Do Good Promotion Tournaments Make Bad Managers? Evidence of the "Peter Principle" in Sales

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Abstract

Firms use employment promotions both as an incentive and for matching. However, these goals may conflict; the best salesperson may not make the best sales manager. We estimate the costs of managerial mismatch using data from 244 companies subscribe to hosted sales performance mangement software. Consistent with tournament theory, firms promote strongly based on raw sales performance. However, consistent with the Peter Principle, firms deemphasize observable prepromotion characteristics correlated with subsequent managerial performance. When top salespeople and top predicted managers differ, when promoted, the median of the former underperforms the latter by one-third of a standard deviation.

Firms use promotions for two purposes: as a tournament to motivate workers and to improve matching. If firms prioritize the former, workers could get promoted to jobs that misallocate their talents. In these situations, should firms promote the best worker in their current position or for the promoted position?

This tension has led to debate within the theoretical literature on promotions and tournaments. Lazear and Rosen's (1981) tournament theory proposes that firms use promotions into higher-paying positions as a way to incentivize workers.[1] Peter and Hull (1969) lampooned this practice and its

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[1]Tournament theory enjoys broad empirical support. Medoff and Abraham (1980), Murphy (1985), and Baker,

perceived outcome: that firms promote managers until they are no longer competent for their positions. They labeled this tendency "the Peter Principle." Likewise, economists have recognized the potential conflict between using promotions as incentives versus matching, noting that firms that promote the best workers in their current jobs could yield managers whose skills are better suited for their subordinates' positions (Baker, Jensen, and Murphy 1988; Fairburn and Malcomson 2001; Waldman 2003). Lazear (2004) challenged the theoretical necessity of the Peter Principle to explain the tendency for firms to promote great subordinates who generally become merely-good managers; rather, he notes that this tendency may instead be a result of "regression to the mean." Notwithstanding this theoretical objection, the Peter Principle may nonetheless reflect a real dilemma facing organizations that see promotions as a motivating tool, but also recognize that star individual contributors may not make good managers. Indeed, the use of distinct career ladders for technical and managerial employees, as well as the use of different performance evaluation criteria for short term incentives and promotions, suggest that firms recognize the cost of promoting solely based on performance in the current job.

This paper tests the main prediction of the Peter Principle–that firms promote on the basis of desired characteristics of the prepromotion job, at the cost of not maximizing match quality between promoted workers and managerial positions. We contribute to the theoretical literature on promotions by providing the first empirical estimates of the magnitude of the loss in match quality that is sacrificed so that tournaments can incentivize workers in their current job. Importantly, we do not claim that firms use suboptimal promotion policies. Rather, we show the benefits of incentives is likely to be substantial to justify the significant costs of mismatch.

Our analysis uses standardized transaction-level and salesperson-level data from 244 large firms that subscribe to hosted sales performance management software. These data are well-suited for this question because they offer clear measured performance before and after a large number of promotions into managerial positions with subordinates. Finding evidence of promotion tournaments in sales may be surprising, given that firms already tie pay to measured performance through

Gibbs, and Holmstrom (1994) find that pay differences between job levels tend to be greater than differences within job levels. DeVaro (2006) finds relative performance is a better predictor of promotions than absolute performance. Empirical work from many settings has shown that greater pay spreads between job levels are associated with greater effort and performance (see Connelly, Tihanyi, Crook, and Gangloff 2013 for a review).

commissions, and the job requirements for sales managers are quite distinct from the requirements for salespeople. Nonetheless, academics and practioners have long used sales is an archetypal candidate for the Peter Principle.[2]

We begin by asking whether firms align promotion criteria to the observable predictors of managerial success. To do so, we examine the correlation between promotion and observable prepromotion characteristics, including total sales credits, team sales credit, transaction size, product variety, and tenure. Consistent with tournament theory, we find that raw sales performance is a powerful predictor of promotions. Next, we examine the correlation between observable prepromotion characteristics and subsequent managerial performance. We find that cross selling and team selling activities are strong predictors of managerial performance despite being weak predictors of promotion. We also find evidence of some "regression to the mean," in that high raw sales performance is only weakly correlated with managerial productivity. This may be caused in part by other observable and unobservable determinants of future managerial success that are not used as promotion criteria. We interpret this as evidence for the use of promotions as incentives and for the "Peter Principle," that firms may promote on the basis of observable, desirable characteristics at the current job at the expense of observed characteristics that predict aptitude in the future job.

