

# **Getting What You Pay For: The Productivity Impact of Incentive Pay Optimization\***

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## **Abstract**

We examine the effects of a firm's attempt to adjust an existing incentive scheme to increase sales growth for direct store delivery workers. The altered incentive plan offered higher compensation for increased sales relative to the previous year, and lower compensation for failing to meet sales objectives. We surveyed workers at pilot and control sites before and after the change was introduced, gathering information on attitudes and self-reported ratchet effects, plus performance. Relative to the control sites, average sales growth increased in the pilot sites by two percentage points, which provides a meaningful contribution to the firm's profits. We find no evidence of increased distortion of effort or manipulation of the performance measure. Workers did not substantially change hours worked, the distribution of time spent on different tasks, or perform any tasks worse. We also find evidence of ratchet effects both before and after the pilot study. Workers report that they sometimes reduce performance to avoid having their target ratcheted up too much in the following year. We also find that an unplanned price increase midway through a fiscal year affected the extent of ratchet effects on incentives that year.

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## I. Introduction

Several studies have found large productivity effects from introducing pay for performance in firms. These effects are partly due to incentive effects, and partly to sorting effects, as higher ability workers find performance pay more appealing than lower ability workers do. Seiler (1984) finds that workers paid by piece rate earn higher pay due in part to higher effort, and in part to a risk premium. Lazear (2000) finds a 44% productivity increase in a windshield installation company, and attributes about half of this to incentive effects and half to worker sorting. Paarsch and Shearer (1999, 2000) find a similar productivity differential among tree planters who are paid piece rates, relative to those who are paid a fixed salary. In a laboratory experiment, Cadsby, Song and Tapon (2007) find that incentive pay leads to higher productivity among all workers, and that more risk-averse individuals both prefer a fixed salary and are less productive under incentive pay.<sup>1</sup>

Economic theories suggest that design and implementation of even simple incentive schemes may be complex. First, it is difficult for the firm to set the correct initial incentive intensity, since it is likely to have imperfect information on how productive workers can be. It may then adjust the incentive intensity once it observes the workers' performance in response to the initial incentive. If workers anticipate this, they may reduce effort to avoid having the rate lowered in the next period. This is known as the ratchet effect (Roy 1952, Mangum 1962, Stiglitz 1975, Frexias, Guesnerie and Tirole 1985, Lazear 1986, Gibbons 1987), which may occur if the firm can commit ex ante to a fixed rate. The spinning industry in 19<sup>th</sup> century England was able to avoid the ratchet effect through inter-firm collusion to keep piece rates fixed (Lazonick 1981, Huberman 1986). The Lincoln Electric Company has been able to pay piece rates for approximately one hundred years by developing a reputation for never lowering the piece rate, and offering guaranteed employment for all workers (Milgrom and Roberts 1995).

In this study, we examine the effects of a change from a linear incentive scheme to a slightly more complex scheme, using personnel data from a large consumer products company. We study direct store

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<sup>1</sup> Harrison, Virick and William (1996) find higher turnover when sales representatives switch from a base pay plus commission reward structure to a commission-only pay system.

delivery workers who initially are paid a straight commission based on sales on their routes. Surveys indicate that workers regularly withhold output in anticipation of ratchet effects in this firm. The firm tested a change to the program designed to strengthen incentives and increase sales, in a pilot study. The new compensation scheme offered a steeper incentive rate for sales around the target, plus a new base pay for low sales. Compared to the initial pay plan, compensation was higher if sales exceeded the target, and lower if they did not.

Prior to the program launch, average sales growth in the pilot sites was one percentage point lower than in the control sites. After the launch, average sales growth in the pilot sites exceeded that in the control sites by one percentage point. Both differences are statistically and economically significant. These results may not seem dramatic to those of other studies. However, other studies compared implementation of incentives to straight salary. We are studying the effects of smaller adjustments to an existing incentive plan. The results do indicate the marginal changes to incentives lead to marginal changes in effort. Moreover, the effect on firm profits of two percent greater sales growth is non-trivial. We find no evidence of changes in distortion of effort or manipulation of the performance measure (which did not change, though the stakes for not meeting target performance increased). Workers did not significantly change total hours worked, the distribution of time spent on different tasks, or perform any tasks worse. These results indicate that one way in which incentive schemes affect behavior is through the intensive margin – working harder and more effectively for a given amount of time on the job – and not just the extensive (time) margin.

We find some of the first empirical evidence of ratchet effects in firm incentive systems since Roy's famous paper (1952), both before and after the compensation system change. Target setting appears to be linked to an employee's prior performance, and employees are aware of this. Employees report that they sometimes hold back performance to avoid a greater increase in next year's target. We also find that an unplanned price increase midway through a fiscal year affected the extent to which employees held back performance to avoid ratcheting up of their target in the next year.

## II. Company, Compensation Plans and Data

The company studied is in a consumer products industry and uses a direct store delivery (DSD) system.<sup>2</sup> Under DSD, manufacturing companies take responsibility for shipping products from their plants and warehouses directly to retailers, and for stocking the product on the shelves (versus using the retailer's warehouse and distribution systems). The focus of this study is the route representative, who is responsible for four tasks: ordering the products, delivering the products to the retailer, stocking the products on the retailer's shelves, and negotiating additional shelf space. With the exception of delivering the product, all of the other tasks have a direct impact on sales, and require the driver to intelligently analyze sales trends, manage relationships with store managers, and creatively market the product within the store. Ordering affects product mix and avoids out-of-stock situations, stocking (location, neatness of the display, rotating older products to the front, etc.) affects how customers choose which product to buy, and gaining additional shelf space for displaying the product (at the expense of competing products) affects total volume sold.

Retail establishments sell a wide variety of products, so each manufacturer has minimal impact on the flow of traffic into a store. Instead, competition for consumer dollars at the retail level takes place among products that are substitutes in the consumer's shopping cart: tobacco competes with alcohol, various drinks compete with each other, breakfast cereal competes with ready-to-eat breakfast items, over-the-counter weight loss aids compete with comfort foods, etc. At the margin, manufacturers increase sales through branding and marketing campaigns, price promotions, gaining additional shelf space at the retail establishment, and varying the product mix available on the shelves. Of these, DSD employees can directly influence only the last two: gaining shelf space and optimizing product mix.<sup>3</sup>

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<sup>2</sup> The data are confidential, including the identity of the firm, region, or specific products it sells. We cannot report actual sales, compensation, number of employees, etc., though we have full access to all detailed information. Some figures reported here are disguised (e.g., by adding or subtracting a constant to change the mean value).

<sup>3</sup> Prices are set centrally rather than by DSD employees or store managers. That is true for most products sold in these types of retail stores.

## **A. Initial and New Pay Schemes**

Figure 1a illustrates the original and pilot incentive schemes. Both are linear commissions on the dollar value of net sales revenue (gross sales net of returned / unsold product). There are a number of advantages to this scheme. It is easy to understand by employees and supervisors. There is high transparency because there is little dispute regarding the dollar volume of total sales: employees observe which products sell at what prices, and which do not and are returned to the warehouse. Finally, the scheme is easy to administer.

The performance measure should provide relatively well-balanced multitask incentives and thus not distort incentives away from optimal behavior much. As long as profit margins do not vary much across individual company products, revenue provides incentives to manage tradeoffs between sales of different products in the same store. It also motivates the employee to effectively allocate effort to different tasks. The measure also motivates the employee to avoid excess inventory, since unsold product is not included in sales (the employee is not charged for the opportunity cost of excess inventory in the store or truck, but that is likely to be a small cost for this firm's products). Overall, this performance measure seems to have relatively good properties for an incentive scheme for DSD employees.

The commission rate in the initial pay scheme is determined by two numbers: target compensation TC, and target sales TS. Once those are determined, the commission rate is simply the slope,  $TC/TS$ . The company divides DSD employees into three categories based on the size of the route. Within each category, it attempts to design specific routes – a set of stores in the same geographical location – so that expected compensation will fall in a fairly narrow range, assuming equal ability and effort of the employee.

Target sales TS for each employee are set using the following general procedure. First, dollar profit growth targets are set for senior management. Those cascade down to the middle and frontline managers through the annual budget and planning process. Targets for individual employees are then based on their manager's growth goal, historical performance of stores on the route, and relative performance of the driver. Historical performance is intended to account for store-specific factors affecting

growth possibilities. Relative performance is determined via management's subjective assessment of whether the employees grow their route sales at a sufficiently fast pace, given factors outside their control such as population growth. Employees deemed to have provided relatively low effort may be given higher growth targets in the subsequent year. Any adjustments to an individual employee's growth target lead to offsetting adjustments for all other routes in a geographical area. For example, if there are  $N$  routes and  $X$  dollars are subtracted from one route's target,  $X/(N-1)$  dollars are distributed to the targets for other routes in that area. In practice, the most important determinant of an employee's target sales  $TS$  is the overall growth goal for that region.

