X (Performance = 2.5)		6.220*	
Salary Growth X (Performance = 3.5)		3.158	
Salary Growth X (Performance = 4.0)		-6.751	
Salary Growth X (Performance = 4.5)		-25.562[t]	
Salary Growth X (Performance = 5.0)		-15.531	
Promotions X (Performance = 1.0)			1.103*
Promotions X (Performance = 1.5)			1.201[t]
Promotions X (Performance = 2.0)			0.633***
Promotions X (Performance = 2.5)			0.331
Promotions X (Performance = 3.5)			0.115
Promotions X (Performance = 4.0)			-1.057[t]
Promotions X (Performance = 4.5)			-0.233
Promotions X (Performance = 5.0)			-0.491
Change in Model Chi-square (df = 8)		47.47***	21.23**

[t] p<.10 *p<.05 **p<.0l ***p<.001

To more closely examine the nature of the interaction of salary growth and performance, the relation between turnover and salary growth was estimated separately through proportional hazards regressions for each performance category. As the coefficients in Table 5 indicate, the relation between salary growth and turnover is negative at all performance levels, but is much

stronger at higher performance categories, providing support for H2. In other words, turnover decisions of high performers depend more strongly on their salary growth experience than do turnover decisions of low performers.

Table 5: Proportional Hazard Regressions of Voluntary Turnover on Average Annual Salary Growth and Average Annual Promotions, for each Average Performance Category

Average Performance Level	Salary Growth Coefficient	Promotions Coefficient	Number of Observations
Average Performance = 1.0	-19.54***	1.65*	60
Average Performance = 1.5	-24.83**	.93	97
Average Performance = 2.0	-13.44***	.49*	1171
Average Performance = 2.5	-21.41**	.73*	1090
Average Performance = 3.0	-22.58***	.69***	1667
Average Performance = 3.5	-21.40***	.58	672
Average Performance = 4.0	-30.60***	.46	317
Average Performance = 4.5	-82.56*	3.01	46
Average Performance = 5.0	-54.54^{t}	-.28	23

Note. At each performance category, equation also includes salary level, age, marital status and year of hire. Performance ranges from 1 (lowest) to 5 (highest).

^{t} p<.10 *p<.05 **p<.01 ***p<.001

To illustrate this moderating effect of salary growth on the performance-turnover relation, we computed survival probabilities for three levels of salary growth (i.e., at salary growth's mean, and at plus and minus one standard deviation) throughout the performance range (see Figure 3). The more pronounced curvilinearity in the low salary growth condition, which was predicted in H2, implies that failure to pay top performers for that performance results in greater loss of these valuable employees. In contrast, high pay for performance serves to keep these high performers with the firm. These findings strongly suggest that organizations need to be especially concerned with equitable salary growth among its top performers. Given the survival curve for mean salary growth, and the previous conclusion that the top average performance rating is not related to salary growth, it appears that the firm in this study may be paying a stiff price for failing to equitably reward star performers.

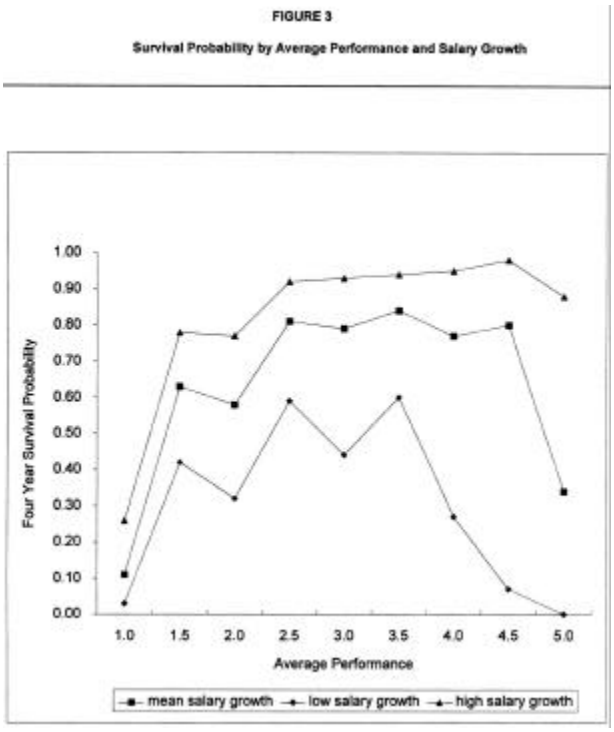

Figure 3. Survival probability by average performance rating and salary growth.

The lack of research on the effect of promotions prompted our third hypothesis, which proposed that average annual promotions would increase turnover. While the correlation between promotions and turnover was significantly negative, in the proportional hazards regression model, once the effects of salary growth and the other variables were partialled out, promotions did in fact have a positive impact on turnover (see Table 2). Thus, H3 and our supposition of promotions contributing to employee viability on the external market were supported. Interpretation of this .703 promotions coefficient is possible at each level of promotions in a manner analogous to interpretation in ordinary least squares regression (Morita, Lee, & Mowday, 1993). Assume two employees were equal in all respects except that employee one had averaged one promotion per year while employee two had no promotions. Because their respective hazard functions would differ only by the exponentiated promotions variable value, employee one would be more likely to leave by a factor of exp[(.703) x (1 - 0)). Hence, controlling for the other variables, increasing average promotions from zero to one increases turnover likelihood by a factor of 2.02. Employee one would be twice as likely to leave as employee two, all else remaining equal.

Although this interpretation would seem to imply that, assuming salary growth is retained, limiting promotions might be a viable strategy for reducing turnover, analysis of the

promotions performance interaction provides a more appropriate explanation. Addition of the eight performance by promotions cross product terms resulted in a significantly better fit for the proportional hazards model (see Table 4). Similar to the approach taken for the salary growth moderator, the relation between turnover and promotions was then estimated separately through proportional hazards regressions for each performance category. As Table 5 indicates, the relation between promotions and turnover is positive and significant at four of the five lowest performance categories, but is never different from zero for the higher performers. That is, turnover decisions of low performers depend more strongly on promotions than do turnover decisions of high performers, providing support for H4.