Second, we estimate how much performance would be improved if subordinates were optimally matched on our observable criteria, setting aside potential incentive effects. To do this, we estimate managerial performance as a function of prepromotion characteristics among the sample of promoted workers. We then compare predicted values for managerial performance among promoted and non-promoted workers, and the expected gain in managerial performance if a firm were to move from its current promotion policy to one that promotes purely on the basis of expected managerial performance.

[2]Baker, Jensen, and Murphy (1988: 602) opine that "in many cases, the best performer at one level in the hierarchy is not the best candidate for the job one level up– the best salesman is rarely the best manager, for example." Deutsch (1986), points out that "American companies have always wrestled with ways to keep the Peter Principle at bay - to prevent competent salesmen, for example, from rising to become incomptent sales managers."

1 Background

Salespeople are often cited as an an archetypal example of an occupation fraught with the Peter Principle. This is motivated by two beliefs: first, that organizations typically tap top salespeople to be promoted, and second, that the productive characteristics of salespeople and managers are so different that this practice is misguided.

Consistent with the first belief, the US Department of Labor's Occupational Information Network (ONET) show stark differences in the duties of sales managers and subordinates. Sales representatives' job duties emphasize direct selling activities, including: assisting customers in selecting products, emphasizing product features based on customers' needs, and answering customers' questions. Sales managers' job duties emphasize directing others, including: directing staffing, training, and performance evaluations; directing and coordinating sales activities; and monitoring customer preferences to determine focus of sales efforts. Consistent with this, the productivity of sales managers is typically measured by the performance of their teams.

Lazear's (2004) critique pertains to the second belief–that promoting a top salesperson is misguided. He notes that the top salesperson could be an organization's best guess as to who would make the best manager, though unobserved determinants of managerial productivity will result in "regression to the mean." Rather, this paper focuses on a particular alternative version of the second belief: that firms do possess data that are informative of a salesperson's potential as a sales manager, but deemphasize these in promotion decisions.

Under tournament theory, ignoring data that are informative of future managerial peformance could be a firm's optimal policy if doing so provides incentives for workers to excel at their current jobs. However, empirical work offers little support for whether firms that use promotions as an incentive suffer from matching, and whether they substitute between the two. Perhaps the closest test is Grabner and Moers (2013). They construct a model allowing for skills to change across organizational hiearchies. Using data from a retail bank, they find that firms place greater weight on current job performance when a promotion would be to a job performing a similar task.

2 Data

The data come from a firm offering sales performance management software over the cloud. Subscribing firms input their employee records, organizational hierarchies, quotas, orders, and sales transactions into the online system. For each transaction that the firm reports, the software calculates the corresponding commission or bonus. These calculations can then be directly linked to the client firm's payroll software. The software also features an online dashboard that allows salespeople and managers to monitor their performance and commissions in real time.

The data include 244 client firms, 61,092 salespeople, and 941,864 person-months. Represented industries include manufacturing (62); information and enterprise software (56); scientific, professional, services (38); retail trade (14); wholesale trade (13); administrative support (12); finance and insurance (10); and others (39). Median salary (including zeroes) is $68,535 USD, and median annual variable pay is $32,080 USD.[3] Client firms pay the software provider a license fee that depends on headcount, and so the sample is composed of relatively well-paid salespeople in larger firms with complex incentive plans, and should not be interpreted as representative of all salespeople. All firms have at least one complete fiscal year of data, and no one firm constitutes more than 8% of person-months. Table 2 provides counts of changes in hierarchical positions and exits.