There are two concerns with implementation of the initial incentive scheme: the strength of incentives, and the possibility of ratchet effects. First, DSD jobs typically have high sales volume of small, inexpensive products. It is not uncommon for sales on a route to average \$10,000 per week or more, for total annual sales around \$500,000. DSD employees typically are high school graduates or have some college education. Assuming target compensation of approximately \$40,000, the commission rate would need to be 8 percent; higher expected sales would mean an even lower commission rate. Thus a key question is whether the commission rate in the initial plan provides sufficient incentive to elicit effort. For example, additional sales of \$500/week, added up over all employees' routes, could significantly help a company meet its profit objectives. Yet at 8 percent commission, and assuming a marginal tax rate of 33 percent, an extra \$500/week in sales translates into only about \$25/week extra in take-home pay. This is one reason the company considered changing away from a simple commission rate compensation system.

The pilot pay scheme was designed to provide stronger incentives for employees to meet or exceed their targets, so that management would be better able to meet overall growth goals set for them by higher levels of management. This was accomplished by establishing base compensation  $BC$ , or minimum salary paid regardless of volume, and a steeper commission rate paid out only for sales above a threshold  $T$ , as shown in Figure 1a. Interestingly, this is precisely the kind of change modeled by Oyer (2000), with the same intention of increasing the incentive intensity in a desired range of output. For sales above  $TS$ , compensation under the pilot scheme was higher than under the original scheme, and vice versa for

sales below TA. The company set the new compensation formula so that compensation would be exactly equal in both plans when sales equaled the growth target. The base pay is intended to provide a safety net to workers in the case of natural disasters or other calamities that might cause consumers to stop purchasing products other than bare necessities for extended periods of time. In normal circumstances, workers are expected to achieve at least minimum expected sales  $M > T$ , so that base pay B will be non-binding. While a worker will not face termination for performing below M in a single month, consistently performing below M will trigger termination (this was also true under the old system). In the pilot plan, the worker knows BC, T, and the commission rate, but M is implicit.

The second concern is that both plans may be subject to ratchet effects. To the extent that an employee's new target is calculated as a percentage increase from the prior year – an important component in target setting in this company – targets will increase more for employees with higher performance and vice versa. Once employees learn about the link between their sales and their next target, they will have somewhat muted incentives. Even if new targets were not based in part on percentage growth, it seems likely that employees with higher performance would tend to be given higher targets next year, which would have the same effect. The problem is compounded if incremental increases in sales are more difficult for the employee to achieve, the higher are total sales, as seems likely.

Ratchet effects may be compounded by the firm's practice of route "rebalancing." If expected sales on a route grow too large, the job may become difficult for one employee to handle in a normal workweek. In such cases the firm adjusts the set of retail stores in the employee's route to bring volume back in line with the company's view of physical limitations of DSD employees in performing the job. Such rebalancing typically takes place at most once per year, sometimes less often. Route rebalancing is one of the most disliked and distrusted management processes, even though it is conducted using objective criteria and linear programming routines that maximize efficiency and fairness. The company uses lump-sum pay adjustments to ease the impact on total compensation, but those are imprecise. Moreover, the effect of rebalancing on an employee's target sales for the next year is unclear. While an employee's target sales should fall with rebalancing, the percentage growth in that target over the prior year might be

larger or smaller with rebalancing, depending on which stores are kept in or eliminated from the route. In a previous survey of DSD employees in this company, one-fifth indicated that they managed sales growth on their route to avoid rebalancing.

### **B. Pilot Inception and Data Collection**

The company decided to initially change the compensation scheme at two of their sites. Two of the authors, Benson and Levenson, were engaged by the company to conduct an external evaluation of the compensation change. They had no role in design of the pilot incentive scheme. The external evaluation entailed working closely with corporate and local management to identify issues to be addressed by the evaluation, conduct interviews at pilot and control sites after launch of the new scheme, and design and field two surveys to measure before-and-after impacts of the change.

The sites chosen for the pilot program were representative of the middle of the company's distribution of growth performance. They were selected to be as normal as possible, meaning that sites with known management problems or peculiar demand or labor market characteristics (e.g., a highly depressed local economy) were excluded. A site consists of a contiguous geographic area covering a distinct consumer and labor market. For example, a small- or medium- sized city and surrounding communities might constitute a site. To keep the span of control and complexity of site management at a reasonable level, each site ranges from approximately 80 to 120 routes. Very large urban areas contain multiple sites, but the area covered by each site within those large urban areas is drawn to correspond to natural community divisions.

For each pilot site, two control sites were chosen – one that matched as closely as possible in terms of pre-pilot performance, and one that did not necessarily match as well in pre-pilot performance but had demand characteristics very similar to the pilot site. Prior to initiating the change, a survey was distributed for the workers to fill out in private and return by mail to the external evaluators. Workers at pilot and control sites were not informed of plans to experiment with a revised pay plan, nor that they were considered to be pilot or control sites. This is important, because it means that pilot employees did

not alter their behavior in anticipation of a higher commission rate. Workers were given paid time to fill out the surveys and were assured that their confidentiality would be maintained. All subsequent matching with archival data was performed by the external evaluators. Only summary information from the surveys that could not be linked back to any individual's responses was reported to the company as part of the evaluation process.

1,008 surveys were distributed and 746 were returned, for a response rate of 74 percent. Table 1 shows that of these 746 respondents, 272 were workers in the pilot sites, and 474 were in the control sites. Additionally, only 611 (216 in pilot sites and 395 in control sites) of these are considered "primary" workers. Higher volume routes are staffed by a primary person who works only that route five days per week, and by a secondary person who is responsible for the other two days per week (ensuring the higher volume routes are staffed seven days/week) and splits time between two higher volume routes. The primary person has the bulk of control over performance on the route, so we limit the analysis to primaries only. We also exclude new hires and others who are not dedicated to specific routes and spend their time filling in on routes where there is a temporary vacancy.

The survey obtained basic worker demographic information: age, race, gender, marital status, number of children, and education level; years of experience in the current position, in the company at any position, outside the company in other DSD jobs, and general experience of any kind; and information on second-job holding and commuting. Additional questions included hours worked each week, and how that time was spent between a number of job tasks. Finally, a large number of Likert-scaled questions measured workers' risk aversion, motivation, selling techniques, relationship and interactions with supervisor, organizational support, understanding of the sales goals and pay scheme, sense of pay equity, job satisfaction, pay satisfaction, job security and intention to quit. These questions were selected from established constructs used within the management research literature to analyze these issues (e.g., Park and Holloway 2003, Fang, Evans and Zou 2004; Tekleab, Bartol and Liu 2005).

The compensation change was introduced to the pilot sites in July and August 2007, after all the surveys had been returned. Management held a site-wide meeting to announce the new pay system, and

supervisors subsequently spent many hours answering workers' questions. After giving the new pay scheme almost two years to affect workers' performance and attitudes, the survey was repeated in May 2009. This round, 986 surveys were distributed, and 724 of them were returned, for a response rate of 75 percent. As Table 1 indicates, 231 of the second round respondents were in pilot sites, and 493 were in control sites. Among the 586 that were considered primary route workers, 187 were in pilot sites, and 399 were in control sites. As the bottom rows of Table 1 show, of those who returned the round one survey (746), 608 received a round two survey, with the remainder having left the company or taken a different job within the company. 486 received and returned a round two survey—149 in pilot sites and 260 in control sites. Since we are mainly interested in the difference-in-difference between round one and round two at the pilot sites compared to round one and round two at control sites, this is the sample that our remaining tables employ.

These survey data were then linked to personnel data by the external evaluators. Sales growth was provided by the company for the specific retail establishments on the worker's route, relative to the same establishments in previous periods. The average percent of plan attained for several different ranges of periods was provided, from which the number of times the workers achieved their sales plans was calculated. Additionally, supervisor ratings of the workers' sales performance, as well as driving and delivery performance and merchandising/customer service performance, all from the supervisor surveys, were matched to the survey data.

Between administration of the first and second surveys, in the middle of 2008, the company instituted a price increase that was unusual in both size and timing. Price increases are usually introduced around the beginning of the calendar year, which facilitates setting sales targets at the corporate level that are incorporated at all levels from senior leadership down to DSD employees. Input price pressures had been building for a while, but the company had previously resisted passing them along to customers for fear of losing market share. By mid-2008, the recession and slower sales threatened attainment of corporate profit goals. The company decided to put through a relatively large and extensive price increase that covered a much broader set of products than the usual end-of-year adjustments. Target sales (TS) for em-

ployees were not changed. The increase had not been accounted for in route planning for the year, and represented an unexpected scenario to the local management and DSD employees. Questions about the impact of the price increase on employees' ability to meet sales targets were included in the second round survey. At face value it appears that the price increase should have affected employees in the pilot and control sites equally.

