Counterproductive Worker Behavior After a Pay Cut*

Decio Coviello, Erika Deserranno, Nicola Persico

December 14, 2020

Abstract

We examine how workers reacted to a pay cut in a sales call-center setting in the US. The pay cut was implemented by raising two pre-existing sales targets, i.e., by "moving the goalposts." Using a difference-in-difference approach, we show that among the workers who experienced the pay cut, some chose to leave the firm (exit); others generated abnormally high customer refunds, in a way that hurt both them and the firm (we define this work practice as *counterproductive*). The firm believed, and we present evidence, that these workers intentionally sold the wrong items, as opposed to simply optimally shirking on effort in response to the pay cut. We show that the most loyal workers (those with longer tenure) expressed themselves only through counterproductive work practices and not through exit. Less-loyal workers reacted more strongly than loyal workers, and did so through a balanced mix of exit and counterproductive behavior. To our knowledge, this is the first study to document individual-level patterns of exit and (counter-)productivity following a pay cut and, how these differ for high- vs. low-loyalty workers.

Keywords: pay cut, counterproductive work practice, exit, loyalty, call centers

---

*Decio Coviello: HEC Montreal, decio.coviello@hec.ca. Erika Deserranno: Kellogg School of Management, Northwestern University, erika.deserranno@kellogg.northwestern.edu. Nicola Persico: Kellogg School of Management, Northwestern University, n-persico@kellogg.northwestern.edu. We thank Shumiao Ouyang and Athanasse Zafirov for excellent research assistance. This research was conducted in collaboration with Workforce Science Project of the Searle Center for Law, Regulation and Economic Growth at Northwestern University and was undertaken, in part, thanks to funding from the Canada Research Chairs program. This paper has been screened to ensure no confidential information is revealed. Data and institutional background will be provided such that we do not disclose information that may allow the firm to be identified. An earlier draft of this paper was circulated with the title "Exit, Voice and Loyalty After a Pay Cut."

1 Introduction

This study documents how workers reacted to a pay cut that was not caused by their collective performance. The setting is the sales call center of a large brick-and-mortar US retailer. After the pay cut, some workers chose to leave the firm; others generated abnormally high customer returns, in a way that hurt both them and the firm. This counterproductive work practice was interpreted by management as a form of *voice* as in Hirschman (1970).[1] We study how workers with different tenures (which is interpreted as a proxy for loyalty) chose between exit and/or counterproductive work practices, and whether these behaviors were substitutes to one another.

We define a work practice as *counterproductive* if it is costly for the firm and *not economically expedient* for the worker, ignoring possible future systemic changes that may be induced by it. For example, compared to "regular" strikes where the worker stays home, strikes where workers picket or damage the plant are counterproductive in our definition: they are more costly for the worker and for the firm, and not an optimal response to incentives, unless the prospect of systemic change is taken into account. (Of course, these actions are undertaken precisely to produce systemic change).[2] In our case, we will show that generating high customer returns is a counterproductive work practice in this sense.

Our company has two types of call-center workers: *sales representatives* (SRs) who are tasked with selling parts over the phone, and *customer representatives* (CRs) who solve customer complaints in addition to selling parts. Their compensation schemes differ. SRs receive a fixed hourly wage and, in addition, commissions based on "net sales" (gross sales minus refunds) and "conversion rate" (percentage of calls resulting in positive gross sales). CRs receive a fixed

[1] Voice is defined by Hirschman (1970) as "*any attempt at all to change, rather than to escape from, an objectionable state of affairs*, [...] *through various types of actions and protests*."

[2] Similarly, sit-down strikes, where the worker shows up for work but forgoes the day's salary, are counterproductive in our definition. Hunger strikes are an extreme form of counterproductive practice. (In 1955, Nintendo workers went on hunger strikes to protest layoffs. https://kotaku.com/why-nintendo-employees-went-on-a-hunger-strike-182201709).

hourly wage only.

On a Monday in mid-2014 (henceforth "C-day"), the SR's commission rate schedule changed unexpectedly due to financial difficulties in other parts of the business (the brick-and-mortar stores). The new schedule "moved the goalposts" on conversion rate, i.e., it required SRs to achieve higher conversion rates in order to keep their total compensation the same as before. Holding their performance constant at the pre-change level, we calculate that the SRs' commission earnings dropped by 13% thus reducing their salary.[3] In contrast, the CR's fixed wage did not change.

To estimate how workers reacted to the pay cut, we compare the behavior of SR's (treatment group) to the behavior of CR's (control group), before and after C-day. Reassuringly, our data indicate that our difference-in-difference approach is valid: the two groups' behavior (e.g., performance, turnover) followed a parallel trend until C-day, and sharply diverges thereafter.

We find that SRs' number of calls handled and conversion rate did *not* change after C-day. Instead, the SRs reacted to the pay cut in two ways: according to HR records, some of them voluntarily exited the company (they were not laid off); others generated a burst in *high refunds without an associated increase in gross sales*. The sharp increase in voluntary exits and high *refund rates* (refunds/gross sales) materialized exactly in the two weeks following C-day and not before, and they remained elevated throughout the remainder of our sample period (for 14 weeks after C-day).

The observed high refunds without an associated increase in gross sales is, we argue, *counterproductive behavior*, as opposed to an optimal effort response. This is because in our setting, workers' compensation does not depend on *gross sales*, but rather on *gross sales minus refunds*. After the pay cut, we see workers spending the same amount of time on the phone and generat-

[3] We note that the pay cut of SRs is not implemented by cutting their base wage but, rather, by changing incentives, which may potentially have a distinct psychological effect.

ing the same gross sales, but causing the item to be returned more often, either through malice or by not paying sufficient attention to the customer's needs. In this way, workers hurt themselves (lower *net sales*) and the company, relative to a "more efficient" way of generating the same net sales, which would be to *also shirk at the gross sales stage*. An analogy may be helpful: if workers were paid based on selling tennis shoes (net of refunds), it would be sub-optimal for workers to ship some shoes without laces, because those shoes would surely be returned and the worker would have wasted the effort necessary to ship them. More abstractly, the worker in our setting is expected to perform different costly tasks: those required to generate a gross sales (ship the shoes), and those required to ensure that the item is right for the customer (add the laces). Given the workers' compensation scheme (based on *net sales*), these two task types are *complements* from the workers' perspective in the production of wages. No matter how the incentives on net sales change, the two complementary tasks must co-move in response: either more shoes and more laces are shipped, or fewer shoes and fewer laces. If, as in our case, the same number of shoes is shipped, but with fewer laces, then the worker is self-sabotaging.

We show that workers' earnings dropped by a total of 28% after the pay cut, 13% of which is attributed to the mechanical effect of the shift in the compensation scheme and 15% of which is attributable to counterproductive work practices. The firm interpreted this counterproductive behavior as a form of *voice* (Hirschman 1970) intended to effect systemic change (specifically, in the compensation scheme); but conclusive proof of motive is unavailable in our setting.

We find that both voluntary exits and counterproductive work practices are more muted among high-tenure workers: these workers increased their refund rate only slightly, and they did not quit more. In contrast, low-tenure workers reacted equally strongly through voluntary exit and through counterproductive work practices. These findings imply that the ratio of "reaction by counterproductive work practices" to "reaction by voluntary exit" increases with tenure (the denominator is zero for high-tenure workers). We verify that the role played by tenure is distinct from the role played by individual productivity differences and other worker-level characteristics which correlate with tenure. If we interpret tenure as proxying for *loyalty*, and counterproductive work practices as *voice*, then our results support Hirschman's (1970) idea that more-loyal members of the organization are relatively more inclined to exercise voice rather than to voluntarily exit.

Furthermore, we find that workers who engaged in counterproductive work practices were less likely to exit voluntarily, consistent with Hirschman's (1970) idea that voice and exit are alternative means for members of an organization to react to organizational decline. We also provide suggestive evidence that the decision to engage in counterproductive work practices (exert voice, according to our analogy) is more "socially determined" than the decision to exit: workers who did not engage in counterproductive work practices immediately after the pay cut were more likely to do so if they belonged to a team where many other teammates did. Their decision to exit, instead, is statistically uncorrelated to other teammates' exit reactions.