To better illustrate how promotions moderated the performance-turnover relation, we computed survival probabilities for high promotions (one standard deviation above the mean), mean level, and low promotions (set at zero, which was .93 of one standard deviation below the mean) throughout the performance range (see Figure 4). As anticipated, at the higher levels of performance promotions appear to make little difference in turnover decisions. However, as the more pronounced curvilinearity in the high promotions condition implies, the effect of promotions is greater at lower performance levels. Thus, as hypothesized, lower performers' turnover probabilities are more strongly positively influenced by promotions than are those of higher performers. Presumably, this effect is due to the relatively greater need of lower performers to exhibit visible indications of competence to the external market.

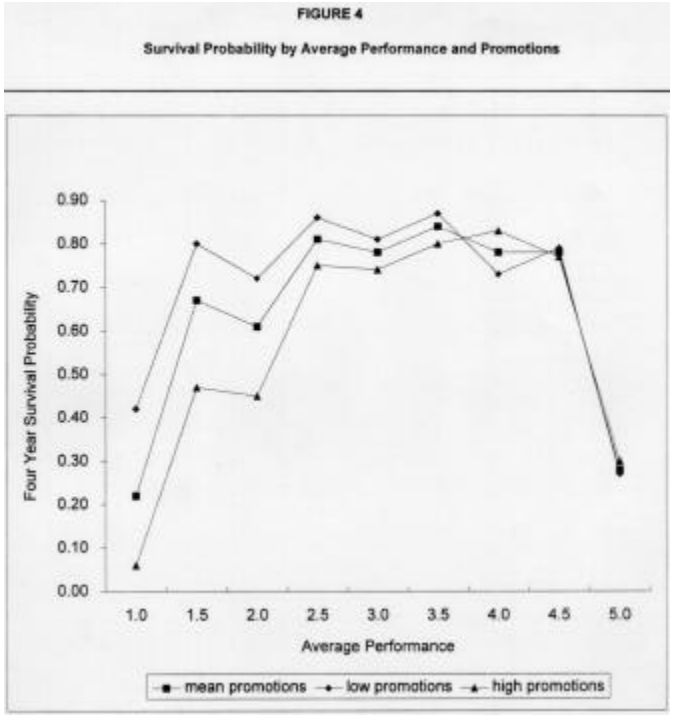

Figure 4. Survival probability by average performance rating and promotions.

The fifth hypothesis, that performance and labor market conditions interact to determine turnover, was tested by examining the relation between hazard rates and labor demand over six years as a function of performance category. The staggered hire years in our sample allowed us to examine the turnover of employees of equal tenure facing varied labor market environments. These tests were performed according to performance level. Sample size of only six notwithstanding, we did find positive, statistically significant correlations between labor demand and turnover occurring among employees in the two lowest performance categories (see Table 6). None of the correlations for the high performance categories were significantly different from zero. In other words, labor demand influenced turnover of low performers more strongly than turnover of high performers, supporting H5.

Table 6: Correlation between Hazard Rate and Labor Demand for Average Performance Rating Categories

	Correlation of Hazard Rate and Labor Demand
All Performance Categories	.465
Average Performance = 1.0	.887**
Average Performance = 1.5	.755*
Average Performance = 2.0	-.507
Average Performance = 2.5	-.747*
Average Performance = 3.0	.414
Average Performance = 3.5	.018
Average Performance = 4.0	.699
Average Performance = 4.5	.204
Average Performance = 5.0	-.265

Note. Statistical tests of correlations are based on sample sizes of six. The sample sizes for estimating the hazard rates within each performance category are based on samples ranging from 22 to 1,643 employees.

*p < .05 **p < .01, one-tailed test

Because the results in Table 6 are based solely on a tenure level of one, we also performed a graphical analysis which collapsed hazard rates across multiple tenure levels. For potential turnover years with high labor demand and with low labor demand, we compared the hazard rates of average performance rating category 1 (low performers) with those of combined categories 4.5 and 5.0 (high performers). The two top categories were combined because only 23 employees were in category 5, resulting in unreliable hazard rate estimates as the category

is broken down by hire year and tenure. To further improve the reliability of the estimates, we averaged hazard rates across three tenure levels (years one, two, and three) and two potential years of turnover in both the high and low labor demand conditions.

Years 1986 and 1987 were the two lowest labor demand years in the study, while 1988 and 1989 were the two highest. Hence, we created an average hazard rate representing potential turnover in 1986 or 1987 after one, two, or three years of tenure (low demand condition) and a similar average for potential turnover in 1988 or 1989 (high demand condition). This was done for both low and high performers. In support of HS and the Table 6 correlations reported for one year of tenure, Figure 5 clearly indicates that turnover was more strongly related to labor demand for low performers than for high performers.

FIGURE 5

Average Proportional Hazards Estimates by Labor Demand and Job Performance

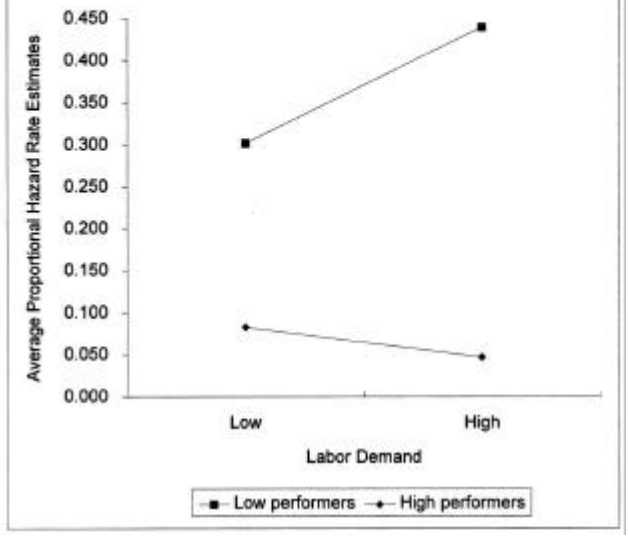

Figure 5. Average proportional hazard rate estimates by labor demand and job performance.