### **C. Descriptive Statistics**

Table 2 provides summary statistics. We see that the demographics of pilot and control employees are very similar; the only statistically significant difference is that pilot workers are slightly younger. They are predominantly male. Around 35 percent have a high school education, 46 percent have some college, and more than 16 percent have a Bachelor's degree or more. Around 8-10 percent are non-white. The employees have fairly high job tenure,<sup>4</sup> averaging 11 years with the company in round one, increasing to 12½ to 13 years by round two. This is partly due to the exclusion of new hires, who are not primaries on a route. This is also a job that encourages high tenure to some extent, because seniority determines priority on bidding for route assignments. Primary route employees are around 42-43 years old in round one, and have 24-25 years of general work experience, 5 of which is as a DSD worker for another company. While Table 2 shows that these numbers change significantly between round one and round two as expected, any differences between pilot and control groups are insignificant.

Table 3 shows that the workers in the pilot sites seemed to understand clearly how the new pay scheme affected their incentives. When asked how important growth potential and high volume are to their choice of routes, they initially respond similarly to those in the control sites. After the pilot introduction, however, they indicated a much stronger preference for growth potential and a lower preference for high volume, consistent with the incentives of the new pay scheme. Workers in pilot sites significantly increased their stated commitment to their sales goals, which was an intention of the new incentive pro-

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<sup>4</sup> According to the BLS (<http://www.bls.gov/news.release/tenure.nr0.htm>), median job tenure for all U.S. workers was 4.0 years in 2006 and 4.1 years in 2008.

gram.<sup>5</sup> Workers in the pilot sites also slightly increased their tolerance for risk in terms of route preference. Despite the added complexity of the new pay structure, there was no significant difference in the pilot workers' understanding of their goal before the pilot start versus after.

Workers in the pilot sites were less likely than those in control sites to agree that goals were fair after introduction of the pilot plan, despite answering similarly in round one. We take this as evidence of the heightened importance of the goals in the employees' minds, since there was no major change in the goal-setting process. If anything, the fairness of the process might have increased because management knew that they had to be even surer to get the process right once the compensation scheme changed. They consequently increased their efforts in the pilot sites post-implementation to ensure that the site-wide sales growth goal was distributed across routes in accordance with underlying business conditions and growth potential on each route. (This was confirmed through interviews with corporate and local management at each site.) Thus the increase in stated unfairness of the goals most likely reflects their heightened importance under the new compensation scheme (see also the discussion of goal importance consequences below).

### **III. Empirical Predictions**

We now discuss the likely effects of the pilot program compared to the original incentive scheme. Our primary interest is in incentive and ratchet effects. Figure 1b focuses on the portion of Figure 1a in the range where virtually all employees will operate, since those with performance too close to  $M$  are likely to be terminated quickly. Figure 1b shows indifference curves for an employee whose initial performance is exactly at target sales  $TS$ . The indifference curves point toward the northwest since lower output implies less effort/ higher leisure. At that point, the employee's optimum effort and output will increase by switching to the pilot pay plan, precisely the effect the firm intended. Moreover, the em-

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<sup>5</sup> Goal commitment is an index, obtained through factor analysis, of four similarly worded survey questions about a worker's commitment to achieving the sales goal. Goal fairness is a similar index based on three questions about fairness of goal setting procedures.

employee's utility will rise. If an employee's output were initially to the right of that point, at output higher than TS, utility would rise with the pilot program. The opposite would hold if his output were initially below TS. In both of those latter cases the effect on output is ambiguous because it is possible that income effects dominate substitution effects. However, that seems quite unlikely since the change in total compensation in going from the initial pay plan to the pilot is small. Therefore, we predict that performance will be higher for employees in the pilot plan than in the initial plan. DSD jobs involve multitasking as described above. Therefore, increased total performance could come via the extensive margin of greater hours worked, or changes in allocation of time to different tasks. We examine both in the empirical work.

Lazear found that the range of output increased when Safelite implemented pay for performance. We will examine whether similar effects occur in the pilot study. In Lazear's case the logic was that lower ability workers will be more likely to quit, and high ability worker's more likely to apply for a job, after Safelite implemented piece rates. Our logic is not based on selection via recruiting and turnover, but instead on the different effects of the incentive change on the *same set* of workers. In the pilot study, workers have strong incentives to achieve at least target sales each year. If they can achieve that level, they then have marginal incentives to increase sales incrementally. Thus, we might expect that performance becomes more skewed to higher output.

Lazear also found significant turnover from Safelite's new pay scheme. We expect turnover to be highest when making large changes, such as from an hourly pay rate with no incentive component to a piece rate system, as in Safelite. In the present case, we expect the "fit" story to be less important because compensation both before and after the change was based on incentive pay tied to the volume of sales. What changed was the relative emphasis of different components of the incentive pay. There are two reasons for potentially increased turnover as a result of the compensation scheme change. Lower productivity workers who cannot meet the new performance standards, and thus stand to receive a cut in compensation, might choose to leave voluntarily. Involuntary turnover might also increase if the company couples the new compensation scheme with an increased performance management emphasis on meeting the growth targets, treating below-average performance as a possible cause for termination. We test for these

effects by examining the productivity of leavers in the pilot versus control sites, and the workers' and managers' responses to questions about termination risk.

Ratchet effects are extremely difficult to model formally, especially with closed-form solutions, even for linear incentive schemes (Gibbons 1987).<sup>6</sup> To illustrate why this is the case, consider how this firm sets the commission in the second period as a function of performance in the first period,  $b_2 = TC/TS$ . Ratchet effects will occur if  $TS$  is a function of prior output. Suppose a simple model for output,  $sales_t = a \cdot e_t + \varepsilon_t$ , where  $a$  = marginal product of effort or employee ability,  $e$  = effort, and  $\varepsilon$  = performance measurement error. Further assume, close to what the firm actually does, that  $TS$  is a simple percentage increase  $r$  over last period output,  $TS_{t+1} = (a \cdot e_t + \varepsilon_t)(1+r)$ . If so, the second period commission is  $b_{t+1} = TC/(a \cdot e_{t+1} + \varepsilon_{t+1})(1+r)$ . From the perspective of period  $t$ ,  $b_{t+1}$  is a random variable, but analysis of its properties is difficult since it has the stochastic term  $\varepsilon_1$  in its denominator. However, we can see where the ratchet comes from right away, since  $\partial b_2 / \partial e_1 = -TC/e_1 < 0$ . The harder the employee works in period 1, the smaller the commission in period 2.

Ratchet effects should also depend on some other variables. The greater the expected growth in target compensation  $TC$  next year, the smaller the ratchet effect. We have no information on worker expectations about growth in compensation during the period studied, so cannot study that prediction. If we interpret  $a$  as worker ability, then higher ability workers should have stronger ratchet effects. We will attempt to construct proxies for variation in worker talent to see if there is any evidence for such an effect. Finding such evidence would suggest that effort and ability are complementary in producing output, instead of additive. Finally, the larger the firm's grow rate in targets  $r$ , the stronger the ratchet effect.

An interesting question is how ratchet effects would be affected by using relative performance evaluation to set targets for performance in period 2. The answer depends on how information about relative performance is set, which in turn depends on how the firm views the information in relative performance. Suppose first that the firm views relative performance as informative about relative levels of ef-

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<sup>6</sup> Lazear (1986) analyses a closed-form ratchet effect model, but in his model the ratchet is done to base pay, not the commission rate, which makes the analysis tractable.

fort. It would then tend to set higher targets for workers who had relatively low performance last year, which would tend to mitigate the ratchet effect. Slacking off lowers the base level of performance which the firm uses to set the worker's target next year, but it also lowers the worker's relative performance, which works to increase the target for next year. But suppose instead that the firm views relative performance as informative about whether the target was set too high or too low this year (since job difficulty varies across workers). In that case, it would tend to lower targets for workers with relatively low performance, which would increase the ratchet effect.

#### **IV. Worker Responses to the Pilot Compensation Plan**

##### **A. Changes in Labor Supply and Effort**

Our first hypothesis is that given the small nature of the income effects, we expect sales to grow faster in the pilot sites than the control sites after the introduction of the new compensation scheme. Table 4.A reports the changes in median sales growth and plan attainment for the pilot versus control sites. Table 4.B reports the results of cross sectional and fixed effects estimates of sales growth. Considerable care was taken to ensure that sales growth numbers are measured as a change in sales at the set of retail establishments on the worker's route, not as a change in the worker's sales. Otherwise, a worker on a re-engineered route might have higher sales by virtue of having a higher volume set of retail establishments, rather than by increasing sales at the same establishments.