We explore, and ultimately reject, alternative interpretations for the observed behavior (higher refunds without more gross sales), besides counterproductive behavior. We consider a change in *sales composition* between big- and small-ticket items, but reject it because average sale size (gross sales/number of items sold) did not change. We consider *optimal* shirking, but reject it on the basis of the "complementary efforts" argument made above: we document no change in gross sales, call handling time, number of calls handled, and customer satisfaction, all of which proxy for effortful activities that are complementary to return avoidance in the "production of worker pay." The fact that only the latter decreased implies that, if we want to call the jump in refunds "shirking," then it was definitely suboptimal shirking. Finally, we consider whether the burst in abnormally high refunds can be explained by *worker selection:* the selective termination of "low-refund-rate" workers in anticipation of, or after C-day. However, the effect of the pay cut on counterproductive work practices is estimated using worker fixed effects and, moreover the result is robust to restricting to a balanced sample of workers, which we think allays concerns about selection.

Broadly speaking the literature on counterproductive worker response to pay changes can be divided into two strands. The first strand, to which our paper *does not belong*, correlates worker i's behavior to variation in factors *other than i's own pay* (other workers' pay, say). The aim is to show that workers respond to factors other than their own short-term incentives.[4] By definition, this literature cannot study any counterproductive behavior arising in response to changes in i's *own pay*. As such, important phenomena such as worker morale during recessions are outside this literature's purview.

Our paper belongs to the second strand of the literature, which correlates variation in *worker i's own* pay structure with her own behavior. The challenge in this literature is to document that the worker's response is in fact counterproductive, i.e., that it can be distinguished from shirking, separations, and other responses that are functional to the change in short-term incentives. Because we are able to do so, we can study the correlates of counterproductive behavior. This is our main contribution. To the best of our knowledge, this paper provides the first evidence of how exit and counterproductive work practices emerge in reaction to a pay cut, and how loyalty/tenure mediates these patterns. This is exactly the question in Hirschman's (1970) seminal book *Exit, Voice and Loyalty*.[5] We now discuss this second strand of the literature in some detail.

Krueger and Friebel (2020) and Sandvik et al. (2018) document an increase in worker turnover and mixed results on worker effort, following a pay cut.[6] We complement these studies

[4]A typical situation is seeing one's co-workers unfairly rewarded without a change in own pay. Breza et al. (2018) and Dube et al. (2019) show that raising the wage of co-workers while keeping i's wage fixed, raises i's turnover and absenteeism.

[5]The book was once popular among labor economists thanks to the influential work of Freeman and Medoff (1979), which says that unions give *collective voice* to workers when individual *exit* is not a meaningful option. In our setting unions are absent, and thus one way workers can exercise voice is by engaging in counterproductive work practices.

[6]Krueger and Friebel (2020) analyze the effects of a pay cut in call centers in Germany over a three year horizon, and find that workers' output decreased substantially, and attrition increased. Sandvik et al. (2018) show that staggered commission reductions at a sales firm increases turnover for the most productive workers, while

in three ways: (1) we identify counterproductive worker practices as opposed to merely optimal response in shirking and turnover, (2) we explore how loyalty mediates a worker's reaction to a pay cut, and (3) we assess the substitutability between counterproductive work practices and exit. Adhvaryu et al. (2020) studies how experimentally providing workers with an opportunity to give anonymous feedback on job conditions, supervisor performance, and overall job satisfaction, affects exit and performance (as measured by absenteeism) after a disappointing wage hike. The "voice" treatment is shown to attenuate the negative effect of the disappointing wage hike on exit and absenteeism. In their paper, as opposed to ours: (a) "voice" is a form of "cheap talk," not sabotage-like behavior; (b) "voice" is a controlled treatment, which is a valuable research design but one that cannot speak to the *endogenous emergence* of voice; (c) the pay change is a disappointingly low raise, as opposed to a pay cut.[7,8]

Finally, our paper also relates to the large experimental literature on fairness and negative reciprocity, which often posits that preferences are anchored to a "fair" reference point.[9] The main goal of some of these papers is to establish that preferences are in fact anchored to a reference point.[10] A few papers (Hart and Moore 2008, Fehr et al. 2011) argue that contracts are perceived as reference points. As Fehr et al.'s (2011) experimental subjects, our workers are willing to incur a cost in order to punish a "greedy" contractual counterpart, perhaps because the perceive the prior contractual terms as a reference point.

The rest of the paper is structured as follows: Section 2 presents a theoretical model that

triggers limited effort responses.

[7]The effect of a pay cut on worker morale may be much more potent than a disappointingly low pay raise. Indeed, Bewley (1999) argues that this is why firms rarely cut nominal compensation. Grigsby et al. (2019) shows that only 2% of job-stayers receive a nominal base wage cut during a given year in U.S. – a much lower share than previously thought.

[8]Similar to Adhvaryu et al. (2020), Mas (2006) also studies the response to a disappointing pay raise. This paper does not refer to voice or to loyalty, focusing instead on performance. Krueger and Mas (2004) examine the production of defective products ahead of, and during, contract renewal negotiations with unions. The paper is limited to plant-level data and shares the limitations (1)-(3) listed above.

[9]See Fehr and Gachter (2000) for a review of the earlier literature.

[10]In this vein, Kube et al. (2013) show that library workers exert less effort if given an unexpected lump-sum wage-cut; however, Della Vigna et al. (2016) show that envelope-stuffers' effort does not change after an unexpected lump sum wage cut. Abeler et al. (2011) examine the anchoring role of worker expectations.

underpins our empirical measurement of counterproductive work practices; Section 3 explains the data and the institutional setting; Section 4 discusses the emergence of counterproductive practices and voluntary exit following the pay cut, and the impact on worker earnings; Section 5 studies how loyalty mediates these effects; Section 6 discusses how the firm responded after workers engaged in counterproductive work practices; Section 7 concludes.

2 Model: Identifying Counterproductive Work Practices

The challenge in identifying the onset of counterproductive work practices is that the new practice must not be functional to the new incentive scheme.

To identify a behavior as a counterproductive work practice, we leverage our knowledge of the incentive scheme that workers face. The actual compensation scheme is reproduced in Figure 1. One of its features is that, both before and after the pay cut, workers are rewarded based on: the value of net sales, i.e., gross sales minus refunds; and the conversion rate, i.e., the fraction of calls that result in a sale, no matter how small.[11] Thus the worker's compensation scheme before the pay cut may be denoted by the function:

$$w(n, t_3),$$

where n denotes net sales and t_3 the fraction of a work hour's time devoted to increasing the conversion rate. The incentive scheme after the pay cut may be denoted by:

$$\widetilde{w}(n, t_3).$$

Let net sales n be an increasing function of the fraction t_1 of time spent selling and upselling,

[11] Conversions are rewarded over and above net sales in order to encourage the worker to spend time on small-value transactions.

and the fraction t_2 of time spent educating the customers in order to avoid returns:[12]

$$n = n(t_1, t_2).$$

Finally, suppose that a worker solves the following problem before the pay cut:

$$\max_{t_1, t_2, t_3} w(n(t_1, t_2), t_3) - c\left(\sum_i t_i\right), \tag{1}$$

and after the pay cut:

$$\max_{t_1, t_2, t_3} \widetilde{w}(n(t_1, t_2), t_3) - c\left(\sum_i t_i\right). \tag{2}$$

The function $c(\cdot)$ represent the cost of spending time. We assume that $c(\cdot)$ is convex and $c'(1) = \infty$; the latter assumption ensures that the worker doesn't choose to work more than 60 minutes per hour.