[Table 1]

The data include 156 million credited transactions (such as a final sale, a renewal, or an upgrade). Credited transactions include a credit value, which is then divided into split credits according to an organization's internal crediting rules. For example, a relationship manager may be a client's single point of contact. For specialized products and services, the relationship manager may bring in a product specialist, and if a sale is made both the relationship manager and the product specialist would receive credit. For complex products, credit may also be split with prospectors who develop initial sales leads, salespeople in several territories provide on-site

[3]The 10th, 25th, 50th, 75th, and 90th percentiles are $0, $0, $68,535, $110,000, and $161,000 for salary and $2,949, $10,367, $32,080, $82,820, and $380,082 for total variable pay, including commissions and bonuses. Our sample consists of relatively high-wage and highly skilled workers. For comparison, the 2013 Occupational Employment Statistics program of the BLS reports that the mean annual wage in sales and related occupations is $38,200, although this is a broad category that encompasses nearly 10% of the US labor force.

product demonstrations, technicians who manage installations, and account executives who service renewals and upgrades. For national or international clients, a single major transaction could be split across both functions, products, and geographies. As such, split credits allow firms to measure performance and distribute pay when work is organized along many dimensions and may involve many salespeople. High relative credit sharing does not imply low total credits; salespeople may have high total split credits and high relative credit sharing if they are credited on several large, complicated deals involving other salespeople.

The sum of these split credits over a measurement period is the fundamental unit of a salesperson's measured production; in the software, the rolling sum of split credits mechanically determines a salesperson's quota attainment, commissions, and bonuses. In the data, managers also typically receive credit from subordinates' transactions. Like salespeople, these credits also determine the managers' pay.

The dependent variables are promotion events and managerial performance. We observe 6,224 instances in which a rank-and-file salesperson is promoted into a position that has subordinates; the most common job titles for these positions include territory manager, sales director, regional director, regional manager, sales engineer manager, and regional vice president. We are left with 4,871 promotions after excluding those with fewer than twelve months of data before or after promotion.

Determining relative performance requires first defining a peer group. Because the data are large, our preferred specification conservatively defines a peer group to be individuals who meet the following criteria: (1) they must work under the same manager, (2) they must have the same job title, and (3) they must be assigned the same sales plan. We exclude individuals who have a unique job title under the manager, yielding a sample size of 2,358 promoted workers with twelve months of data before and after promotion. Alternatively, the peer group could include individuals with the same job-titles under higher levels of aggregation (e.g. region or company), or could exclude individuals with a smaller peer group (e.g. those who have only one peer with the same job title).

Table 2 presents how the sample size of observed promotions change with the definition of the peer group. Table 2 also reports the share of instances that the individual with the greatest sales

credits within that peer group is promoted, conditional on any individual within that peer group being promoted. Salespeople with the greatest sales credits are much more likely than any one of their peers to be promoted, although for larger peer group sizes, the majority of promotions are not the single top salesperson by total sales credits.

[Table 2]

To predict promotions and postpromotion managerial performance, we use total sales credit, credit sharing, concentration of credits into fewer transactions, product diversity, and tenure. For total sales performance, we use the sum of split credits within an individual's peer group. For credit sharing, we use the mean number of people credited on transactions weighted by their credit values. In the data, split credits are typically assigned for qualified leads, origination, For sales concentration, we use the Herfindahl index for the split credit values.[4] For product diversity, we use the count of unique product identifiers for transactions. These variables are highly skewed, and not always following typical transformations (e.g. log-normal). Therefore, we use percentiles of each measure within the peer group. We also include an indicator variable for those with the highest values of total credits and credit sharing within their peer group.

3 Results

3.1 Who do firms promote?

The first goal of the paper is to examine whether promotion criteria align to the predictors of success among sales managers. If promotion and subsequent performance measures align, we would interpret this as evidence that firms prioritize matching in promotion decisions. If firms promote based on the desired outcomes of the subordinate position, but these do not align with the predictors of managerial success, we would interpret this as evidence that firms prioritize tournament incentives in promotion decisions.