The results in Table 4.A indicate sales were growing 1.2 percent slower before the pilot launch in the pilot sites. During the first year post-pilot launch, sales in the pilot sites grew 0.8 percent faster, though the gap narrowed to 0.3 percent faster in the second year post-launch. Taken together, the net increase in sales growth for the pilot sites in the first year (relative to the pre-launch period) was 2.0 percentage points, compared to the control sites. For the second year, the net increase in sales growth was 1.5 percentage points. From the company's perspective, these are meaningful increases because they

represent incremental sales above a fixed cost base, after accounting for the additional compensation payout associated with the higher sales, and thus contribute disproportionately to profits.

The first column of Table 4.B includes only indicators for whether the worker is in a site with the new pilot compensation scheme and time period indicators. Thus, the coefficient on the pilot site dummy measures the difference in difference between performance 1) before and after the pilot start, and 2) in pilot sites versus control sites. Sales growth increased after the pilot introduction one half percent faster for those in pilot sites than for those in the control sites. The second hypothesis we test here is that if ability and effort are complements, the distribution of sales growth should be more skewed to the right in the pilot sites than in the control sites following the introduction of the new pay scheme. Figures 2a and 2b depict the distribution of average sales growth for the control group and the pilot group, respectively. The numbers represent the six months before the pilot, and the year or so after the pilot, but before the price change is introduced. To complement the patterns in Figures 2a and 2b, Table 5 reports the percentage of people in the pilot and control sites falling into the tails of the distribution (below zero percent growth and above ten percent growth, respectively) for the pre-pilot period, for the first year following the pilot launch, and for the second year after that.

Given the results of Table 4.B, it is not surprising that both Figures 2a and 2b and Table 5 show that the distribution of sales growth in the pilot sites shifted to the right in the year following the pilot launch. There is some suggestion that the skewness also moves rightward, as evidenced by the disappearance of the far left tail, representing routes that had a decrease in sales from the past year. There is also a decrease in the density of the far right tail. However, to reach any conclusions about the overall change in dispersion at the pilot sites, the patterns need to be compared to the performance distribution changes in the control sites, which were similar.

The difference in differences estimates from Table 5 indicate that the density of the lower tail of the performance distribution in the pilot sites decreased by 5.1 percentage points more than the control sites, while the density of the upper tail of the performance distribution in the pilot sites increased by 4.1 percentage points more than the control sites. Thus the difference-in-difference-in-differences estimates

show that cumulative density in the tails of the performance distribution decreased by 1.0 percentage points for the pilot sites relative to the control sites. This is counter to our third hypothesis, that the range of output would be wider for the pilot workers than the control ones. However, this ignores the possibility of a potential compensation scheme-induced ratchet effect differential that might have caused the top part of the performance distribution in the pilot sites to contract more than the lower parts of the distribution, as compared to the control sites. Thus, although we do not find much direct evidence that effort and ability are complements, we do find quite strong evidence that the substitution effects outweigh the income effects of the new compensation scheme, resulting in an increase in the supply of labor.

Employees can increase their labor supply either by increasing the total number of hours worked or by increasing their effort and working harder/smarter. Although in many jobs, workers do not have control over the number of hours they work, workers in this company have a high degree of independence, and largely set their own schedule to best accommodate the retailers they service. There are no set hours required by the company, although routes are engineered such that it would be difficult to make the deliveries working very short hours. The first column of table 6 shows that workers average over 50 hours per week. The second column estimates hours worked as a function of whether the worker was in a pilot site and an indicator for the first time period (there are two observations per worker, one for each round of the survey). The coefficient on the pilot indicator measures a difference in differences between the hours worked 1) before and after the introduction of the new compensation scheme, and 2) in pilot sites vs. control sites. Results show that workers in pilot sites did not increase their hours by significantly more than those in control sites. Although we have strong evidence of an increase in labor supply, in the form of increased productivity, the introduction of the new pay scheme had no effect on the hours worked by employees in the pilot sites.

We now consider whether the employees achieved faster sales growth by redistributing their labor supply from the less sales-oriented parts of the job to the more sales-oriented parts. The surveys asked workers what percent of their time was spent among a variety of tasks. The first column of table 6 shows that employees spend the greatest amount of time on merchandising and display, around 33-34 percent,

followed by driving and delivery at around 20 percent. The second column shows fixed effects estimates of the amounts of time spent on each task, as a function of whether the worker was in a site with the new compensation scheme and the first period indicator variable. Most of the effects are not statistically significant. The only exception is for “other” activities, which workers in the pilot sites reduced the amount of time they spent on, relative to control sites. Since this represents a small fraction of total working time, these results indicate that the higher sales growth found at pilot sites is not due to a shift in the distribution of hours worked across tasks. Taken together, the evidence on increased sales, total hours worked and distribution of hours worked across tasks implies that higher productivity was accomplished through workers supplying greater effort in the tasks they performed — they did not work longer hours, they just worked harder and/or smarter.

### **B. Performance Management and Turnover**

Because the employees have essentially no influence over the traffic of customers who come into a store, a significant portion of the sales on an account are beyond their control – assuming they do not purposefully sabotage the account. The company is well aware of this and has performance management processes that ensure a minimum performance standard. For all intents and purposes this means that sales on a route cannot fall below a particular level (measured in relative terms to prior year sales) without triggering termination. There is no explicitly stated threshold for triggering termination because local market factors (e.g. population growth; income growth) vary substantially, and because rare events like natural disasters can cause the sales on a route to shrink abnormally for reasons beyond the employee’s control for extended periods of time.

Though terminations happen, they are relatively rare and predominantly concentrated among low tenure employees who are still in the process of learning about the job. Terminations “for cause” among longer tenure employees are essentially indistinguishable from voluntary terminations. Once someone has worked on a route long enough, they know how to maintain performance above the termination threshold. Longer tenured employees who end up getting fired almost certainly were intending to quit anyway for

another job (or to be voluntarily unemployed) and pull back on effort to enjoy more leisure time while they count the days to when they are pushed out.

Interviews with management representatives indicated that the performance management standards remained the same for the pilot sites when the new compensation system was introduced. Thus the threat of termination remained unchanged in the pilot sites post pilot launch. In Table 7, we report evidence that workers in the pilot sites were more concerned about meeting their goals after the new pay scheme was introduced. The variable goal important consequences indexes several survey questions on the negative repercussions of failing to meet sales goals, including general negative consequences, career limitations, and potential termination. Between round one and round two, workers in pilot sites became significantly more concerned about the consequences of not making their goals, while workers in control sites became less so, undoubtedly due to the 2008 price change that made it easier for them to attain their sales goal.

Examining the specific question about potential termination, in the pilot sites the mean response increased by a statistically significant amount from 2.81 to 3.08 while it remained essentially unchanged in the control sites, 2.82 versus 2.86. In a separate survey administered to supervisors, the comparable question about termination risk due to missing sales plan goals was not significantly different at pilot and control sites and did not change from round one to round two, confirming the management interview results about termination risks. This suggests that the institution of a compensation penalty for sales below the target (for the new compensation scheme compared to the old one) sent a strong signal to the employees that the company cared about the sales growth targets. The employees in turn may have misinterpreted the compensation emphasis change to include tougher performance management standards that could lead to termination. Thus part of the behavior change in the pilot sites could have been driven not just by responses to the compensation changes but also by a perceived termination threat.

Despite this perceived job insecurity, Table 7 also shows that workers in the pilot sites were no less satisfied with their jobs or with their pay before the pilot introduction than after, although the price increases seem to have improved the sense of well-being of workers in the control group. Table 8 esti-

mates the probability of leaving the company, as a function of being in one of the pilot sites. The first column indicates no higher likelihood of leaving for those workers in pilot sites, with no additional controls. Such a result might arise, however, if the pilot were launched in sites where there was more dissatisfaction among workers. To address this, the survey asked a number of questions about job satisfaction, including specific questions about workers' intention to turnover. A composite variable was created out of two highly correlated Likert scaled questions: "I am seriously thinking about quitting my job" and "I intend to quit my job," which are coded as follows: 1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree.

The second column of Table 8 shows how the probability of leaving is affected by intending to leave beforehand. Although the coefficient is positive, it is not significant, which either implies that workers are not fully forthright in answering such questions, or that their attitudes were subsequently changed. The third column shows that controlling for the propensity to leave does not change the result that workers in the pilot sites are no more likely to leave than those in control sites. In the fourth column, we interact the intention to turnover with the pilot indicator. The coefficient on intention to turnover indicates that those in control sites who intend to turnover are, in fact, more likely to turnover. Those in pilot sites are on average more likely to leave, but those with a higher intention to quit are actually less likely to subsequently do so.