The key insight from this framework is that the solutions to problems (1) and (2) must, under reasonable regularity conditions, be such that $t_1^* > \widetilde{t}_1^*$ if and only if $t_2^* > \widetilde{t}_2^*$; that is, gross sales and customer refunds must co-move. But if, as in our aggregate data, we see customer refunds spike without gross sales increasing, then the worker's actions are not functional to the incentives provided by (1) and (2). To state this insight formally, we require the following assumption.

Assumption: t_1, t_2 are normal inputs in the production of n for unit input prices.

Inputs are *normal* in a production function if they co-move along the expansion paths. Expansion paths are defined as those lines which reflect the least cost method of producing different levels of output, in our case when factor prices of t_1, t_2 are both equal to one. Inputs are normal

[12]To prevent returns, the sales representative must ensure that the item meets the customer's needs and educate the customer about the correct use for the item. Ferguson et al. (2006) write: "A large percentage of returns are *false failure returns*: returns that have no functional or cosmetic defect. Reasons why false failure returns occur include installation difficulties, product performance incompatibility with consumer preferences, and remorse (...) For HP's inkjet printer group, false failure returns can account for up to 80% of the returns."

in any homothetic production function.[13]

Proposition 1. ***(Identifying counterproductive work practices)*** *Consider a change from incentive scheme $w(\cdot,\cdot)$ to another one $\widetilde{w}(\cdot,\cdot)$, and denote the solutions to problems (1) and (2) by t_i^* and $\widetilde{t}_i^*$, respectively. Then:*

- *$t_1^* > \widetilde{t}_1^*$ if and only if $t_2^* > \widetilde{t}_2^*$.*
- *if gross sales and refunds do not co-move as the incentive scheme changes, then the worker's actions are not functional to the incentives provided by (1) and (2), and thus represent counterproductive work practices.*

Proof. Note that, whatever the form of w, if (t_1^*, t_2^*, t_3^*) solves (1) then it must be the case that (t_1^*, t_2^*) solves:

$$\max_{t_1,t_2} n(t_1,t_2) \text{ s.t. } t_1 + t_2 \leq K,$$

where $K = t_1^* + t_2^*$. The solutions to the above problem as K varies trace the expansion path in the production of n. Since t_1, t_2 are normal inputs in the production of n, then both inputs must co-vary (increase or decrease) along the expansion path, i.e., as K varies. $\square$

Remark 1. *Proposition 1 holds true in the more general scenario where the cost function varies together with the incentive scheme, so that the cost function goes from $c(\cdot)$ to $\widetilde{c}(\cdot)$ as the incentive scheme goes from $w(\cdot,\cdot)$ to $\widetilde{w}(\cdot,\cdot)$.*

Remark 2. *Proposition 1 also holds true in the more general scenario where net sales also depend on t_3, provided that net sales can be expressed as a function $N(t_1,t_2,t_3) = H(n(t_1,t_2),t_3)$,*

[13] Here is an example of normal inputs. Suppose that for every 2 minutes spent upselling (i.e., selling an item that the customer doesn't know she needs), exactly 1 minute of education (how the item is actually to be used by the customer) is required to prevent that item's return. Then the production function for net sales is:

$$n(t_1,t_2) = \min[t_1, 2\cdot t_2].$$

In this production function, the expansion paths are rays with slope 1/2 emanating from the origin, and so t_1 and t_2 are normal inputs.

where the function $H(\cdot,\cdot)$ is increasing in its first argument and, as before, t_1,t_2 are normal inputs in the production of n for unit input prices. The proof of this statement is essentially identical to the proof of Proposition 1. A special case is that of a function $N(t_1,t_2,t_3)$ that is homothetic in all three of its arguments.

Proposition 1 also holds, with minor modifications, if there is a differential ability for the firm to punish different forms of shirking. For example, an employee might fear reprisal or punishment from management if she slacks off on making sales (i.e., on t_1), but she might not fear punishment if returns increase (i.e., for shirking on t_2). To model this scenario, we may fold the fear of punishment into the cost function as follows. When workers work more, the fear of punishment decreases even as the cost of physical/mental effort increases. The net effect is captured by a cost function $\widehat{c}(\cdot)$ which will be *less steep* than $c(\cdot)$ (the function c captures the physical/mental effort cost only) because increasing effort *reduces* the fear of punishment. Let's now model a greater ability to punish shirking on t_1 *relative* to t_2. This scenario may be modeled as follows:

$$\widehat{c}(t_1+t_2+t_3) = c(\alpha t_1+t_2+t_3).$$

Setting the parameter $\alpha<1$ causes the cost function to be *less steep* as a function of t_1 relative to t_2. This property captures the idea that increasing t_1 results in a greater offset to the physical-effort component of $\widehat{c}$, owing to the greater reduction in the fear of punishment. The only adaptation required for Proposition 1 to hold is that t_1,t_2 must now be assumed to be normal inputs in the production of n for input prices $(a,1)$ as opposed to unit input prices. This mild assumption is verified if n is homothetic.

3 Data and Institutional Setting

Our data cover 965 workers located in two call centers owned by a large US retailer in two non-contiguous U.S. states. Workers are divided into two types: 434 of them are *sales representatives* (SRs) and 531 are *customer representatives* (CRs), both equally spread across the call centers.

SRs are tasked with selling parts: they handle incoming calls; evaluate consumer needs, recommend and ultimately sell the item(s). As described below, they are compensated through a mix of fixed wages and commissions. CRs are in charge of a broader set of tasks: beyond handling incoming calls and selling parts, they also handle customer inquiries and complaints, coordinate returns or charge-back credits from customers, follow through with order management and warehouse personnel on delivery issues. Unlike SRs, their pay is almost entirely fixed.

The sales task, which SR and CR both engage in, is relatively straightforward. Typically, a customer will call with a desired part type. The worker's job is to (a) help the customer ascertain the model/part number, if not already known; (b) check availability and price; and (c) complete the sale by recording payment and shipping information. A worker may choose to spend less time helping the customer ascertain the correct part number (this time is denoted by t_2 in our model), or even deliberately send the customer the wrong part, thus causing the item to be returned. This damages the firm's reputation with that customer and also creates reverse-logistics costs (shipping, re-stocking) for the firm.

Workers are paid bi-monthly, and our data is limited to 12 consecutive pay periods (6 months) within the calendar year 2014. During this time we know: their wages and commissions; their net sales (gross sales minus refunds); and whether they quit (voluntary exit) or were fired (involuntary exit). Summary statistics are presented in Table 1. In our time frame, no worker transitions from one position to another, even though we see much turnover: we take this as evidence that SR and CR are separate "careers.'

Worker characteristics CRs tend to have more seniority in the company: their average tenure is 3.2 years vs. 1.9 years for SRs. CRs and SRs are comparable in terms of age: 31 vs. 33 years old on average, respectively. The gender breakdown is also comparable: roughly 65% of both CRs and SRs are women.

Worker compensation Over a two-week period, the average SR works 65 hours; earns $951, of which 70% from a fixed rate ($9.7/hr on average) and 30% from commissions. Commission earnings are paid bi-monthly and equal "net sales" (gross sales in the two weeks preceding the pay check minus refunds in those same two weeks) times a "commission rate." The commission rate is a schedule which depends on "net sales per hour" and on "conversion rate" (proportion of calls that result in positive gross sales): refer to Figure 1. Net sales per hour are divided in 12 "sales-per-hour tiers" and conversion rate is divided in 3 "conversion-rate tiers." The higher is the sales-per-hour tier or the conversion-rate tier, the higher is the commission rate. The maximum commission of 7.15% is paid to workers in sales-per-hour tier 12 and conversion-rate tier 3, while the minimum commission of 0% is paid to all workers in sales-per-hour tier 1, irrespective of the conversion-rate tier.[14]

The average CR works 75 hours over two weeks; earns $962, 99% of which is a fixed hourly base of $13/hr on average. Commissions are negligible (1% of their income) and are based on seniority.