Utility Analysis

The previous results suggest that pay policies that provide greater pay growth for high performers (and less for low performers), though perhaps more costly, might retain more high performers, encourage separation among low performers, and thus increase the value of the work force. In order to investigate the economic practicality of implementing such a policy, we conducted a utility analysis to estimate the relative dollar values of three pay strategies,

calculated by subtracting service and movement costs from service value over a four year period. We created a hypothetical 1989 cohort, based on empirical data, in order to track, over four years, the effects of the three pay strategies. This cohort's performance distribution, and the 1989 and 1993 average pay levels by performance category and, for 1993 pay, by pay strategy, are depicted in Table 7. (See the Appendix for details on the cohort construction and its average pay estimates.)

Table 7

Employee Distribution and Estimated Average Salaries bar Performance Level

Performance	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	All
Employees (1989)	48	78	946	881	1,347	543	256	37	19	4,155
1989 Average Pay	$28,490	$29,473	$32,194	$37,437	$39,864	$43,561	$46,385	$41,041	$43,058	
1993 Average Pay (Strategy 1)	$30,124	$32,105	$37,882	$45,861	$48,404	$53,897	$57,677	$51,326	$54,462	
1993 Average Pay (Strategy 2)	$30,124	$32,105	$37,882	$45,861	$48,404	$53,897	$64,393	$57,034	$62,982	
1993 Average Pay (Strategy 3)	$23,476	$26,529	$37,882	$45,861	$48,404	$53,897	$64,393	$57,034	$62,982	

Separation/retention patterns. The four year survival probabilities computed earlier for each performance category under low, mean, and high pay growth were applied to three different pay strategies in order to estimate separation and retention patterns. As described earlier, Strategy 1 employed mean pay growth at all performance levels, while Strategies 2 and 3 employed high pay growth in pay levels 4 through 5, with Strategy 3 also employing low pay growth for performance levels 1 and 1.5. The resultant distributions of survival probabilities across the three pay strategies are presented in Table 8. To estimate the number of separations and retentions in each performance category, after four years of each pay strategy, the appropriate survival probability was multiplied by the number of employees in that performance category in 1989, shown in the second row of Table 8. The different pay strategies significantly altered the retention and separation patterns for the affected performance categories (i.e., performance rating categories 4, 4.5, and 5 for Strategies 2 and 3; performance rating categories 1 and 1.5 for Strategy 3). It was assumed that replacements would be hired for each separating employee (i.e., constant employment levels).

Table 8

Estimated Four Year Separation Patterns and Movement Costs under Different P4Y Strategies

Performance	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	All	Movement Cost
Employees (1989)	48	78	946	881	1,347	543	256	37	19	4,155	
Survival Probabilities*											
Low Pay Growth	.03	.42	.32	.59	.44	.60	.27	.07	.00		
Avg Pay Growth	.11	.63	.58	.81	.79	.84	.77	.80	.34		
High Pay Growth	.26	.78	.77	.92	.93	.94	.95	.98	.88		
Survival Probabilities*											
Strategy 1	.11	.63	.58	.81	.79	.84	.77	.80	.34		
Strategy 2	.11	.63	.58	.81	.79	.84	.95	.98	.88		
Strategy 3	.03	.42	.58	.81	.79	.84	.95	.98	.88		
Retained Employees (1993)											
Strategy 1	5	49	549	714	1,064	456	197	30	6	3,070	
Strategy 2	5	49	549	714	1,064	456	243	36	17	3,133	
Strategy 3	1	33	549	714	1,064	456	243	36	17	3,113	
Replaced Employees (1990-1992)											
Strategy 1	43	29	397	167	283	87	59	7	13	1,085	$69.40M
Strategy 3	43	29	397	167	283	87	13	1	2	1,022	$65.37M
Strategy 3	47	45	397	167	283	87	13	1	2	1,042	$66.65M

Note: Average cost per movement is estimated at $63,960, as discussed in the Appendix.
*Survival probabilities for Strategies 1, 2, and 3 represent average pay growth survival probabilities except that Strategies 2 and 3 differ by representing high pay growth in performance categories 4-5 and Strategy 3 also represents low pay growth for performance categories 1-1.5.

Movement costs. Costs of accommodating separations and replacements were assumed to be a linear function of the number of separations/replacements. Because the number of separations and replacements is assumed to be equal for this analysis, we combined separation and replacement costs, and refer to them simply as "movement costs." An empirical estimate of movement costs for this particular organization was not available, so they were estimated to be 1.5 times the average salary of the work force in the year of the movement (Cascio, 1991, p. 19), which we calculated to be $63,960. (See the Appendix for details of the calculation.) Total separation/acquisition costs for each pay strategy over the four-year period were calculated by multiplying the number of separation s/retentions by this estimated movement cost. Thus, total separation costs were $69.40 million, $65.37 million, and $66.65 million for Strategies 1, 2, and 3, respectively, as listed in the last column of Table 8.