Columns 5 and 6 divide the sample into pilot sites and control sites to show the same relationship between intention to turnover and leaving as in column 4. Only in the case of the control sites does intention to turnover lead to leaving; in pilot sites, those who plan to quit are no more likely to do so. The results for the control sites are consistent with extensive evidence in the management literature showing a positive relationship between intention to turnover and actual turnover. Thus the counterintuitive results for the pilot sites suggests that the introduction of the new compensation scheme may have led workers who otherwise would have quit to delay leaving, at least temporarily. The opportunity to perform under different incentives may have been sufficient to induce some of these workers to change their minds and work at the company at least a little while longer.

In assessing the productivity effects of the new compensation scheme, it is important to account for turnover. If workers with lower performance leave the company following the introduction of the pilot program, it might appear that the pilot enhances the productivity of workers, when in fact the remaining workers are no more productive than in the control sites. To assess this, we compare the productivity of leavers versus stayers at pilot versus control sites. Table 9 estimates ordinary least squares regressions of sales growth as a function of whether the worker left in a later period. Column 1 measures sales growth in the period before the introduction of the pilot, while column 2 measures sales growth in the period after the introduction of the pilot. Leavers are defined as those who do not have sales data for 2009. Leavers at all sites are significantly less productive in the pre-pilot period, but no more or less productive than stayers following the pilot introduction. In columns 3-6, we disaggregate the analysis into workers at pilot sites and control sites. In the control sites, leavers are those who were less productive in the first period, while in the pilot sites, leavers are those who are less productive in the second period, following the introduction of the pilot. Columns 7 and 8 show that there are no significant productivity difference in either period between those leavers in pilot and control sites.

In addition to workers leaving the company, there are new hires in the company. The new compensation scheme may attract a more motivated worker, since it rewards high effort workers more. Thus, there may be productivity differences in new hires. Table 10 compares the post-pilot productivity for workers who did not have sales data from the pilot start through the end of 2007 and those who were present from 2007 through 2009. Column 1 estimates sales growth for all sites as a function of whether the worker was a new hire. Among all sites, joiners were no more or less productive than incumbents. Columns 2 and 3 disaggregate the analysis into pilot site workers and controls. The coefficients on joiners have opposite signs, with joiners in the control site being a statistically significantly 1.2% more productive; and, while not statistically significant, joiners in the pilot sites are less productive. Column 4 directly measures the difference in productivity of joiners in pilot versus control sites, by restricting the sample to joiners and including a control for whether the worker joined a pilot site. Workers who joined pilot sites were over 2% less productive than those who joined control sites.

### **C. The Ratchet Effect**

Table 11 reports employee survey responses to two sets of questions about quota restriction and the ratchet effect. The top panel shows that there is a fairly substantial ratchet effect before the compensation scheme change, and that it is higher at the pilot sites: almost a quarter (23.5 percent) of employees at the control sites indicate that either they or someone they know manage the sales growth on their routes to avoid having accounts taken away by route rebalancing, compared to more than a third (35.7 percent) of employees at the pilot sites. The responses in round two are essentially the same. A similar discrepancy in the pilot versus control sites exists for people reporting only about their own behaviors (first row). The differences in initial self-reported ratchet effects could be due to differences in trust of the route rebalancing process at the two groups of sites. Consistent with that, initial pay satisfaction and perceived pay fairness is lower at the pilot sites than at the control sites (Table 7).

A separate set of questions on the round two survey measured ratchet effects in response to the unexpected 2008 mid-year price increase. Similar to the pattern in the top of the table, the pilot sites' employees are more likely to report quota restriction ("slacking off") because the price increase made it easier to meet the sales plan goals.

In subsequent drafts we will analyze the relationship between self-reported ratchet effects and changes in productivity related to the compensation scheme change.

### **V. Conclusion**

In this study, we examine the effects of a change from a linear piece rate scheme to a more complex compensation scheme, using personnel data from a large consumer products company. We study direct store delivery workers who initially were paid a straight commission based on sales on their routes. In a number of locations, a new payment scheme was introduced which offered higher incentives for increased sales relative to the previous year, as well as higher penalties for failing to meet sales objectives. Workers at both treatment and control sites were surveyed both before and after the change is introduced, gathering information on attitudes and self-reported ratchet effects.

Prior to the program launch, average sales growth in the pilot sites was one percentage point lower than in the control sites. After the pilot launch, average sales growth in the pilot sites exceeded that in the control sites by one percentage point. Both differences are statistically and economically significant. The workers did not substantially change the distribution of time spent on different job tasks. Nor did they perform any of their tasks worse. Rather, it appears that the linear incentive pay simply did not elicit maximum worker effort, and that the new compensation scheme elicited greater effort.

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Figure 1a. Pilot and Control Pay Schemes