Change in compensation for SRs The commission rate schedule of SRs shifted down on a Monday in mid-2014 (see Figure 1 for details). For confidentiality reasons we refer to this date as "C-day." Our data starts 4 periods before C-day (where each period is two weeks) and ends 8 periods after.

[14] The goal of the company is here to penalize workers with low conversion-rate tier rather than rewarding workers with high conversion-rate: conditional on the sales-per-hour tier, there is indeed a big jump in commission rate between workers in conversion-rate tier 1 vs. tier 2 (the commission is twice as high), while there is only a 10% jump in commission rate for moving from conversion-rate tier 2 to tier 3.

The new schedule "moved the goalposts" on conversion rate, i.e., it required workers to achieve higher conversion rates in order to keep their total compensation the same as before. More specifically, before C-day, a worker was assigned to conversion-rate tier 2 or tier 3 if her conversion rate was above 27% and 37% respectively. After C-day, this cutoff was raised to 30% and 40% respectively, making it harder to achieve higher tiers.

Figure 2 depicts the distributions of conversion rate before C-day. The fraction of SRs whose conversion rate belongs to the two intervals $(27\%, 30\%)$ and $(37\%, 40\%)$ equals 27% percent. This 27% estimate is a (maximally conservative) measure of the fraction of workers "affected" because it does not account for the possibility that workers who were not affected in the period before C-day might be affected at some future date.[15]

Holding conversion rate constant, the incentive scheme pushed all workers with a conversion rate between 27 and 30% or between 37 and 40% before C-day to a lower conversion-rate tier and lower commission rate. Obviously, such workers could have remained in the same conversion-rate tier as before had they *increased* their conversion rate as a reaction to the incentive change. As we will show later, workers did not increase their conversion rate after C-day. As a consequence, the proportion of workers in the highest conversion-rate tier (tier 1) dropped from 26.5 to 12.3% after C-day while the proportion of workers in the lowest conversion-rate tier (tier 3) increased from 8 to 12% (see Figure A.1).

We calculate that, holding net sales per hour and conversion rate constant at the pre-C-day level, commission earnings per hour for the average SR worker dropped by 13% ($0.65/hr).[16] In this sense, the change in policy represented a pay cut for SRs. The compensation scheme of

[15] This unmeasured future impact is larger if there is a lot of randomness in the conversion rate over time, and is smaller if the conversion rate is persistent. In Table A.1 (Column 1) we show that the correlation between a worker's performance at times t and $t-1$ is 0.33, hence the variable is far from deterministic. Therefore, 27% is definitely an underestimate of the fraction of workers who would expect to be impacted at least occasionally in the future.

[16] We calculate this by comparing the actual post-C-day payout per hour to a "counterfactual" payout which imputes the post-C-day commission rate to the pre-C-day performance. See Figure A.2 for the distribution of actual commission payout per hour before C-day and its counterfactual after C-day.

CRs however didn't change.

The shift in the commission schedule was not anticipated by the workers. It was precipitated by financial difficulties in other parts of the business (the brick-and-mortar stores) and wasn't connected to business conditions in the call center. We learned this from personal communication with management. Importantly, the evolution of the average number of incoming calls per worker over time around C-day does not differ in the treatment group (SRs) vs. control group (CRs); see Figure A.3, Panel A. This supports the claim that the firm did *not* drop commissions in reaction to an anticipated increase in the number of incoming call in the treatment group (which could have – by itself – increased net sales per hour and commissions, holding the commission rate constant).

Worker performance We have various measures of worker performance. First, we observe those incentivized by the firm: net sales per hour (mean of $170/hr for SRs and $193/hr for CRs) and conversion rate (mean of 34.5% for SRs and not available for CRs). Second, we have information on three non-incentivized performance measures: (1) average handle time (time spent on the phone with a customer) which is 6.2 minutes on average for both types of workers; (2) average customer satisfaction (mean of around 8.5 out of 10 for both types of workers);[17] and (3) the number of incoming calls answered by the employee (mean of 178 calls answered for SRs over a two-week period and mean of 272 calls for CRs). For SRs, we also observe the number of items told and can thus estimate the average sale size as gross sales divided by the number of items sold (mean of $34 for SRs and unavailable for CRs).[18]

[17]The customer satisfaction score is based on customer surveys and measured on a likert scale 0-10. It is aggregated at the bi-monthly level for each worker and is available for relatively few calls; this may be because few customers are selected to answer these questions, or because few customers choose to answer them. Because we have no visibility of customers' non-response, we take these numbers at face value although the variable may suffer from a selection bias.

[18]All variables are collected symmetrically for both the CRs and SRs, except "conversion rate" and "average sale size" which are recorded for SRs only.

Measuring counterproductive work practices Our measures of counterproductive work practices are grounded in the theory developed in Section 2. The theory says that if gross sales don't change and refunds increase after C-day (so that net sales decrease and refund rate increases), then worker practices are not functional to their incentives.[19] Accordingly, we study the evolution of gross sales, refunds and refund rate (refunds/gross sales) before and after C-day. These variables are available for both the CRs and the SRs.[20] We also create an indicator for whether gross sales and refunds *do not co-move* at the worker level. The indicator takes value one if a worker's refunds increase from one period to another *and* gross sales decrease or remain constant.[21]

Exit We know whether each worker exited the firm during our sample period and when. The data also distinguish between voluntary and involuntary exits (quitting vs. being laid off). Turnover is high for both types of workers: on a bi-monthly basis, the likelihood that a worker exits is 4.1% for SRs and 2.4% for CRs, with more than 80% of these exits being *voluntary*. SRs are more likely to both voluntary and involuntary exit than CRs.[22]

[19] The intuition is as follows: rather than spending an unchanged amount of time/effort on selling, and curtailing the time spent educating the customer about the items being shipped (or even deliberately misleading the customer by selling the wrong part), the worker should efficiently achieve the decreased level of net sales by *decreasing both gross sales and refunds*.

[20] Both workers sell parts (and hence generate returns), with the difference that CRs are also in charge of non-sales activities (e.g., solving customer inquiries) while SRs are not.

[21] Formally, the indicator takes value 1 if: $refunds_t - refunds_{t-1} > 0 \geq sales_t - sales_{t-1}$. This indicator cannot be estimated for the first period.

[22] Table A.1 (Columns 3-6) correlates exit with various performance metrics in the entire sample of workers. Accepting many calls per hour is the only variable that is significantly related with a reduction in lay off. Note that we regard this variable as a choice because employees have at least some control over their work flow. For example, the Occupational Safety and Health Administration requires that "toilet facilities [be] available so that employees can use them *when they need to do so*" (https://www.osha.gov/laws-regs/standardinterpretations/1998-04-06-0.)

4 Worker Behavior After the Pay Cut

4.1 Counterproductive work practices after the pay cut

To estimate the effect of the pay cut on counterproductive work practices, we use a difference-in-difference approach that compares workers who experienced a pay cut (treatment group; SRs) to workers who did not (control group; CRs), before and after C-day. The assumption is that the control group captures the evolution of the refund rate over time *in the absence of a pay cut* (and hence in the absence of counterproductive work practices), and the difference in the refund rate between the treatment and control group captures the effect of the pay cut on the extent of counterproductive work practices. This difference is estimated with the coefficient β in the following model:

$$Y_{ijt} = \alpha + \beta Treated_j \times Post_t + X_{ijt}\gamma + \phi_j \cdot t + \delta_i + \eta_t + \varepsilon_{ijt}, \tag{3}$$

where Y_{ijt} is the outcome of interest for worker i in job j in period t. $Treated_j$ is a dummy for whether the worker is treated (i.e., whether she is a SR). $Post_t$ is a dummy that takes value 1 for periods after C-day (i.e., period 0 to period +7) and value 0 for periods before C-day (i.e., period -4 to period -1), where a period corresponds to two weeks. X_{ijt} is a vector of controls that includes worker tenure and worker supervisor id. We also include time and worker fixed effects (which absorb $Post_t$ and $Treated_j$), and account for potential differential time-trends in the treatment or control group by adding job-specific time-trends.[23] Standard errors are clustered at the worker level.[24]

[23] To improve the comparability of treatment and control workers, we also estimate the effect of the pay cut using a difference-in-difference approach combined with a propensity score matching of control and treatment workers. In Table A.2 (Panel A), the control group is matched to the treatment group using pre-C-day data. The results are qualitatively similar in size and precision.