Service costs. Service costs reflect the total ongoing costs required to retain and support the work force, such as pay and benefits (Boudreau & Berger, 1985). Thus, service costs vary with pay strategies because base pay varies, as do pay-related expenses. Therefore, we first calculated the service costs that would have existed in the 1989 and 1993 work force under each pay strategy, and then assumed linear increases in service costs between 1989 and 1993 to estimate the total service costs incurred under each strategy during the four-year period. We calculated service costs as salary cost plus benefits, which were assumed to average 35% of salary. This may underestimate total service costs, which would also include training costs and administrative costs supporting the employment relationship, but these latter costs are unlikely to vary with pay strategies, so comparisons between pay strategies are unlikely to be substantively affected. Service costs were calculated differently for those who were retained versus those who were replaced (Boudreau & Berger, 1985), because retained employees carry the effects of prior pay strategies, while the quality and salary of employees hired after 1988 was assumed to be equal to the average of the work force in the year they were hired. Total service costs for Strategies 1, 2, and 3 were $981.68 million, $990.37 million, and 990.77 million, respectively. (See the Appendix for details of service costs calculations.)

Comparison of pay strategies based on total costs. Total service and movement costs are $1,051.08 million, $1,055.74 million and $1,057.42 million for Strategies 1, 2, and 3, respectively. This pattern of movement and service costs is intuitive. Compared to Strategy 1, which gives all employees average pay increases, Strategies 2 and 3 both pay high-performers more and reduce high-performer separations, increasing service cost. Strategy 3 has higher service costs because low-paid performers are replaced with higher-paid average performers. As is evident in Table 8, movement costs are highest for Strategy 1, lowest for Strategy 2, which

retains more high performers, and somewhat higher for Strategy 3, which induces more low performers to leave. It is likely that separation rates or costs might be most visible to organizations, favoring Strategy 2. If both movement costs and service costs were apparent, the total cost figures favor Strategy 1 rather significantly (up to six million dollars in four-year cost savings).

Service value. While informative, the cost analysis certainly is not the complete story. Just as changes in the performance distribution affect service costs, they also result in changes in work force value, which is related to movement patterns through the quality of the acquired and retained employees (Boudreau & Berger, 1985; Boudreau, 1991, Milkovich & Boudreau, 1994). We need to estimate the dollar value of changes in the performance distribution and subsequent changes in the value of the work force in order to fully understand the implications of different pay strategies. Our data provide estimates of changes in the performance rating distribution, so a conversion method is required to estimate the dollar value of particular performance levels. This conversion method requires two components (Boudreau & Berger, 1985) -- the value of the average performance level and the incremental value of deviations from that average performance level. To estimate the first component, we employed the approach of Schmidt and Hunter (1983), which suggested that the value of the average performance level would be 1.754 times the average wage at that level. For the second component, the standard deviation of dollar-valued performance (SDy), we investigated three different values: 20% of average salary, which is a very conservative estimate; 40% of average salary, which is also conservative (Boudreau, 1991); and a more realistic 100% of average salary (see Appendix). Table 9 reveals that the four-year stream of service value levels grow higher as pay growth is more strongly linked to performance. The difference in four-year service value ranges from $4.3 million when SDy is assumed equal to 20% of average salary, to $21.5 million when SDy is assumed equal to 100% of average salary. (See the Appendix for the rationale behind our assumptions regarding both components and for their application in calculating service value.)

Table 9

Computation of Four Year Investment Value of Different Pay Strategies*

Pay Strategy	Service Value	Service Costs	Movement Costs	Four Year Value
SDy = 20%				
Strategy 1	$1,287.54	$981.68	$69.40	$236.47
Strategy 2	$1,290.88	$990.37	$65.37	$235.14
Strategy 3	$1,291.83	$990.77	$66.65	$234.42
SDy = 40%				
Strategy 1	$1,299.63	$981.68	$69.40	$248.56
Strategy 2	$1,306.29	$990.37	$65.37	$250.56
Strategy 3	$1,308.21	$990.77	$66.65	$250.79
SDy = 100%				
Strategy 1	$1,335.88	$981.68	$69.40	$284.81
Strategy 2	$1,352.54	$990.37	$65.37	$296.80
Strategy 3	$1,357.32	$990.77	$66.65	$299.91

*Values are in millions of dollars.

Combined cost and value: The payoff from performance-linked pay growth. We have estimated the three components for this decision: (1) the four-year stream of movement costs, (2) the four-year stream of service costs, and (3) the four-year stream of service value. Now, we combine them to estimate the relative value of the three pay strategies, by taking the stream of service value and subtracting the stream of service costs and movement costs (Boudreau & Berger, 1985). The relevant figures are summarized in Table 9, for each strategy and SDy assumption

These results suggest a different conclusion from the cost analysis presented earlier. Strategy 1, which appeared optimal based on costs, now appears optimal only if one assumes that performance differences are relatively low (SDy = 20% of average yearly salary). If SDy is 40% of average yearly salary or the more probable 100% of average salary, Strategy 3 produces the greatest four year value. In the SDy = 100% case, the Strategy 3 advantage is potentially as high as $15.1 million when compared to Strategy 1. Thus, the utility analysis results indicate that, for this group of exempt employees, pay for performance at all performance levels seems to be the more viable pay strategy.

Discussion

The present findings suggest that the relation between employee performance and voluntary employee turnover is curvilinear, such that low and high performers exhibit greater turnover than average performers. Moreover, our results indicate that performance-turnover research is enhanced not only by allowing for curvilinearity, but also by examining contextual factors that can moderate this relation. While we found support for hypothesized moderating effects of promotions and labor demand, perhaps the most important result from this study concerned the moderating influence of salary growth. We found that failure to pay according to performance level resulted in sharp increases in turnover probabilities as performance advanced from average to high levels. Conversely, paying for performance defused this tendency as high performer turnover probabilities resembled those of average employees.

As further support for the efficacy of reducing high performer turnover by paying for performance, results of a utility analysis suggest that, under the most realistic assumption of the dollar value of performance differences, the four year financial benefit to the organization was substantial. Even under a somewhat more conservative assumption, paying high performers according to their performance was a superior policy. Moreover, we may have understated the case for the dollar value implications of pay for performance. Rosenbaum (1979, 1984) and Forbes and Wertheim (1995) maintain -that early career promotions predict later promotions and that those not promoted early tend to be eliminated from later competition. Thus, SDy should increase over time, which, in this study, would result in further advantage for the pay for performance strategy (see Russell, Colella, and Bobko, 1993, for a discussion of SDy instability over time). Additionally, in the utility analysis we ignored the potential of pay for performance to motivate employees to perform better. Such effects on performance obviously would result in an even larger payoff for the firm.