[4]The Herfindahl index is the sum of squared shares of all credits. As an individual is credited on infinitely many small transactions, this index approaches zero. If there is only one credited transaction, this takes a value of one.

We begin by examining which characteristics of salespeople are correlated with promotions. We do so using a Cox proportional hazards model with the form

$$\lambda(\text{promotion}_i|X) = \lambda_0(t) + \beta_1 \text{Top Salesperson}_i^{t=1} + \mathbf{X}_i^{t=1}\mathbf{B}' \tag{1}$$

where Top Salesperson is an indicator that salesperson i has the greatest total sales credit among i's peer group and $\mathbf{X}_i$ includes other observable characteristics. We isolate the Top Salesperson variable because it follows from tournament theory's prediction that firms will promote the most productive worker in the prepromotion job. Table 4 presents results.

[Table 3]

The hazard model strongly prioritizes the indicator variable for being the top salesperson, as measured by total sales credit. Other predictors are sometimes significant but have much smaller effects. In the full model, terms on total sales credit percentile and credit sharing are positive, while selling many products and long tenure are negatively correlated with promotion. The Herfindahl index on transaction size is not significant.

3.2 Who makes the best managers?

Next, among promoted managers, we examine which prepromotion characteristics are correlated with subsequent success as a sales manager. We use an OLS regression model with the form

$$Y_i^{t=2} = \beta_1 \text{Top Salesperson}_i^{t=1} + \mathbf{X}_i^{t=1}\mathbf{B}' + \epsilon_i \tag{2}$$

where $t = 1$ denotes a prepromotion variable, $t = 2$ denotes a postpromotion variable, and $Y_i^{t=2}$ is the manager's performance. To measure the manager's performance, we use the manager's annual quota attainment: the manager's total credits divided by his or her quota. To filter common shocks, we divide the manager's quota attainment by the mean of the manager's own peers in

measurement periods following the promotion. For example, a sales manager who reaches 150% quota attainment, and whose peer managers reach an average of 120% quota attainment, would receive a value of 1.2 (150%/120%). Because a sales manager's performance is generally measured as the cumulative performance of the subordinates, making and exceeding quotas requires sales managers to build, train, motivate, and support his or her team. Firms typically use 100% quota attainment as a benchmark for acceptable performance.

As before, the inclusion criteria include salespeople who: were promoted to a position with subordinates (excluding those with subordinates added beneath them), had twelve months tenure prepromotion (to observe prepromotion characteristics), and who had at least one peer with the same job title working under the same manager (to compare relative performance). To calculate the dependent variable, we add two new criteria: sales managers must have at least twelve months tenure postpromotion and must have a quota. These reduce the sample to 1,777 observations.

Table 4 presents results.

[Table 4]

The model finds that managers with relatively high sales and credit sharing prior to promotion became relatively successful managers. However, there is no significant "bump" for either having the highest sales or credit sharing, nor are prior sales concentration or product diversity correlated with subsequent performance.

While total sales performance is correlated with subsequent success as a sales manager, the correlation is not so strong as that for credit sharing. One interpretation is that salespeople who achieve high total sales credits through the teamselling activities are either personally predisposed or otherwise acquire the interpersonal skills, political skills, and team respect that are particularly productive to sales managers. While split crediting may be suggestive of these skills, it is potentially gamable and not inherently productive, so firms may not give extra credit toward compensation for these behaviors.

We may also test Lazear's (2004) prediction that great salespeople will be promoted to become good sales managers due to "regression to mean." Among top salespeople who are promoted, the

correlation between their prepromotion sales percentile and postpromotion relative quota attainment is only 0.197.