[24] We obtain similar results if we cluster the standard errors at the team level (where a team is defined as a group of workers under the same supervisor), or if we use two-way clustering at the worker and treatment $\times$ month level (see Table A.2, Panels B and C).

The estimates from Equation (3) are presented in Table 2: the refund rate (refunds/gross sales) increases by 5.8pp (64%; Column 1) in the treatment group relative to the control group. This increase is driven by the numerator: refunds per hour (expressed in dollars) increase by 76% after C-day whereas the change in gross sales per hour is small in magnitude (0.8%) and is not statistically significant (Columns 2-3). Also, the proportion of workers for which gross sales weakly decrease and refunds increase grows by 9.2pp (41%; Column 4). As expected, net sales per hour (gross sales - refunds) also went down (Table 3, Column 1).

The burst of *high refunds without an associated increase in gross sales* is interpreted as evidence of counterproductive work practices. The theoretical argument is developed in Section 2. The intuition is as follows: observe that every additional return decreased the workers' wages *as if the part had never been sold* in the first place; however, rather than lowering their wages by simply hanging up the phone on some customers, the workers took the time to actually sell the wrong part. Due to this time sacrifice, both the firm and the worker are made worse off.

Recall the analogy in the introduction: if workers were paid based on selling tennis shoes (net of returns), it would be sub-optimal for workers to ship some shoes without laces, because those shoes would surely be returned and the worker would have wasted the effort necessary to ship them. If, as in our case, the same number of shoes is shipped, but with fewer laces, then the worker is self-sabotaging.

Effects over time Figure 3 present the effect of the pay cut on counterproductive work practices over time by estimating the βs in the following equation:

$$Y_{ijt} = \alpha + \sum_t (\beta_t Treated_j \times Period_t) + X_{ijt}\delta + \phi_j \cdot t + \delta_i + \eta_t + \varepsilon_{ijt}, \tag{4}$$

where t = (-4,+7) is negative for pre-C-day periods, 0 for the two weeks following C-day and positive afterwards, and where period -1 is the omitted group. All the other variables are defined as in Equation (3).

Panels A, B and C of Figure 3 show that counterproductive work practices materialize exactly in the two weeks following C-day (period 0) and not before. We interpret this result as evidence of "parallel trends" in the treatment and control group before C-day and lack of "anticipation effect" in the treatment group.[25] After period 0, the effect of the pay cut on counterproductive work practices attenuates over time but it does not disappear (at least until period +7, where the data end).

Heterogeneous effects for more vs. less affected workers In Table 4 (Column 1), we display the heterogeneous effects of the pay cut on counterproductive practices by the extent to which SRs can expect to be "affected" by the change in compensation scheme. Accordingly, we classify SRs as "high impact" if their conversion rate in the first pay period (period -4) was in the affected range (i.e., within 27% - 30% and within 37% - 40%). We classify the rest as "low impact."[26] We find that the effect of the pay cut on the refund rate is positive and significant for all types of workers, but significantly higher for high-impact workers than for low-impact ones.[27] The fact that low-impact workers do react to the pay cut may reflect two things: they too are somewhat affected,[28] and/or solidarity with co-workers. We revisit the latter in Section 5.3.

Alternative explanations One might worry that the *high refunds without an associated increase in gross sales* is not only consistent with a counterproductive work practice but also with an optimal worker response to incentives (i.e., change in the composition of sales or optimal

[25] See Table A.3 for another test of parallel trends. Also, note that the evolution of refund rate, refunds per hour and gross sales per hour in the control group is smooth around C-day, suggesting limited spillovers from treatment to control group (i.e., CRs do not seem directly affected by their SRs colleagues experiencing a pay cut): see Figure A.4.

[26] See Figure 2. Recall that conversion rate is recorded for SRs only. Thus, we cannot use a triple-difference approach. Instead we compare the change in counterproductive practices (as proxied with the refund rate) before vs. after C-day for high- vs. low-impact workers.

[27] The p-value of the difference is 0.017 and is shown at the bottom of Table 4, Column 1.

[28] Workers who are not affected in the first pay-period might be affected at some future date. See Footnote 15.

shirking), or with a selection effect. We provide evidence against each of these alternative explanations below.

Let's start with the *sales-composition effect*. The change in the incentive scheme (described in Figure 1) might have induced salespeople to try to boost their conversion rate (percentage of calls with positive gross sales) by switching from big-ticket items to *a few* customers to selling small-ticket items to *many* customers. By changing the fraction of small-ticket items sold, the total value of returned items might have changed, while gross sales might have remained constant. In contrast with this alternative story, our data indicate that workers did *not* increase their conversion rate after C-day (Table 3, Column 2); only refunds increased. Moreover, there appears to be no switch to small-ticket items: we find that the *average sale size* (gross sales/number of items sold) did not change after C-day among treated workers (Table 3, Column 3).The same evidence also rules out the *opposite* switch in sales strategy: attempting larger-value sales (bigger-ticket items) at the risk of "striking out" (zero-ticket items). Because we do not have data on conversion rate and average sale size for the control group, the effect on these variables is estimated with a before-after difference for the treatment group, controlling for worker tenure, supervisor and worker fixed effects. Table 3 shows that for both variables the difference before and after C-day is not statistically different from zero.

Let us now turn to optimal shirking. The observed behavior (higher refunds without more gross sales) might reflect *higher shirking*, i.e., *lower worker effort* per unit of time during the phone call, as an *optimal* response to the new incentives. But then optimizing workers would also shorten the time spent on the phone or even not pick up the phone at all, either of which would result in lower gross sales (this "complementary efforts" argument is made rigorous in the theory section). However, we find that gross sales did not decrease after C-day (Table 2, Column 2). Furthermore, neither call handling time nor the number of calls handled decreased (if anything, handle time seems to have increased slightly by 2%; see Table 3, Columns 4-5).

Customer satisfaction also did not change (Table 3, Column 6). Although customers are more likely to return their products, this suggests that they are not more dissatisfied at the moment of the call. All this evidence, we think, discounts the optimal-lower-effort hypothesis. This is not to say that the workers' response might not be interpreted as some kind of (sub-optimal) shirking, but rather that optimal shirking alone cannot explain observed behavior.

One might wonder whether shirking on returns is more difficult to detect and punish than shirking on gross sales, thus leading workers to *optimally* shirk on preventing returns but not on generating gross sales. Table A.1 shows that this is not the case: gross sales and refunds predict firing with the same (low) precision.[29] Moreover, even if it was the case, then the worker would already have taken advantage of that "differential slack" before the change in compensation scheme, by shirking "more." More precisely, the worker would have chosen the optimal amount of shirking in both kinds of efforts, so as to equalize any "negative repercussions" at the margin. After the change in compensation scheme, there would be no "excess slack" on either type of effort. This argument is made precise in the discussion following Proposition 1.

Another concern is that the results might be explained by *selective termination*, i.e., higher termination of "low-refund-rate" workers in the treatment group. The evidence does not support this hypothesis. First, the specification includes worker fixed effects, thus minimizing any selection effect. Second, we see from Table A.2 (Panel D) that the results are invariant to restricting the sample of workers to those on-the-job throughout the whole period (balanced sample). Moreover, the results do not change significantly whether we add or remove the worker fixed effects (Table A.2, Panel E, Columns 1-4), indicating again that selection effects along measures of counterproductive work practices may be minimal.

Finally, the observed behavior are unlikely a rational response to individual ratchet effects.