Although the utility analysis results and related concerns are important, they do not address two additional and potentially substantial costs, both of which involve high pay growth's limiting effect on the turnover of the very top performers. When increasing pay growth from a mean to a high level, the largest retention increase, by far, was exhibited in the top performance category. Although the relatively low number of employees in this top performance category (n = 23) may prompt questions regarding the importance of their turnover rate, we contend that the fate of these few is disproportionately important to the organization. Top performers are of value not only for their present and short term future performance value alone, as estimated in the utility analysis, but also as the members of the selection pool from which future firm leaders are chosen. Precisely because there are so few indispensable firm members or "franchise players"

(e.g., professional basketball's Michael Jordan) that, as individuals, can influence the success of the entire organization, it is important to maximize selection pool quality in order to increase future leader quality (on average) and the probability of finding an exceptional leader. Tomorrow's executive level stars and perhaps even franchise players may be among today's 23 top performers, and their retention, at least in part, appears to be dependent upon paying them according to their performance.

Moreover, motivational theory indicates that a firm's financial treatment of the few top performers seems certain to have implications for the motivation and performance of the remaining employees. Why should these workers strive to perform better when they can see, either through direct knowledge of top performer pay or through attributions made from top performer turnover, that such performance improvements will not be sufficiently rewarded? Indeed, tournament theory, for example, predicts that such a situation (i.e., the perception of a low payoff for top performance) will result in relatively low motivation and performance among those with the ability to raise their performance levels. Similar predictions would follow from expectancy and equity theories.

In sum, retaining talent is a fundamental tenet of compensation strategy and, according to our data, pay growth commensurate with performance appears to be one effective approach toward meeting that goal. We argue that the greater labor costs necessary for retention of these stars would be trivial relative to the opportunity costs associated with their turnover. These opportunity costs can include the potentially heavy losses associated with: (1) absence of performance value from departed high performers, as illustrated in the utility analysis; (2) the possible turnover of future leaders of the organization; and (3) detrimental motivational effects on the remaining employees.

Another major finding from this study was the evidence of curvilinearity. We found a curvilinear relationship between job performance and voluntary turnover because we allowed for its possibility. That is, given our results and the undermined meta-analytic attempts to study curvilinearity (McEvoy & Cascio, 1987; Williams & Livingstone, 1994), we argue that the time has passed for methodological approaches that preclude examination of nonlinearity in studies of job performance and turnover. Growing evidence of a negative linear effect of performance on turnover should be interpreted in light of the knowledge that in the vast majority of cases, curvilinearity was not sought out. As our results attest, curvilinearity and negative linearity are not mutually exclusive.

Promotions were found to be a significant moderator in that they facilitated low performer turnover. If promotions have this effect via visible indications of competence, two

issues warrant notation. First, while we would not advocate that organizations should attempt to elicit functional turnover by showering their poor performers with meaningless (i.e., unrelated to monetary rewards) promotions, related questions come to mind. For instance, if training, job rotation or skill based pay result in relatively concrete credentials for the employee, might these programs be vehicles that provide ancillary benefits to the organization by enhancing low performer ease of movement and subsequent turnover while having little effect on high performer turnover?

A second matter revolves around the lack of a promotions effect for high performers. Should this result generalize, it bodes well for flatter organizations, where one fear is that promotional bottlenecks will precipitate high performer turnover. The inference from our results is that this should not be a problem, as long as those that perform well are paid accordingly. On the other hand, this uncoupling of promotions and pay growth may well yield high performer turnover if promotions are given without being accompanied by appropriate salary increases (Johnston, Griffeth, Burton, & Carson, 1993).

It does seem that promotions serve as a means to an end for both high and low performers. For the stars, promotions are important to the extent they are tied to pay growth. For the low performers, promotions simply help one to be taken seriously on the job market. For the organization, promotions may not facilitate the expected increases in high performer retention unless they are tied to high salary growth, but they may provide an unexpected benefit through low performer turnover.

In terms of labor market condition, we found that the labor market influenced low performer turnover more than high performer turnover. Beginning to address what Williams and Livingstone (1994: 289) cited as the "need for research that assesses the construct validity of the different objective measures of unemployment," we utilized labor demand rather than unemployment rate as the measure of labor market condition. Thus, we may have found a result where Williams and Livingstone did not because our labor demand measure may have been a more sensitive indicator of the labor market than their data permitted them to employ. A second possible reason for the different results is that our sample appeared to have higher level employees on average. Our low performing subjects, more so than those in the Williams and Livingstone meta-analysis, may have been able to generate a larger number and better quality of performance indicators observable to organizations in the external market.

From a theoretical perspective, the results of this study have several applications. The finding of curvilinearity supports Jackofsky's (1984) hypothesis. Moreover, our contextual approach allows for certain inferences regarding the turnover determinants first set forth by

March and Simon (1958). Jackofsky's implicit assumption that high performers' ease of movement will not be offset by lower movement desirability appeared to hold true only when pay and performance were not linked. When pay and performance were strongly linked, the finding that turnover was approximately equal for top and average performers (Figure 3 indicates little change between performance levels 2.5 and 5.0) suggests that the high movement ease enjoyed by high performers is negated by low movement desirability. Also, low performer ease of movement seemed to be positively affected by labor demand. However, in the present study it was not possible to differentiate between actual and perceived ease of movement for turnover attributions. Additionally, we speculate that, with salary growth effects removed, promotions may still have created somewhat lower movement desirability due to unmeasured elements such as challenge, positive reinforcement, and relief of boredom. However, our findings suggest that any promotion driven decreases in movement desirability for low performers were overcome by increases in actual and or perceived ease of movement.