3.3 Are firms promoting on factors correlated with managerial performance?

We next ask whether the promotion rule described by Equation (1) is the same rule that the firm would follow if it were only trying to maximize the selection of the best managers. Answering this question is not straightforward because workers are not promoted at random. This means that characteristics that are correlated with managerial quality among promoted workers may not be correlated in the general sample. For example, if we observe that measures of teamwork are very predictive of managerial quality but not of promotion, we cannot necessarily conclude that teamwork is under weighted: it is possible that teamwork may be very predictive of managerial quality for the set of promoted workers, but it may not be for the population of workers as a whole.

To address selection issues, we follow Chandra and Staiger (2010) and Abaluck and Agha (2013) and ask whether, conditional on a salesperson's probability of promotion, a worker's sales or teamwork measures are still predicts managerial performance. The intuition behind this test is simple: assuming that firms want to promote workers based solely on their managerial potential, we would expect them to incorporate all information about a worker's future managerial quality into their promotion decision. In this case, a firm's propensity to promote a worker should be a sufficient statistic for the firm's assessment of his managerial potential; if we see any additional correlation between measures of sales credits or credit sharing and managerial quality, then this suggests that firms are either misweighting worker characteristics or attempting to maximize something other than expected managerial quality.

In the first stage, following the notation in Chandra and Staiger (2010), we estimate Equation (1), letting $I \equiv \lambda\left(\text{promotion}_i|X\right)$. In the second stage, we estimate Equation (2) with a flexible function for the firm's propensity to promote. The equations take the form:

$$I \equiv \lambda(\text{promotion}_i|X) = \lambda_0(t) + \beta_1 \text{Top Salesperson}_i^{t=1} + \mathbf{X}_i^{t=1}\mathbf{B}' \quad (3)$$

$$Y_i^{t=2} = \beta_1 \text{Top Salesperson}_i^{t=1} + \mathbf{X}_i^{t=1}\mathbf{B}' + \text{g}(I) + \epsilon_i \quad (4)$$

where $g(I) = \alpha_1 I^1 + \alpha_2 I^2 + \alpha_3 I^3 + \alpha_4 I^4$ and coefficients α and β are estimated simultaneously.

[Table 5]

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These results lead us to two conclusions. First, firms do promote on factors correlated with success as managers. Second, the data suggest that firms prioritize total sales performance, and deemphasize other data correlated with managerial success, in promotion decisions.

3.4 How often do top salespeople and top predicted managers conflict?

Next, we examine the frequency that top salespeople and managers conflict. Intuitively, three factors will increase the prevalence that top salespeople and top predicted managers will not match: a weak correlation between being a top salesperson and postpromotion managerial performance, a strong correlation between other prepromotion characteristics and postpromotion managerial performance, and a weak correlation between being a top salesperson and those other prepromotion characteristics.

To estimate this frequency, we create an indicator variable for salespeople who have the top predicted value of managerial performance within their peer group. Next, we produce cross-tabulations so that salespeople fall into four categories: they are both top predicted managers and top salespeople, they are top salespeople alone, they are top predicted managers alone, or they are neither. We examine the distribution of top salespeople and predicted managers in all months, and then only in months in which someone from that peer group was promoted. Lastly, we examine monthly promotion hazard rates. We do so at different inclusion criteria for peer group size. Table 6 reports results.

[Table 6]

Table 6 shows three notable results. First, notwithstanding the strong positive correlation between prepromotion sales performance and subsequent performance as a sales manager, the top salesperson is often not the top predicted manager, particularly among large peer groups. Second,

salespeople who are both the top predicted salesperson and the top predicted manager have much higher probabilities of being promoted than those with one or neither distnction. Third, when top salespeople and top predicted managers do not match, top salespeople are promoted at a slightly higher rate (but not significantly so) as the top predicted manager.

Next, we restrict the sample to event in which the top salesperson and top predicted manager do not match, and then examine observed promotions. To preserve intuition, we report counts rather than rates. We compare these counts to the counts under three decision rules: promote randomly, promote the top predicted manager, and promote the top salesperson. Table 7 reports results.