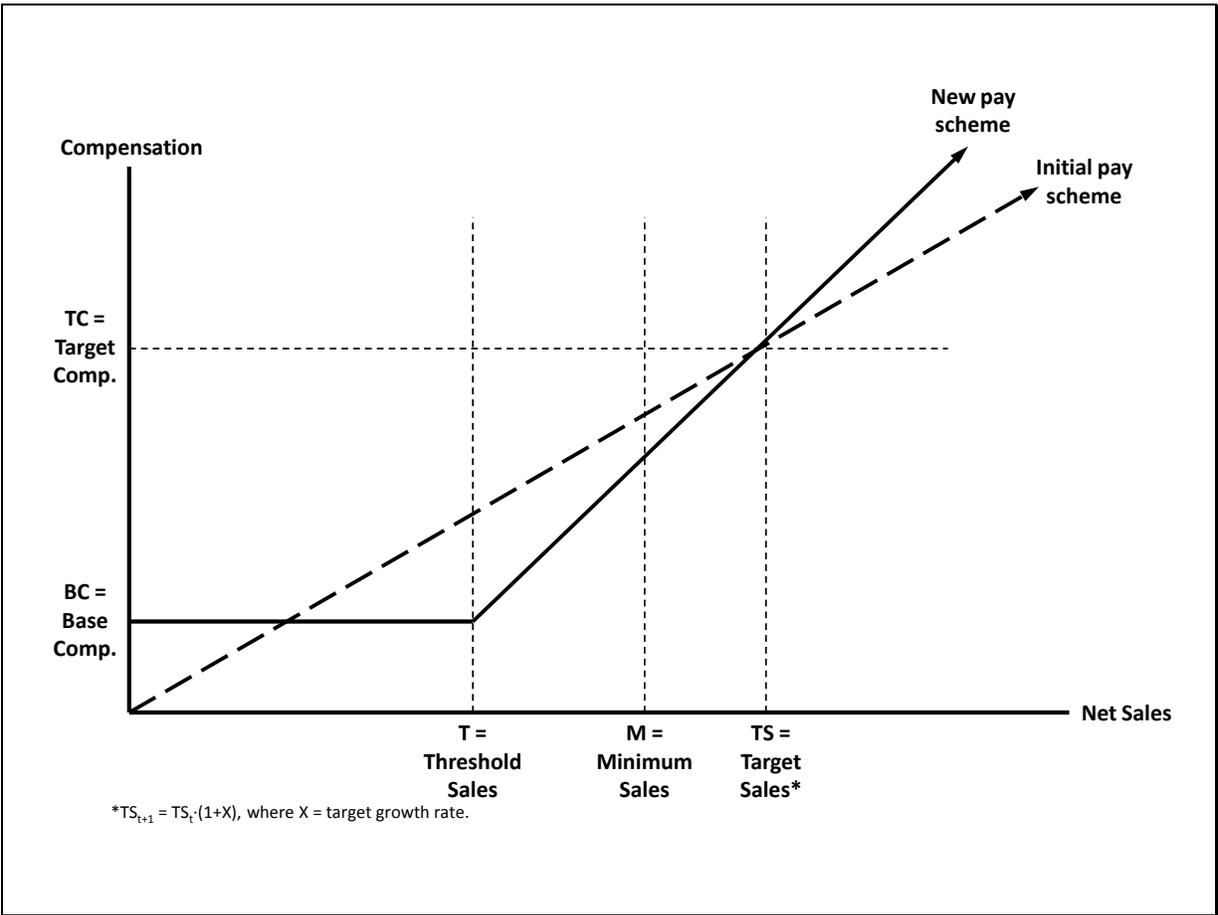
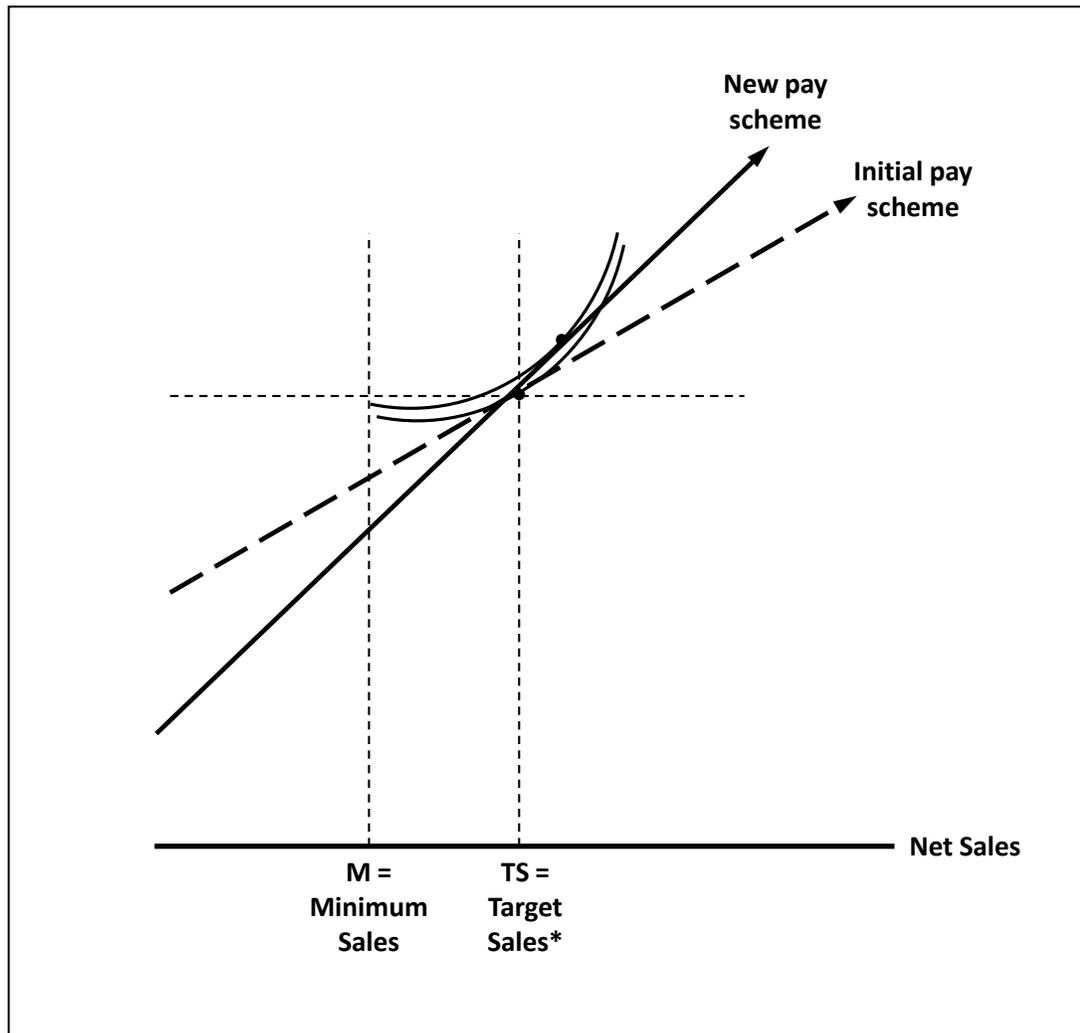
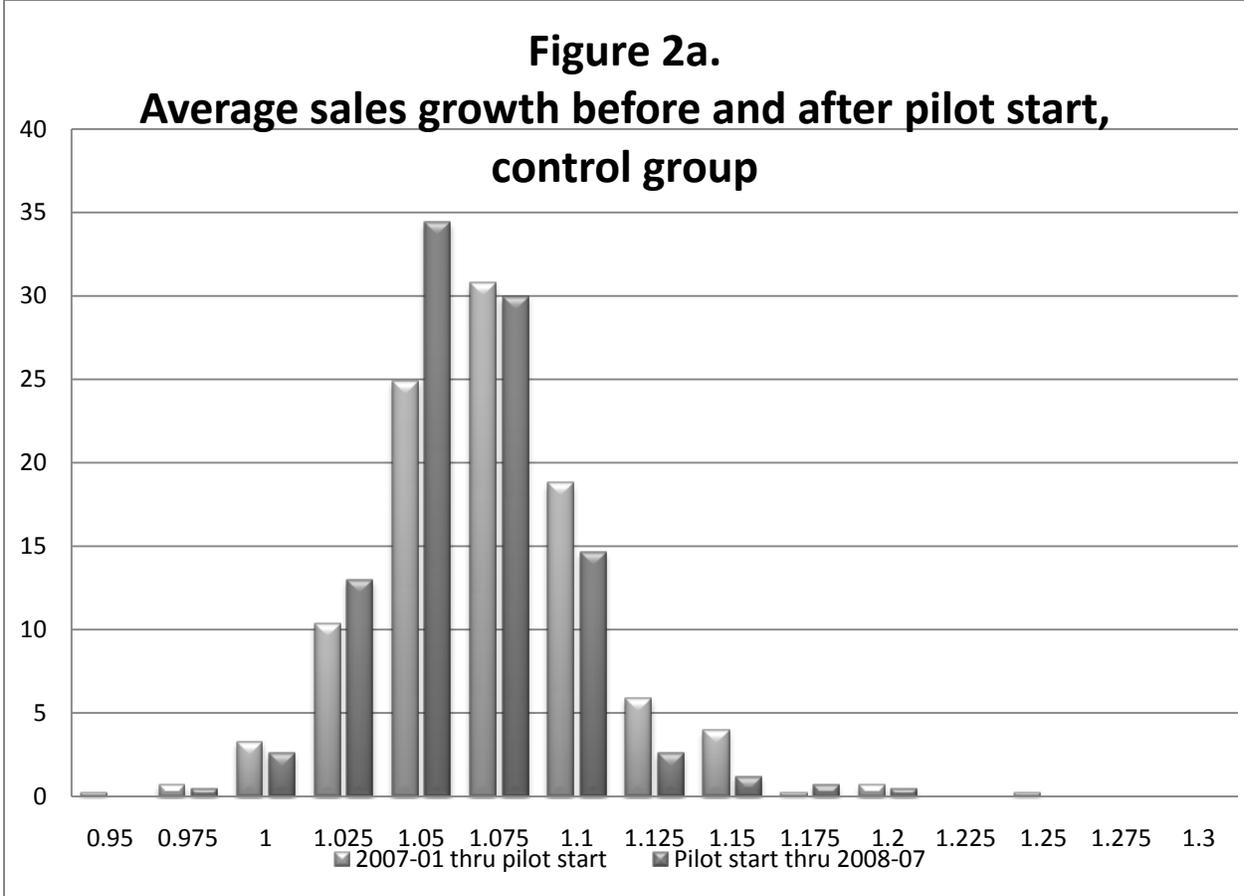
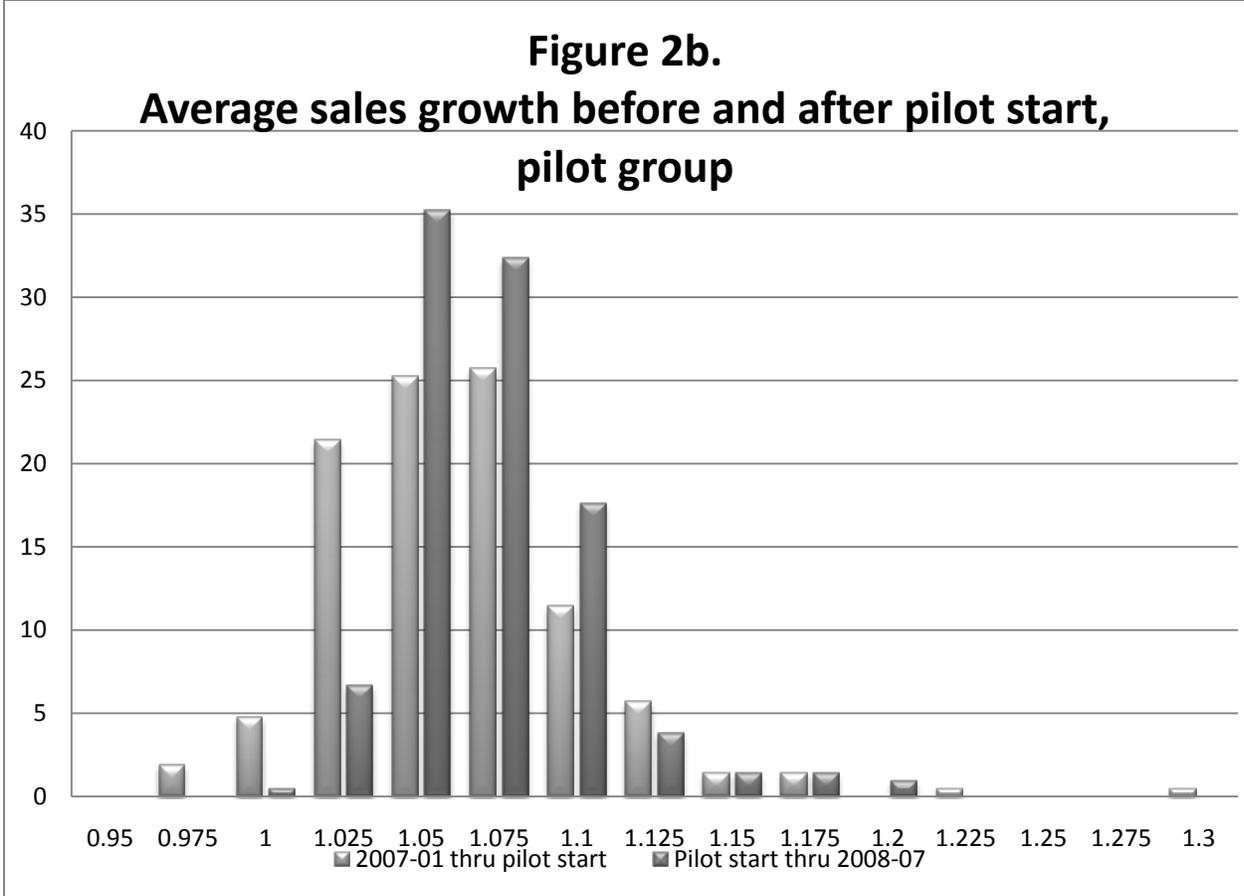