Despite the overall support we found for Jackofsky's (1984) model, our results also indicate that moderating influences that operate on ease and desirability of movement have the potential to substantially enhance or reduce the curvilinear relation, particularly when the values are extreme. Such results may explain the earlier research that failed to find performance-turnover curvilinearity but reported a virtual lack of reward contingency (Wright & Bonett, 1993) and unusually high labor market demand (Birnbaum & Summers, 1993). A more flexible approach to Jackofsky's framework that easily accommodates such contextual influences might explain different degrees of and even the absence of curvilinearity. This study indicates that such a derivative model will need to more fully address the impact of different levels of moderators on perceived and actual ease and desirability of movement.

This study contributes to the hopeful emergence of a stream in turnover research which recognizes the importance of identifying and examining new moderators of the performance-turnover relation. While our main contribution is the pay for performance finding, certainly labor demand and promotions moderators are of practical interest as well. As opposed to the internal pay equity which was the focus here, external equity might also moderate performance and turnover. Indeed, Schwab (1991) in part attributed a positive relation between performance and turnover for tenured university faculty members to the higher pay level available in the external market. More broadly, a potential moderator worthy of study is the human resource system as a whole (e.g., Arthur, 1994). These systems incorporate a variety of policies and programs (e.g., compensation and benefits, training, staffing, dispute resolution) that could interact with performance in a number of different ways. Finally, macro-level organizational variables should

also be investigated. Accordingly, Sheridan (1992) found a significant interaction between organizational culture and performance in the investigation of turnover. Other possible macro-level moderators include diversification, industry, and downsizing.

In addition to the theoretical and empirical issues addressed above, several other points are of interest. The present findings may understate the potential effects of the reward system on turnover among high performers in other settings. The petroleum industry is known as a high pay level industry. For example, Hay Group (1986) reported that the petroleum industry paid its middle managers 18% above the all-industry average. Given this high pay level, it is possible that high performing employees placed less emphasis on internal comparisons than they might have in an organization where average pay was lower. In the latter organizations, high performers would perhaps be more likely to experience inequity, based on both internal comparisons and external comparisons with the relevant external market. The result in such cases could be even higher relative turnover among high performers.

The influence of labor market conditions may have also been related to factors somewhat specific to the petroleum industry. Based on Bureau of Labor Statistics data, total employment in the United States grew approximately 20% over the 1983 to 1989 period. In contrast, combined employment in the petroleum and chemicals industries decreased by approximately 28%. Thus, during the period studied, the general level of alternative job opportunities was small for those employees staying within the petroleum and chemicals industries. It is difficult to know what effects the low labor market demand might have had on the results of the present study. For example, pressure on low performers to leave "voluntarily" may have been higher than usual. On the other hand, based on the finding that turnover among high performers is relatively independent of labor market conditions, there may have been little impact on the results for higher performers.

Future research using data from multiple organizations would permit an examination of whether firm differences in the performance contingency of pay correspond to differences in the performance levels of leavers. Earlier research (Gerhart & Milkovich, 1990) clearly demonstrates that organization pay strategies differ significantly, particularly in terms of how pay is delivered (e.g., relative emphasis on base and bonus pay). Thus, it seems likely that pay-performance relations may similarly differ. It would be useful to see if the key implication of the present study, that weaker pay for performance relations increase turnover among high performers, could be replicated using that type of multiple organization data set. Moreover, such a sample could provide a confirmatory test of curvilinearity in general, and moderated curvilinearity in particular.

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Appendix

Utility Analysis Assumptions and Calculations

Hypothetical 1989 Cohort

Our data contained information on the 5,143 employees who were hired between 1983 and 1988. Table 7 indicates the number of employees present at the beginning of 1989 (N=4,155), representing the addition of the 3,635 stayers to the 520 employees that voluntarily or involuntarily separated in 1989. Thus, our simulated analysis applies to a hypothetical group of 4,155 employees with six or less years of tenure with this firm (i.e., pre-1983 hires were not included in the data). To estimate the distribution of this group across the performance categories, we multiplied the original sample observations in each performance category by the ratio 4,155/5,143, or.808. This approach was driven by the assumption that the most reliable performance distribution would be based upon our entire sample. The resulting employee performance distribution is exhibited in Table 7 and formed the basis of our simulation.

The second row of Table 7 lists the estimated average 1989 pay levels by performance category. These averages were calculated as the mean observed salary in each performance category, across the entire sample period (1983 to 1988), adjusted for inflation to 1989 dollars. Once again, applying entire sample data to the hypothetical 1989 work force was undertaken to utilize the most reliable estimates of, in this case, average salary. The final three rows of Table 7 contain the estimated 1993 salary levels, under each of three pay strategies. For each performance category, "high (low) pay growth" was defined as a series of four pay increases equal to one standard deviation higher (lower) than the average for the pay category. Thus, for each performance category, four times the appropriate yearly pay growth level was added to the 1989 salary level. For example, to calculate the 1993 salary level for those in performance category 5 under Strategy 2 or Strategy 3, we took the observed average yearly salary increase for category-5 performers ($2,851), and added the yearly salary increase value equal to one standard deviation for category-5 performers ($2,130), multiplied the result by four, and added that to the estimated 1989 salary level.

Movement Costs

We assumed that movement costs would not vary with pay strategy, so we estimated average salary assuming average pay growth for all performance categories (Strategy 1). Thus, average cost per movement in 1989 was estimated to be 1.5 times the average 1989 salary level of $38,187, and average cost per movement in 1993 was estimated to be $47,092, which is 1.5 times the average 1993 salary of the employees retained between 1989 and 1993, assuming that salary increases were given for the four-year period. Because we assumed that

movement costs increased linearly between 1989 and 1993, the average cost per movement over the four-year period was thus estimated to be $63,960 (i.e., 1.5 times the midpoint between the 1989 and 1993 average salary levels). This is a simplified version of the Boudreau and Berger (1985) cost calculation, which separated acquisition and separation costs, and allowed for variations over time and strategies. Because analyzing different selection or retention activities was not the object of this analysis, we combined the two costs and used an average level.