[Table 7]

Table 7 shows that, when top predicted managers and top salespeople conflict, they are promoted at roughly equal rates and significantly more often than their peers. Although top salespeople and top predicted managers enjoy much higher rates of promotion than their peers, because there are many such peers, observed promotions feature many such peers.

3.5 What are the producitivity lossses from mismatching?

Next, we examine the observed distribution of postpromotion managerial performance, depending on prepromotion top salesperson and top predicted manager status. To filter common shocks, we measure managerial performance as the manager's primary quota attainment divided by the mean quota attainment of the manager's peers. Figure 1 reports kernel density estimates.

[Figure 1]

Promoted salespeople who were the top predicted managers but not the top salespeople had the highest performance as managers. Remarkably, individuals who were the top salespeople alone even underperformed salespeople who were neither top salespeople nor top predicted managers. This might be explained by selection, as organizations promoted on other unobservable (and therefore, presumably uncompensated) characteristics.

Lastly, we estimate the cost associated with promoting the top salesperson instead of the top predicted manager when these individuals conflict.

[Figure 2]

Figure 2 presents two panels. In the top panel, we show the predicted values of managerial quota attainment for top predicted managers and top salespeople when these people conflict. The median predicted value for top salespeople is that they perform at 94.9% of peers' quota. The median predicted value of top predicted managers is that they perform at 104.0% of peers quota, an 8.9% gap. The standard deviation for the joint distribution is 17.2%. The bottom panel shows the observed relative managerial quota attainments for observed promotions. Top salespeople and top predicted managers perform at 94.5% and 103%, respectively, an 8.5% gap. The standard deviation for the joint distribution is 37.2%.

To provide an intuition of how this compares with relative managerial quota attainments full sample, top salespeoples' relative quota attainment of 94.5% is in the 45th percentile of the full managerial sample. Top predicted managers' relative quota attainment of 103% is in the 57th percentile of the full sample. The difference, 8.5%, is about one-quarter of a standard deviation.

Continuing under the assumption that the correlation between prepromotion characteristics and postpromotion managerial performance extends among the nonpromoted, we can also produce a back-of-the-envelope estimate for the costs of not promoting the best predicted manager. The median relative quota attainment among all new managers is 99%, compared to 103% among those who were the top predicted managers (whether or not they were the top salespeople), a 4% gap.

Considering that promoted manager have a median of seven subordinates who contribute credits on any quarter, the cost of not promoting the best predicted manager is about one-third of an average salesperson in the year following promotion. When the organization promotes the top salesperson and not the top predicted manager, the cost is about two-thirds of an average salesperson in the year following promotion.

Altogether, results suggest that top salespeople substantially underperform non-top salespeople after promotion.

4 Conclusions

Sales are an archetypal setting for the Peter Principle. This reputation owes to two beliefs: frontline and managerial sales duties sharply differ, and organizations tend to promote top salespeople despite this disconnect. ONET job descriptions suggest that managers are primarily engaged in direction and coordination activities, while frontline salespeople focus on direct selling activities. However, as Lazear notes, the Peter Principle may be an unnecessary theory; the tendency for firms to promote great salespeople who go on to become merely-good sales managers may be because organizations are making their best guesses for who will make a good manager. While theoretically unnecessary, this paper suggests that the Peter Principle is nonetheless supported by evidence that sales organizations strongly prioritize top salespeople in promotion decisions, and away from the prepromotion characteristics that are correlated with performance as sales managers.

We find that prepromotion characteristics, and espeically top salesperson status, are strong predictors of future promotions. Nonetheless, when the top salesperson and our model's top predicted manager differ, firms are about equally likely to promote either one. In this scenario, promoted top salespeople tend to underperform non-top salespeople, and their quota attainment relative to their peers is almost 10% lower the following year than it is when the firm promotes the individual whom our model predicts would be the top manager. This last estimate should be taken with an abundance of caution before extrapolating to the counterfactual scenario of someone else being promoted, which we do not observe. Due to truncation, we also only observe managers one year after promotion.