Figure 1b. Incentive Effects of Pilot Scheme







<b>Table 1. Sample sizes</b>			
	<b>All Employees</b>	<b>Pilot</b>	<b>Control</b>
Full sample			
All workers surveyed in either round	1,194	375	819
Round 1 (April 2007) survey period			
All workers surveyed	1,008	318	690
Respondents	746	272	474
Primaries <sup>a</sup> on route	611	216	395
Round 2 (July/August 2008) survey period			
All workers surveyed	986	326	660
Respondents	724	231	493
Primaries <sup>a</sup> on route	586	187	399
Both rounds			
All workers surveyed in both rounds	800	269	531
Respondents in both rounds	486	183	303
Primaries <sup>a</sup> on route both rounds	409	149	260
<sup>a</sup> Higher volume routes are staffed by a primary person who works only that route five days a week, and by a secondary person who splits time between two higher volume routes. For most specifications, the sample is restricted to survey respondents who were primaries on a route in both survey rounds.			

**Table 2. Characteristics of DSD Workers**

	Round 1		Round 2	
	Pilot (N=149)	Control (N=260)	Pilot (N=149)	Control (N=260)
Job tenure (years)	11.0 <sup>✓✓</sup>	10.8 <sup>✓✓</sup>	13.1	12.6
Work experience since HS (years)	23.8 <sup>✓✓</sup>	25.2 <sup>✓✓</sup>	26.0	27.5
DSD experience outside company (years)	4.6	5.5 <sup>✓</sup>	5.2	6.4
Age	42.0 <sup>*✓✓</sup>	43.8 <sup>✓✓</sup>	43.8 <sup>**</sup>	45.8
High school only	36.9	35.0	37.6	35.4
Some college education	45.8%	47.0%	45.5%	46.4%
Four-year college education or greater	16.0%	17.0%	15.9%	16.5%
Non-white	8.5%	7.5%	11.3%	9.8%
Female	4.2%	4.7%	4.9%	6.5%

**Includes only employees who were primaries in both rounds, and who responded in both rounds.**  
 Significant difference between Pilot and Control sites: \*p ≤ .10 \*\*p ≤ .05 \*\*\*p ≤ .01  
 Significant difference between Round 1 and Round 2: ✓p ≤ .10 ✓✓p ≤ .05 ✓✓✓p ≤ .01

<b>Table 3. Worker's opinions of compensation plans</b>				
	<b>Round 1</b>		<b>Round 2</b>	
	<b>Pilot</b> (N=149)	<b>Control</b> (N=260)	<b>Pilot</b> (N=149)	<b>Control</b> (N=260)
<b>Using the numbers 1 (most important) through 6 (least important), please rank order the importance of the following route characteristics in determining your ideal route:</b>				
• Growth Potential	2.21 <sup>✓✓✓</sup>	2.16	1.80 <sup>**</sup>	2.09
• High Volume	2.15 <sup>✓✓✓</sup>	2.15	3.80 <sup>***</sup>	2.14
<b>Response scale: 1='Strongly Disagree', 2='Disagree', 3='Neither', 4='Agree', 5='Strongly Agree'</b>				
Goal Fairness	2.85 <sup>✓✓✓</sup>	2.82 <sup>✓✓✓</sup>	2.37 <sup>***</sup>	3.08
Goal Commitment	3.88 <sup>✓✓✓</sup>	3.97	4.07	3.99
I understand exact level of my assigned performance goals	3.73	3.72 <sup>✓</sup>	3.74	3.82
I prefer a low risk/high security route with steady sales over a route that offers high risks	3.08 <sup>✓</sup>	3.21	3.24	3.12
I prefer to remain on a route that has problems rather than take risk of working a new route	2.56 <sup>✓</sup>	2.60	2.73	2.67
<b>Includes only employees who were primaries in both rounds, and who responded in both rounds.</b>				
Significant difference between Pilot and Control sites: *p ≤ .10 **p ≤ .05 ***p ≤ .01				
Significant difference between Round 1 and Round 2: <sup>✓</sup> p ≤ .10 <sup>✓✓</sup> p ≤ .05 <sup>✓✓✓</sup> p ≤ .01				
Note: Significant difference (p ≤ .01) between Growth Potential rank (1.80) and High Volume rank (3.80) for Round 2 Pilot sites.				

<b>Table 4.A. Median Sales Growth and Plan Attainment</b>		
	<b>Pilot</b> (N=210)	<b>Control</b> (N=426)
<b>Sales Growth (compared to same periods prior year)</b>		
Sales growth from beginning of 2007 through pilot Start (mid-2007)	4.7%***	5.9%
Sales growth from pilot start (mid-2007) through mid-2008	5.6%***	4.9%
Sales growth from mid-2008 through mid-2009	5.8%	5.5%
<b>Plan Attainment</b>		
% Plan attainment from beginning of 2007 through Pilot Start (mid-2007)	-0.9%	0.9%
% Plan attainment from pilot start (mid-2007) through mid-2008	3.0%***	1.4%
% Plan attainment from mid-2008 through mid-2009	3.8%***	3.3%
<b>Includes only employees who were primaries in both rounds.</b>		
Significant difference between Pilot and Control sites: *p ≤ .10 **p ≤ .05 ***p ≤ .01		

<b>Table 4.B. Regression Estimates of Sales Growth at Pilot vs. Control Sites</b>			
	<b>Sales Growth</b> (Sample restricted to Primaries in both rounds)		
	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>
<b>Pilot Site after implementation of new compensation system (Yes=1)</b>	.005*** (.002)	.005** (.002)	.008*** (.002)
<b>Pre-Pilot Time Period (Yes=1)</b>	.004** (.002)	.005** (.002)	
<b>End of Pilot Time Period (Yes=1)</b>	.002 (.002)	.002 (.002)	
<b>Married (Yes=1)</b>		.004* (.002)	
<b>Non-white (Yes=1)</b>		-.002 (.003)	
<b>Female (Yes=1)</b>		.004 (.004)	
<b>Some College (Yes=1)</b>		-.001 (.002)	
<b>Bachelor's Degree or higher (Yes=1)</b>		-.004 (.003)	
<b>Total years of experience working at Company</b>		-.000 (.000)	
<b>Years of work experience since high school</b>		-.000 (.000)	
<b>Years of prior route experience prior to joining Company</b>		-.000 (.000)	
(Constant)	1.052*** (.001)	1.055*** (.004)	1.054*** (.001)
Adjusted R <sup>2</sup>	.003	.005	
N	1905	1645	1905
Fixed Effects Model	No	No	Yes

*Standard errors in parentheses. Significance: \*\*\*p<=.01, \*\*p<=.05, \*p<=.10*