[29] In Column 6, we see that gross sales per hour and refunds per hour are not correlated with firing: i.e., a \$1 increase in gross sales per hour and refunds per hour are associated with a 0.002 and 0.032 percentage points drop in firing, respectively. These effects are small in magnitude and not statistically significant.

Our preferred interpretation is that workers use voice *collectively*, seeking to undo the ratcheting up of incentives that took effect on C-day. But could *individual* ratchet effects be at play, also? We think not because the incentive scheme is not personalized. Therefore it is not *individually* rational for a worker to aim to undo the compensation policy changes implemented on C-day by manipulating her own performance in isolation.

Overall, the takeaway from this section is that, after C-day, workers sell the same but they create more customer refunds. Thus, increasing the refund rate is consistent with a counterproductive work practice. Our theory suggests that such behavior should be costly for the workers. We turn to this evidence in the next section.

4.2 The cost of counterproductive work practices for the workers

According to our theory, engaging in counterproductive work practices should be costly for the workers. And indeed, we find that commission payout per hour decreased by 28% after C-day in the treatment vs. control group (Table 3, Column 7).

However, not all of this drop in earnings is necessarily due to counterproductive work practices. Part of it is mechanical: the shift in the commission rates schedule "moved the performance goalposts," making it harder to achieve any given reward level. Thus holding performance constant, the pay cut mechanically reduces earnings.

We ascribe about half (13%) of the 28% drop in earnings to the mechanical effect of the shift in the commission rate schedule. We compute this number as the drop in earnings due to the change in the schedule, holding performance to its pre-C-day level. (See Footnote 16 for details.)[30] We impute the remaining 15%, residually, to the worker's endogenous response.

[30] Consistent with this effect, Table A.4 shows that some workers end up in a lower conversion-rate tier. More precisely, the fraction of workers in the highest conversion-rate tier drops by 16.7pp (Column 3) while the fraction in the lowest conversion-rate tier increases by 9.6pp (Column 1). Overall, the commission rate drops because of a reduction in both the conversion-rate and the sales-per-hour tiers (Columns 4-5).

Drilling down into this 15% drop, we find that this drop is driven by the spike in refunds, and the consequent drop in net sales, as opposed to any drop in conversion rate (Table 3, Columns 1-2). In this sense, the non-mechanical portion of the earnings drop is fully attributable to counterproductive work practices.

The drop in commission payout per hour in the treatment group is partially offset by them working 10 more hours per period after C-day relative to the control group (Table 3, Column 8).[31] It is not clear whether this increase in hours worked benefits the worker much, over their outside option. In any case, the increase in hours worked is too small to fully offset the effect of the pay cut. In aggregate, total commission payouts decrease by \$66 per period, which represent a 24% cut (Table 3, Column 9).

Overall, the evidence in this and the preceding section supports the hypothesis that workers engage in counterproductive work practices after the pay cut.

4.3 Exit after the pay cut

This section discusses the effect of the pay cut on workers' exit rate. To estimate the effect of the pay cut on exits, we use the same specification as (3) with the exception that we remove the worker fixed effects and replace them with a treatment dummy ($Treated_j$):

$$Y_{ijt} = \alpha + \beta Treated_j * Post_t + \theta Treated_j + X_{ijt}\gamma + \phi_j \cdot t + \eta_t + \varepsilon_{ijt}. \tag{5}$$

The likelihood that a worker leaves her position (voluntary exit) is found to double after C-day in the treatment vs. the control group. The bi-monthly voluntary exit rate increases by 2.9pp (Table 2, Column 5). On the other hand, involuntary exits do not seem affected: the company

[31]This increase in hours worked may be consistent with the observed increase in exit, if the fewer workers that are left end up working more hours.

isn't laying off more workers. The pay drop thus triggers a reaction on the worker's side, but not on the firm's (Column 6). In line with this, Figure 3, Panels D-E present the estimated exit coefficients over time and show that voluntary exits increase in period 0 while involuntary exits do not seem to have consistently changed over time after C-day.

Table 4 (Column 2) shows that the effect of the pay cut on voluntary exit is almost twice as large for "high-impact" workers than "low-impact" ones (5 vs. 2.6pp) and that the difference between the two groups is statistically significant (p-value of 0.007).[32] Finally, Table 4 (Column 4) shows that the "excess voluntary exit" after C-day is mostly concentrated among low-performance workers (those with below-median "net sales per hour" before C-day).[33] In this sense, the firm experienced a positive selection in the retained workforce.

5 Loyalty

In this section, we explore how loyalty mediates exit and counterproductive work practices. We proxy for loyalty with tenure length. In Table 4 (Columns 5-6), we estimate the difference-in-difference effects of the pay cut for "high-tenure" and "low-tenure" workers with the coefficients β_1 and β_2 in the following regression model:

$$Y_{ijt} = \alpha + \beta_1 (Treated_j \times Post_t \times High_i) + \beta_2 (Treated_j \times Post_t \times Low_i) + X_{ijt}\gamma + \phi_j \cdot t + \delta_i + \eta_t + \varepsilon_{ijt}, \tag{6}$$

where $High_i$ is a time-invariant indicator for whether worker i's tenure with the company in the period before C-day is in the top quartile of the tenure distribution, i.e., above 2.4 years. Low_i is an indicator for not being in the top quartile of tenure, i.e., below 2.4 years. The p-value for the

[32] Recall that we classify workers as "high impact" if their conversion rate was in the affected range (i.e., within 27% - 30% and within 37%-40%) before C-day.

[33] The difference in the voluntary exit reaction for high- vs. low-productivity workers is statistically significant at the 1% level. In line with this, Figure A.5 (Panel B) shows that the cumulative hazard rate of voluntary exit is significantly higher for high- than low-productivity workers after C-day.

comparison between high- and low-tenure workers ($H_0 : \beta_1 = \beta_2$) is reported at the bottom of the table. All the other variables are defined as in Equation (3).[34]

Note that, because we do not have exogenous variation in tenure, the coefficients β_1 and β_2 capture a descriptive association between tenure and the Y-variable (meaning that "high tenure" also proxies for other characteristics that happen to be associated with high tenure), and not a causal effect (the thought experiment of changing tenure in a manner uncorrelated from the pattern of characteristics that are usually associated with tenure). To the extent possible, however, we probe into causality by further controlling for the main correlates of tenure (i.e., net sales per hour, age, gender) interacted with $Treated_j * Post_t$.[35] The role played by tenure is robust irrespective of the choice of correlate (Table A.5).

5.1 More-loyal workers are less likely to use both exit and counterproductive work practices

Concerning exit, we find that more-loyal ("high-tenure") workers are significantly less likely to quit (voluntary exit) after C-day, compared to less-loyal ("low-tenure") workers. More precisely, we find that the first group does not quit more after C-day (Table 4, Column 6, coefficient "Treated × Post × High Tenure"), whereas the second group's quit rate increases twofold (coefficient "Treated × Post × Low Tenure"), and the difference between groups is statistically significant.[36] To corroborate this result, Figure A.5 (Panel A) shows that the cumulative hazard rate of voluntary exit after C-day is higher for low- than for high-tenure workers.

[34]Table A.6 (Columns 2-3) present similar results splitting the tenure variable into four quartiles rather than above/below the 75^{th} percentile.

[35]We augment Equation (6) with $Treated_j \times Post_t \times Z_i$, where Z_i is a time-invariant correlate of tenure measured in the period before C-day. See Table A.1, Columns 7-8 for the correlates of tenure.

[36] See p-value of 0.009 reported at the bottom of the Table 4, Column 6. The difference between the two groups remains significant when we control for tenure correlates (Table A.5, Columns 6-10), but the effect on high-tenure workers appears more significant.

Concerning counterproductive work practices, we find that irrespective of loyalty, counterproductive work practices increase after C-day (Table 4, Column 5). However, less-loyal workers are significantly more likely to engage in counterproductive work practices after C-day, compared to more-loyal workers: their refund rate increases by 84% vs. a 22% increase for high-loyalty workers.[37] This relative comparison parallels the finding for exit.