Service Costs

Retained-employee service costs in 1993. For employees retained throughout the four-year analysis, we determined the 1993 salary level for each performance category at the end of the four-year period, under each pay strategy (see Table 7). Then, we multiplied this salary level by 1.35 to reflect total service costs, and then multiplied each service cost estimate in each performance category by the projected number of retained employees in each performance category under each pay strategy (see Table 8) to obtain the total 1993 service costs for retained employees in each performance category. These products were summed across performance categories to give an overall estimate of the 1993 service costs for those retained from the 1989 work force.

Replacement-employee service costs in 1993. To calculate 1993 service costs for the replacements, we assumed that under all pay strategies, replacements would have been of average quality, and paid the salary level that would have existed if average pay increases had been given over the four-year period (Strategy 1). This was calculated by multiplying the number of retained employees under Strategy 1 in each performance category (see Table 8) by the corresponding 1993 salary level assuming average salary increases (Strategy 1 in Table 7), adding the products and dividing by the number of retained employees. The resulting average 1993 salary level was $47,092, as noted earlier. This value was multiplied by 1.35 to estimate the average 1993 annual service cost for each replacement as $63,575. To calculate the total 1993 service costs for replacements hired during the four-year analysis, we multiplied $63,575 by the number of replacements in the 1993 work force under each pay strategy.

Total service costs. 1993 and 1989. To estimate the 1989 service costs levels, we multiplied the average 1989 salary level by 1.35, and multiplied this figure by the total number of employees in the work force in 1989 (see Tables 7 and 8), producing a total service cost value of $214.20 million in 1989. To calculate the total 1993 service-cost level we added the service costs for stayers and replacements, using the performance distributions and salary levels from Tables 7 and 8 for the retained employees, and the average service cost for the replacements,

under each pay strategy. Under all strategies there is at least a 23% increase in service costs over the four years, commensurate with increasing pay levels over time. However, Strategies 2 and 3 produce somewhat higher 1993 service cost levels because Strategy 2 retains more high performers, and Strategy 3 also replaces some low performers with average performers.

Four-year service costs. To calculate the four-year stream of service costs, we assumed that service costs increased linearly between 1989 and 1993. Thus, one-quarter of the difference between the 1993 and 1989 service costs levels was assumed to have accrued in each intervening year. For example, for Strategy 1, the service costs levels in years 1989 through 1992 would be: $226.69 million, $239.18 million, $251.66 million, and $264.15 million, respectively. Hence, the total stream of service costs under Strategy 1 is the sum of these four values, or $981.68 million. The corresponding values for Strategies 2 and 3 were $990.37 million and $990.77 million (see Table 9).

Service Value

Dollar value of average performance. There is no single accepted method of estimating the dollar value of average performance among workers or applicants. Some research has suggested that average performance value can be estimated equal to the average compensation of the work group, as in the CREPID method, where an average rating across all dimensions will produce an dollar-valued performance estimate equal to the average wage (Boudreau, 1991, p. 654). Raju, Burke and Normand (1990, p. 9) propose a similar position. However, it seems unlikely that average-performing employees produce only enough value to offset their direct wage costs. Considering the other service costs that are incurred, and the need for organizations to obtain a positive return on costs, a higher level of average service value seems likely. Thus, Schmidt and Hunter (1983) proposed assuming that the ratio of average wage to average dollar value is approximately .57, based on an analysis of wage and productivity estimates in the national income accounts of the United States. The reciprocal of .57 is 1.754, suggesting that the value of average performance would be 1.754 times the average wage.

Theory and evidence are quite sparse regarding this issue. Fortunately for our analysis, different assumptions about average service value affect the estimated total value of the work force, but the relative work force value under different pay strategies is not affected. These relative values are the key to comparing pay strategy decisions. Therefore, we will use the estimate of average service value as 1.754 times average wage, following the logic of Schmidt and Hunter (1983). For the 1989 work force, we multiplied the average salary by 1.754 to obtain a value of $66,995 per person, per year. For the 1993 work force, consistent with the estimate

of average service costs above, we estimated average salary as that which would have been produced by four years of average salary increases, beginning in 1989. Thus, as noted above, average 1993 salary was estimated to be $47,092 producing an average work force value estimate of 1.754 times $47,092, or $82,600 per person, per year.

Dollar value of performance rating categories. We required an estimate of the value of each of the nine performance levels, in both 1989 and 1993, so that as the distribution of employees across performance levels changes, the dollar implications can be assessed. This was different from prior utility analysis applications, which estimated the value of changes in average work force quality, such as the increased average value of a better-selected or better trained group (Boudreau, 1991). This did not require or produce estimates of the dollar value of particular performance levels, nor the distribution of employees among those levels.

Still, some SDy estimation methods can produce dollar-value estimates of different performance levels. For example, CREPID assigns dollar values to different performance dimensions according to their importance, rates each employee on a scale of 0 to 2 on each dimension, multiplies the resulting ratings by the dollar values, and adds the results to create a dollar-valued performance estimate for each employee (Boudreau, 1991; Cascio, 1994). Raju, Burke and Normand (1990, Appendix B) proposed an My estimation method that uses managerial judgments to determine the relative value of the highest and lowest performance rating level, estimates the dollar value of average performance, and then mathematically derives an SDy value based on the observed distribution of performance level. In this study, we had no direct estimates of the dollar value of particular performance levels, as is probably typical of many organizational situations. Thus, we used an estimation approach that does not require such estimates, but it is consistent with both CREPID and RBN. The method consisted of three steps, each applied to the work force of 1989 and 1993.