<b>Table 5 Percentage of Low and High Sales Growth Performers</b>		
<b>Percent</b>	<b>Pilot</b> (N=210)	<b>Control</b> (N=426)
<b>Low Sales Growth (below zero percent growth) compared to same periods prior year</b>		
• from beginning of 2007 through Pilot Start (mid-2007)	6.7	4.2
• from Pilot start (mid-2007) through mid-2008	0.5***	3.1
• from mid-2008 through mid-2009	2.4	3.1
<b>High Sales Growth (above ten percent growth) compared to same periods prior year</b>		
• from beginning of 2007 through Pilot Start (mid-2007)	9.5	11.0
• from Pilot start (mid-2007) through mid-2008	7.6	5.0
• from mid-2008 through mid-2009	6.2	6.4
<b>Includes only employees who were primaries in both rounds.</b>		
Significant difference between Pilot and Control sites: *p ≤ .10 **p ≤ .05 ***p ≤ .01		

<b>Table 6. Fixed Effects Estimates of Hours Worked and Time Spent on Various Tasks at Pilot vs. Control Sites</b>		
	<b>Mean</b>	<b>Coefficient on Pilot Site After Implementation (Indicator Variable)</b>
<b>Average hours worked per week</b>	<b>51.03</b>	0.759 (.565)
<b>Considering the total hours you work per week, what percentage of your time is spent on each of the following (total must add up to 100%):</b>		
• Planning	9.33	0.619 (1.074)
• Delivery/Driving ( <i>excluding sales activities</i> )	20.25	0.704 (2.082)
• Sales ( <i>excluding delivery/driving activities</i> )	15.19	1.514 (1.636)
• Merchandising/Customer Service	34.60	1.255 (2.452)
• Meetings, training, 1 with 1s	5.57	0.665 (.622)
• Synching data and completing paperwork	5.80	-0.700 (.565)
• Working product in your remote location ( <i>if applicable</i> )	6.32	-1.085 (.839)
• Shopping distribution center for product replenishments ( <i>if applicable</i> )	0.85	-0.360 (.359)
• Other	2.09	-2.612* (1.395)
<b>Includes only employees who were primaries in both rounds, and who responded in both rounds.</b> <i>Standard errors in parentheses. Significance: ***p&lt;=.01, **p&lt;=.05, *p&lt;=.10</i>		

<b>Table 7. Worker's Attitudes – Goal Importance Consequences and Job Aspects</b>				
	<b>Round 1</b>		<b>Round 2</b>	
	<b>Pilot (N=149)</b>	<b>Control (N=260)</b>	<b>Pilot (N=149)</b>	<b>Control (N=260)</b>
<b>Response scale unless otherwise noted: 1='Strongly Disagree', 2='Disagree', 3='Neither', 4='Agree', 5='Strongly Agree'</b>				
Goal Importance Consequences	3.00 <sup>✓✓</sup>	3.10 <sup>✓</sup>	3.34 <sup>***</sup>	3.00
Intention to Turnover	2.34	2.21 <sup>✓✓</sup>	2.20 <sup>***</sup>	1.89
Pay Satisfaction	2.45 <sup>*✓</sup>	2.63 <sup>✓✓</sup>	2.68 <sup>***</sup>	3.14
Pay Equity <sup>‡</sup>	2.78 <sup>***</sup>	3.06 <sup>✓✓</sup>	2.94 <sup>***</sup>	3.54
Job Satisfaction	3.67	3.72 <sup>✓✓</sup>	3.67 <sup>***</sup>	3.94
<b>Includes only employees who were primaries in both rounds, and who responded in both rounds.</b>				
Significant difference between Pilot and Control sites: *p ≤ .10 **p ≤ .05 ***p ≤ .01				
Significant difference between Round 1 and Round 2: ✓p ≤ .10 ✓✓p ≤ .05 ✓✓✓p ≤ .01				
<sup>‡</sup> 1='Very Unfair', 2='Unfair', 3='Neither', 4='Fair', 5='Very Fair'				

**Table 8. Probability of leaving**

Coefficient (Std. Error)	Logit Analysis of Leavers (Sample restricted to Primaries)					
	Model 1	Model 2	Model 3	Model 4	Model 5 Control Sites	Model 6 Pilot Sites
<b>Pilot Sites</b>	-.279 (.216)		-.143 (.271)	1.390** (.671)		
<b>Intention to Turnover</b>		.164 (.119)	.165 (.119)	.363** (.144)	.363** (.144)	-.300 (.238)
<b>Interaction: Pilot Sites &amp; Intention to Turnover</b>				-.663** (.278)		
(Constant)	-1.588*** (.113)	-2.395*** (.314)	-2.349*** (.324)	-2.838*** (.398)	-2.838*** (.398)	-1.448*** (.540)
Pseudo R <sup>2</sup>	.002	.004	.005	.019	.022	.012
N	814	594	594	594	383	211
<i>Significance: ***p&lt;=.01, **p&lt;=.05, *p&lt;=.10</i> <i>Leavers=Missing archival data for 2009.</i>						

<b>Table 9. Productivity of leavers vs. stayers</b>								
Coefficient (Std. Error)	Productivity (Sales Growth) - Leavers vs. Stayers (Sample restricted to Primaries)						Productivity (Sales Growth) of Leavers - Pilot vs. Control Sites (Sample restricted to Primaries and Leavers)	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
			Control Sites		Pilot Sites			
	Pre-pilot	Post-pilot	Pre-pilot	Post-pilot	Pre-pilot	Post-pilot	Pre-pilot	Post-pilot
<b>Leavers (Employees with missing archival data for 2009)</b>	-.019*** (.005)	-.007 (.004)	-.023*** (.005)	-.002 (.005)	-.009 (.008)	-.019** (.008)		
<b>Pilot Sites</b>							.004 (.015)	-.008 (.015)
(Constant)	1.056*** (.002)	1.055*** (.001)	1.059*** (.002)	1.052*** (.002)	1.050*** (.003)	1.061*** (.002)	1.037*** (.008)	1.050*** (.008)
Adjusted R <sup>2</sup>	.019	.002	.029	-.002	.001	.020	-.008	-.010
N	806	757	555	515	251	242	121	73
<i>Significance: ***p&lt;=.01, **p&lt;=.05, *p&lt;=.10</i> <i>Pilot start: mid-2007</i>								

<b>Table 10. Productivity of joiners vs. incumbents</b>				
Coefficient (Std. Error)	Post-Pilot Productivity (Sales Growth) - Joiners vs. Incumbents (Sample restricted to Primaries)			Productivity (Sales Growth) of Joiners - Pilot vs. Control Sites (Sample restricted to Primaries and Joiners)
	Model 1	Model 2	Model 3	Model 4
		Control Sites	Pilot Sites	
Joiners (Employees with missing archival data from pilot start (mid- 2007) thru end of 2007)	.003 (.005)	.012* (.006)	-.011 (.008)	
Pilot Sites				-.021* (.012)
(Constant)	1.058*** (.001)	1.057*** (.001)	1.059*** (.002)	1.069*** (.007)
Adjusted R <sup>2</sup>	-.001	.005	.004	.050
N	763	522	241	42
<i>Significance: ***p&lt;=.01, **p&lt;=.05, *p&lt;=.10</i>				

<b>Table 11. Self-Reported Ratchet Effects</b>				
% indicating “yes”	<b>Round 1</b>		<b>Round 2</b>	
<b>General ratchet effect</b>	<b>Pilot</b> (N=149)	<b>Control</b> (N=260)	<b>Pilot</b> (N=149)	<b>Control</b> (N=260)
(A) Do you ever manage your sales growth to avoid having accounts taken away by route rebalancing?	20.6%***	9.6%	16.3%**	8.1%
(B) Do you know of other employees who manage their sales growth to avoid having accounts taken away by route rebalancing?	27.8%	20.8%	29.05%**	18.0%
Either self (A) or “know of others” (B)	35.7%**	23.5%	33.3%**	21.0%
<b>Ratchet effect in response to 2008 price increase</b>			<b>Pilot</b> (N=104)	<b>Control</b> (N=164)
(C) Due to the 2008 price increases, I slacked off because it was easier to make plan			6.7%	3.0%
(D) Due to the 2008 price increases, I know of other employees who slacked off because it was easier to make plan			15.5%**	7.3%
Either self (C) or “know of others” (D)			19.4%**	9.8%
<b>Includes only employees who were primaries in both rounds, and who responded in both rounds (top and bottom of table).  Sample for bottom of table further restricted to employees who responded to both sets of questions (general ratchet effect + ratchet effect in response to 2008 price increase).</b> Significant difference between Pilot and Control sites: *p ≤ .10 **p ≤ .05 ***p ≤ .01 Significant difference between Round 1 and Round 2: ✓p ≤ .10 ✓✓p ≤ .05 ✓✓✓p ≤ .01				