Overall, we find that more-loyal workers are less likely to use both exit and counterproductive work practices, compared to less-loyal workers. Moreover, high-loyalty workers react to the pay cut relatively mildly, and *only* with counterproductive work practices. In contrast, low-loyalty workers react relatively strongly to the pay cut with a "balanced mix" of exit and counterproductive work practices.

5.2 Counterproductive work practices negatively predict voluntary exit

In this section we explore whether counterproductive work practices are negatively correlated with voluntary exit, *within a loyalty category*. If counterproductive work practices are interpreted as voice, such a finding would support Hirschman's (1970) claim that exit and voice should be substitutes, above and beyond the fact that they correlate differently with loyalty.

We study whether a worker who engages in counterproductive work practices is more or less likely to exit the firm. This might be the case if there is an unobservable characteristic which makes exit or counterproductive work practices relatively more appealing to a worker. If such a characteristic exists, we would observe that some workers would exit rather than engage in counterproductive work practices, while others would rather stick with the company and engage in counterproductive work practices.

Table 5 presents the correlation between worker *i*'s decision to voluntary exit the firm in our

[37]The p-value is less than 0.001 and is reported at the bottom of Table 4, Column 5.

time frame and i 's average refund rate up to exit. We measure the latter in two ways: (a) with the average per-period refund rate up to exit, and (b) with the fraction of periods in which the refund rate is considered as "excessive" by the firm, i.e., refund rate above 14%.[38] The regressions have 434 observations: one per SR. We find that SRs who engage in counterproductive practices are statistically less likely to voluntarily exit.[39] The substitution between counterproductive work practices and exit is more muted among high-tenure workers, who we have shown to react less to the pay cut.[40]

Overall, we have shown that workers who are more inclined to exert counterproductive work practices are less inclined to exit. If we interpret counterproductive work practices as *voice*, then our results support Hirschman's (1970) prediction that, within the group who reacted to the pay cut (low-loyalty workers), voice is indeed a substitute for exit.

5.3 Counterproductive work practices are more "socially determined" than the decision to exit

We ask whether the decision to exert counterproductive work practices is more "socially determined" than the decision to voluntary exit, which might be more individual. Table 6 shows that the proportion of team members who exerted counterproductive work practices in the two weeks following C-day (period 0) positively significantly predicts the likelihood that other work-

[38] We use the 14% cutoff because it is viewed by management as "unnaturally high" (in the management's words) and, later, the company would use 14% as the threshold above which sales representatives would be penalized for excessive refunds (see Section 8).

[39] An alternative approach is to estimate the effect of a worker engaging in counterproductive practices in the two weeks following C-day (period 0) on the likelihood that the worker voluntarily exit *thereafter*. This approach is presented in Table 6 (Columns 1-2) and provides similar results, with the caveat that the sample is restricted to the 287 SRs who are on-the-job until the beginning of period +1.

[40] The coefficient for "Average Refund Rate × High Tenure," which captures the correlation between exerting counterproductive practices and voluntary exit for high-tenure workers, is small and not statistically significant. In contrast, the coefficient for "Average Refund Rate × Low Tenure" is negative and statistically significant. The p-value for the difference between low- and high-tenure workers is less than 0.001 and is presented in the bottom of Table 5.

ers adopt the same behavior thereafter (Column 3).[41] Such effect appears to be less strong for voluntary exits: the decision to exit is not significantly corretated with how many team members previously decided to exit (Column 4). Note however that this result should be interpreted with caution as the estimated coefficient lacks precision.[42] This provides suggestive evidence that counterproductive behaviors are more socially-determined than exit behaviors.

6 Firm's Reaction to the Pay Cut

To understand the firm's reaction to worker behavior, we first need to assess the effect of the pay cut on firm profits. While a detailed calculation is here impossible because we do not have information on the entire cost structure of the firm, a rough estimate indicates that the firm lost \$0.6/hr on average.

After C-day, total hourly pay decreased by \$2.78 on average in the treatment vs. the control group (Table 7, Column 1). This is a source of savings for the firm. The second channel is lost revenue due to the drop in productivity. Hourly revenues (net sales per hour) decreased by \$11 (Column 2), and assuming a standard 30% gross margin rate, this translates into a \$3.33 lost profits.[43] In net, for a given worker, the firm lost \$3.33/hr - \$2.78/hr = \$0.6/hr. When we perform this same calculation at the worker level, we see that the \$0.6 drop in profits is not statistically significant (Column 3).

Refunds however create additional costs beyond the lost revenue computed above. First, reverse logistics costs: handling the refund, examining it for damage, and restocking. Second,

[41] A team is here defined as the group of workers under the same supervisor. (These workers sit together and are geographically close to each other). Teams are composed of either CRs or SRs. The analysis restricts here to SRs teams, which are 28 in total.

[42] Column 3 is restricted to the sub-sample of 161 SRs who were on-the-job until the beginning of period +1 *and* who did *not* exert counterproductive practices in period 0. Column 4 is restricted to the sub-sample of 287 SRs who were on-the-job until the beginning of period +1.

[43] A gross margin of 30% is standard in retail call centers and is in line with what we calculate for our company. (We do not reveal the exact gross margin for confidentiality reasons.)

reputational costs for the business which are not internalized by individual employees. Estimates for these costs are not available to us, but they are likely sizable relative to the gross margin. Overall, adding up the above costs and benefits, and considering the cost of increased turnover, it is plausible that the firm lost profits from the pay cut, both in the short and in the long term.

The pay cut also reduced the number of employees, indicating that the firm did not entirely replace the employees who exited after the pay cut (Table 7, Column 4). This reduction does not seem explained by the firm terminating the workers who exerted counterproductive work practices after the pay cut (Table 6, Column 2),[44] but is rather due to more voluntary exit among "low-tenure" workers (Table 4, Column 6). In this sense, we see no evidence of individual-level retaliation.

Instead, the firm reacted to the persistently elevated refund rate after C-day by tweaking incentives to *penalize refunds* for sales representatives: on a Monday in 2014 after the end of our sample period, the firm introduced a new "Rolling Refund Rate Modifier" that reduced the commission rate of high-refund workers and boosted the commission rate of low-refund workers. More specifically, the commission rate of workers with an average refund rate above 14% between period t and $t+4$ is multiplied by 0.5 in period $t+5$. In other words, workers with excessive refunds rate above 14% had their commission rate halved.

7 Conclusions

This is the first study, to our knowledge, that empirically documents the individual patterns of exit and counterproductive work practices in reaction to a pay cut, and how loyalty/tenure mediates these patterns.

We have defined a work practice as *counterproductive* if it is costly for the firm and *not*

[44] See Footnote 39 for more details.

economically expedient for the worker. We document that, after a pay cut, some workers chose to leave the firm; others generated *abnormally high refunds without an associated increase in gross sales*. The latter is interpreted as evidence of counterproductive work practices. The argument is developed in a theoretical model. The intuition is as follows: observe that every additional return decreased the workers' wages *as if the part had never been sold* in the first place; however, rather than lowering their wages by simply hanging up the phone on some customers, the workers appear to have taken the time to actually sell the wrong part. Due to this time sacrifice, both the firm and the worker are made worse off. Although conclusive proof of motive is unavailable in our setting, management interpreted the artificially-elevated returns as a form of *voice* (as in Hirschman 1970).

We study how workers with different tenures (which is interpreted as a proxy for loyalty) chose between exit and/or counterproductive work practices, and whether exit and counterproductive work practices were substitutes to one another. We found that recently-hired workers were more likely to both exit and engage in counterproductive work practices, as opposed to high-tenure workers who, to the extent that they reacted at all, did so through counterproductive work practices and not through exit. These findings comport with Hirschman's view that loyal workers would prefer to express themselves through voice rather than through exit. Furthermore, we found that those who engaged in counterproductive work practices were less likely to exit. This finding comports with Hirschman's view that voice is an *alternative strategy* to exit.