The external validity of this paper is an open question. The salespeople we examine in these data reflect a large, highly-skilled, high-earning segment of the US labor force. Given that firms already directly incentivize salespeople through commissions and bonuses, it is a puzzle why such firms would be willing to incur the costs of mismatch. This sets salespeople apart from other high-paying occupations, such as scientists and engineers, in which pay is largely distributed by a salary that depends on one's rank within either managerial or technical career tracks.

We caution against interpreting these results as evidence that firms are behaving inefficiently. Rather, firms may use total sales credits in promotion decisions because, consistent with tournament

theory, this is what it wants its frontline salespeople to prioritize. As such, firms may be substituting between the use of promotions as an incentive and their use in matching. Alternatively, the availability of relatively clear measures of the aptitude of frontline salespeoples' aptitude for their own job may lead organizations to emphasize these in promotion decisions. Regardless, these results lend evidence that firms do not promote entirely to maximize match quality.

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TABLE 1— Monthly changes in hierarchical position

		N Events	Monthly Hazard
Workers	→ Workers	831780	95.47%
Workers	→ Supervisors	4871	.52%
Workers	→ Exit	37771	4.01%
Supervisors	→ Workers	414	.39%
Supervisors	→ Supervisors	101520	96.59%
Supervisors	→ Exit	3175	3.02%

TABLE 2— Given the firm promotes, the probability it is a top salesperson

	count of promotion events	actual prob. top worker promoted	null prob. top worker promoted	p-value: test of independence
Peer Group ≡				
Same Company, Manager, and Job Title				
Peer group size ≥ 1	4871	0.668	0.302	<0.001
Peer group size ≥ 2	2358	0.372	0.143	<0.001
Peer group size ≥ 3	1460	0.226	0.072	<0.001
Peer group size ≥ 4	925	0.181	0.048	<0.001
Peer group size ≥ 5	597	0.146	0.037	<0.001
Peer Group ≡				
Same Company, Region, and Job Title				
Peer group size ≥ 1	4871	0.418	0.12	<0.001
Peer group size ≥ 2	2844	0.185	0.039	<0.001
Peer group size ≥ 3	2328	0.129	0.02	<0.001
Peer group size ≥ 4	1943	0.11	0.014	<0.001
Peer group size ≥ 5	1661	0.099	0.012	<0.001
Peer Group ≡				
Same Company and Job Title				
Peer group size ≥ 1	4871	0.245	0.059	<0.001
Peer group size ≥ 2	3936	0.112	0.018	<0.001
Peer group size ≥ 3	3521	0.082	0.01	<0.001
Peer group size ≥ 4	3180	0.07	0.007	<0.001
Peer group size ≥ 5	2846	0.063	0.006	<0.001

NOTE— Null probabilities that workers are promoted is the expected probability that the "top salesperson" is promoted if promotions are random.

TABLE 3— Cox proportional hazards model for promotions

	(1)	(2)	(3)
Top Salesperson	1.205***	1.160***	1.159***
	(0.0441)	(0.0442)	(0.0442)
Sales Percentile	0.283***	0.280***	0.277***
	(0.0742)	(0.0742)	(0.0742)
Top Credit Sharer		0.109	0.133
		(0.0750)	(0.0754)
Credit Sharing Percentile		0.390***	0.294***
		(0.0223)	(0.0362)
Sales Concentration			-0.110
			(0.0921)
Product Diversity			-0.258***
			(0.0783)
Tenure in Months	-0.102***	-0.107***	-0.105***
	(0.00228)	(0.00235)	(0.00238)
Observations	750638	750638	750638

NOTE— * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors in parentheses. Includes salespeople with at least one peer sharing the same job title and supervisor. Hazard is in months.