First, we estimated the standard deviation of dollar-valued performance (service value), SDy, based on a percentage of salary. As Boudreau (1991) noted, across a large number of studies, 40% of salary proved to be a conservative estimate, compared to estimates derived using other methods. However, in actual situations, the value of SDy is unlikely to be estimated precisely, so we investigated three values: as an extremely conservative approach, we used 20% of average salary; we used 40% of average salary as a conservative estimate; and we used 100% of average salary as a more realistic estimate. Support of the 100% approach is provided by Becker and Huselid (1992), who found direct observations of SDy fell in the 74% to 100% of mean salary range. Their study examined retail sales jobs, which would seem to be of less complexity, and thus lower SDy values (Hunter, Schmidt, & Judiesch, 1990), than the exempt

jobs in our sample. For 1989, we estimated average salary as $38,187, producing SDy estimates of $7,637, $15,275 and $38,187 for the 20%, 40% and 100% levels, respectively. For 1993, estimated average salary was $47,092, producing three corresponding estimated SDy levels of $9,418, $18,837, and $47,092.

Second, we estimated the Z-score corresponding to each of the nine performance ratings, using the observed distribution of employees across performance categories. The average performance rating was 2.76, with a standard deviation of .66. We assumed that the Z-scores for the underlying performance distribution would be the same from 1989 to 1993, because the underlying value function changes only with the job activities, which we assumed were constant. Thus, although the distribution of workers across performance categories changes from 1989 to 1993, we assumed that the relative standardized value of different performance levels did not change. This produced the Z-scores corresponding to each performance rating. Finally, multiplying these Z-scores by the appropriate dollar value of a one standard deviation performance difference in 1989 and 1993 produced the dollar values corresponding to each performance rating level, for each My assumption.

The dollar values are more varied as SDy increases. Also, the 1993 values are larger and more varied than 1989 levels, due to the increased average work force value and average salary, which increases SDy levels. Under the largest My assumption, in both 1989 and 1993, the lowest two performance categories are estimated to actually produce negative service value, due to the large variability in performance value.

Service value of alternative pay policies, 1989 and 1993. For 1989, the total service value of the work force was calculated simply by multiplying the performance category service values by the corresponding quantities of employees in each performance category (see Table 7), and adding the products. For 1993, the total service value of the work force was calculated separately for those employees retained over the four-year analysis, and for those hired during the four-year period, similarly to the service-cost calculation earlier. For the retained employees, the 1989 service values for each SDy level were multiplied by the quantity of retained employees from Table 8 for each performance category, and these products were summed. Employees hired during the four-year analysis were assumed to have an average value equal to the average work force value that would have been produced by giving average pay increases over the four years. This value was equal to the average 1993 salary times 1.754. This value was multiplied by the number of replaced employees from Table 8. The service value of the replacements and retained employees was added to produce the estimated total 1993 service value for each pay strategy, and each assumed SDy level, as shown in Table 9.

Under all assumptions about SDy, the 1993 yearly service value is lowest when giving all employees average pay increases (Strategy 1), higher when giving high performers high pay increases and all others average increases (Strategy 2), and highest when giving high performers high pay increases, middle performers average pay increases and low performers low pay increases (Strategy 3). This is because, compared to giving all employees average pay increases, Strategy 2 causes more high-performing and highly-paid employees to stay, and their value enhances the work force. Strategy 3 has the same effect on high performers, but it also induces lower performers to leave more frequently, and they are replaced by average performers, producing an additional increment in low-performer service value. Greater SDy levels increase the magnitude of the differences. Yet, even with SDy estimated to be only 20% of average salary, the organization obtains a one-year 1993 service value increase of over $1.7 million dollars by adopting the more aggressive pay-for-performance strategy, as opposed to the average growth policy.

Four-year service value. As with service costs, we calculated the four-year stream of service value levels under each pay strategy and each assumed SDy level by assuming that total service value rose linearly between 1989 and 1993, so that one-quarter of the change in service value accrued in each intervening year. Summing these stream of service value levels for each pay strategy and each assumed SDy level produced the values shown in Table 9.

Footnotes

[1] Gerhart and Milkovich (1989), for example, in a sample of managerial and professional employees, found that performance was less closely linked to promotions than to overall pay growth.

[2] Of course, the Boudreau and Berger (1985) model in its purest form would calculate the work force value in each intervening year and apply a discount factor to equalize the time value of the dollar amounts. However, such embellishments would not have a significant effect in this case because the changes in dollar amounts are assumed to be linear, the time frame is relatively short, and our focus is on the relative (versus absolute) value of the different strategies. We also did not have information about the organizational tax rate, so we report our results in pre-tax dollars. After-tax effects could be easily calculated by multiplying the final results by an appropriate after-tax proportion, but the relative effects of the options would not be altered.

[3] By using the actual average pay growth for each performance category, we mirrored the organization's past practice in Strategy 1, while Strategies 2 and 3 implemented high and low pay growth based on within-performance-category pay growth means and standard deviations. This approach assumes managerial decisions are made to improve or worsen pay growth relative to historical practices at certain performance levels. Although this assumption has a foundation in anecdotal evidence and in equity theory (i.e., one's own inputs and outcomes at a recent time as the relevant comparison), the notion of pay for performance could easily be interpreted as necessitating the computation of low, average, and high pay growth means and standard deviations across performance categories. Accordingly, we reran the utility analysis with strategies reflecting the following: Strategy 1 - the same percentage increase for all performance levels; Strategy 2 - a higher percentage increase (plus one standard deviation in total sample percentage pay growth) for ratings 4, 4.5, and 5; and Strategy 3 - the higher percentage increase for ratings 4, 4.5, and 5, coupled with a lower percentage increase (minus one standard deviation in total sample percentage pay growth) for ratings 1 and 1.5. Results did not substantively differ from those to be reported here.