TABLE 4— OLS Regression for manager performance by prepromotion characteristics

	(1)	(2)	(3)
Top Salesperson	0.00446		0.00299
	(0.0287)		(0.0287)
Sales Percentile	0.195***		0.187***
	(0.0237)		(0.0238)
Top Credit Sharer		-0.0174	-0.0138
		(0.0327)	(0.0374)
Credit Sharing Percentile		0.556***	0.457***
		(0.124)	(0.122)
Sales Concentration			-0.0533
			(0.139)
Product Diversity			-0.0272
			(0.0357)
Tenure in Months	0.00125	0.00198	0.00101
	(0.00103)	(0.00104)	(0.00103)
Constant	0.711***	0.301*	0.313*
	(0.0717)	(0.137)	(0.150)
Observations	1777	1777	1777

NOTE— * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors in parentheses.

TABLE 5— Predicting managerial sales performance with Chandra and Staiger (2010) correction for selection bias

	First Stage	Second Stage	
	(1)	(2.1)	(2.2)
Top Salesperson	1.243***	0.0316	-0.0805***
	(0.0452)	(0.0210)	(0.0243)
Sales Percentile	0.300***		0.236***
	(0.0740)		(0.0281)
Top Credit Sharer	0.128	0.0939*	0.0573
	(0.0753)	(0.0404)	(0.0399)
Credit Sharing Percentile	0.279***		0.393**
	(0.0361)		(0.124)
Sales Concentration	-0.103	-0.0204	-0.0633
	(0.0920)	(0.141)	(0.138)
Product Diversity	-0.282***	-0.0566	-0.0432
	(0.0781)	(0.0352)	(0.0344)
Tenure in Months	-0.106***	0.00522*	0.00447*
	(0.00238)	(0.00218)	(0.00214)
i1		2.244*	2.470*
		(1.104)	(1.088)
i2		-8.551*	-9.193*
		(4.206)	(4.140)
i3		9.373	10.05*
		(5.009)	(4.921)
i4		-3.040	-3.248
		(1.719)	(1.688)
Observations	750638	1777	1777

NOTE— * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors in parentheses.

TABLE 6—Prevalence that top salespeople and top predicted managers do not match and their promotion rates

Top Sales? →	Yes	Yes	No	No	
Top Predicted Manager? →	Yes	No	Yes	No	count
Composition, All Months					
Peer group size ≥ 1	0.263	0.121	0.121	0.496	57828
Peer group size ≥ 2	0.075	0.151	0.151	0.622	50077
Peer group size ≥ 3	0.04	0.134	0.134	0.692	44354
Peer group size ≥ 4	0.026	0.117	0.117	0.741	39161
Peer group size ≥ 5	0.018	0.103	0.103	0.775	34464
Composition, at Promotion Events					
Peer group size ≥ 1	0.372	0.104	0.104	0.42	18384
Peer group size ≥ 2	0.083	0.151	0.151	0.615	12575
Peer group size ≥ 3	0.038	0.128	0.128	0.706	10021
Peer group size ≥ 4	0.023	0.106	0.106	0.766	8182
Peer group size ≥ 5	0.015	0.091	0.091	0.803	6890
Promotion Rates					
Peer group size ≥ 1	0.088	0.045	0.033	0.012	57828
Peer group size ≥ 2	0.065	0.036	0.03	0.012	45281
Peer group size ≥ 3	0.056	0.024	0.023	0.01	37682
Peer group size ≥ 4	0.049	0.024	0.016	0.009	31483
Peer group size ≥ 5	0.024	0.016	0.013	0.006	26344

TABLE 7— Who is promoted when top salesperson and top predicted manager do not match

		Events expected under null decision rules		
Firm promotes:	events observed	promote randomly	promote top predicted manager	promote top salesperson
Top predicted manager	420	273.2	1393	0
Top salesperson	442	273.2	0	1393
Other	531	846.6	0	0

Note. Top salesperson and top predicted manager do not match in 59% of instances in which someone is promoted.

FIGURE 1— Postpromotion relative quota attainments by prepromotion characteristics



NOTE— Dashed line represents the kernel densities for quota attainments among all observed promotions.

FIGURE 2— Postpromotion quota attainments when top salesperson and top predicted manager conflict