As with most empirical findings, it is important to place them into context and discuss their external validity. In the U.S., pay reductions for job-stayers are rare, even during recessions.[45] This very fact suggests that the repercussions suffered by our firm may represent a lower bound, relative to most other firms who choose not to cut pay. Relatedly, we note that the salary reduction of our workers is not implemented by cutting their base wage but, rather, by changing

[45] See Bewley (1999), Grigsby et al. (2019) showing that only 2% of job-stayers receive a nominal base wage cut during a given year in U.S.– a much lower share than previously thought.

incentives, which may potentially have a distinct psychological effect. Separately, average job tenure in our setting is low. This feature, while not atypical for low-wage jobs,[46] provides meaningful context for the behavior we observe. Indeed, because our workers have low tenure, one would expect their motivation to exert voice to be lower, and their motivation to exit to be higher, relative to workplaces and workers with longer tenure. These topics are left for future research.

[46]Median tenure in our sample is less than one year, though the upper quartile is more than two years. Figure 13 in Butcher and Whitmore Schanzenbach (2018) shows that 23% of low-wage workers in the U.S. have job tenure less than one year.

References

[1] **Abeler, Johannes, Armin Falk, Lorenz Goette, and David Huffman**. 2011. "Reference Points and Effort Provision." *American Economic Review* 101(2): 470-492

[2] **Adhvaryu, A., Molina, T. and Nyshadham, A**. 2020. "Expectations, Wage Hikes, and Worker Voice." Working Paper.

[3] **Bewley, Truman F., and Truman F. Bewley**. 1999. *Why Wages Don't Fall during a Recession*. Cambridge, MA: Harvard University Press.

[4] **Breza, Emily, Supreet Kaur, and Yogita Shamdasani**. 2018. "The Morale Effects of Pay Inequality." *The Quarterly Journal of Economics* 133(2): 611-663.

[5] **Butcher, Kristin F., and Diane Whitmore Schanzenbach**. 2018. "Most Workers in Low-Wage Labor Market Work Substantial Hours, in Volatile Jobs." Washington, DC: Center on Budget and Policy Priorities.

[6] **Della Vigna, S., List, J.A., Malmendier, U. and Rao, G**. 2016. "Estimating Social Preferences and Gift Exchange at Work." National Bureau of Economic Research Working Paper 22043.

[7] **Fehr, Ernst and Simon Gächter**. 2000. "Fairness and Retaliation: The Economics of Reciprocity." *Journal of Economic Perspectives*. 14(3): 159-181.

[8] **Ferguson, M., Guide Jr, V. D. R., and Souza, G. C**. 2006. "Supply Chain Coordination for False Failure Returns." *Manufacturing & Service Operations Management* 8(4): 376-393.

[9] **Freeman, R. B., and Medoff, J. L**. 1979. "The Two Faces of Unionism." *The Public Interest* 57: 69-93.

[10] **Hart, Oliver, and John Moore**. 2008. “Contracts as Reference Points.” *The Quarterly Journal of Economics* 123(1) 1-48.

[11] **Hirschman, Albert O**. 1970. *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States*. Cambridge, MA: Harvard University Press

[12] **Grigsby, John, Erik Hurst, and Ahu Yildirmaz**. 2019. “Aggregate Nominal Wage Adjustments: New Evidence from Administrative Payroll Data.” National Bureau of Economic Research Working Paper 25628.

[13] **Krueger, A.B. and Mas, A.**. 2004. “Strikes, Scabs, and Tread Separations: Labor Strife and the Production of Defective Bridgestone/Firestone Tires.” *Journal of Political Economy* 112(2): pp.253-289.

[14] **Krueger, Miriam. and Guido Friebel, G**. 2020. “A Pay Change and Its Long-Term Consequences.” Manuscript.

[15] **Kube, S., Marïchal, M.A. and Puppe, C**. 2013. “Do Wage Cuts Damage Work Morale? Evidence from a Natural Field Experiment.” *Journal of the European Economic Association* 11(4): 853-870.

[16] **Mas, A**. 2006. “Pay, Reference points, and Police Performance.” *The Quarterly Journal of Economics* 121(3): 783-821

[17] **Sandvik, J., Saouma, R., Seegert, N. and Stanton, C**. 2018. “Analyzing the Aftermath of a Compensation Reduction.” National Bureau of Economic Research Working Paper 25135.

8 Figures and Tables

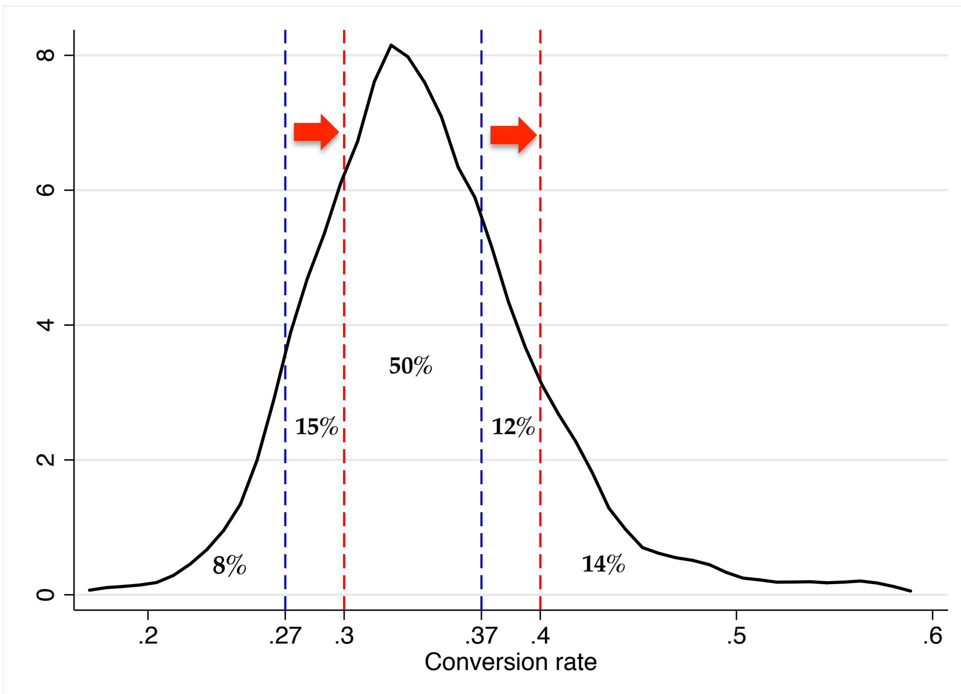
Figure 1: Change of the commission rate schedule at C-day

Commission Payout = Net Sales (Gross Sales - Refunds) x Commission Rate where Commission Rate is defined as in the table below:

		Conversion Rate		
Before C-day ➔		[0 - 27%)	[27 - 37%)	[37 - 100%)
After C-day ➔		[0 - 30%)	[30 - 40%)	[40 - 100%)
Net Sales per Hour		Tier 1	Tier 2	Tier 3
≤ \$129.99	Tier 1	0.00%	0.00%	0.00%
\$130.00 to \$139.99	Tier 2	0.13%	0.25%	0.28%
\$140.00 to \$149.99	Tier 3	0.50%	1.00%	1.10%
\$150.00 to \$159.99	Tier 4	0.75%	1.50%	1.65%
\$160.00 to \$174.99	Tier 5	1.00%	2.00%	2.20%
\$175.00 to \$189.99	Tier 6	1.25%	2.50%	2.75%
\$190.00 to \$204.99	Tier 7	2.00%	4.00%	4.40%
\$205.00 to \$224.99	Tier 8	2.25%	4.50%	4.95%
\$225.00 to \$244.99	Tier 9	2.50%	5.00%	5.50%
\$245.00 to \$264.99	Tier 10	2.75%	5.50%	6.05%
\$265.00 to \$309.99	Tier 11	3.00%	6.00%	6.60%
≥ \$310.00	Tier 12	3.25%	6.50%	7.15%

Notes: The commission payout of each sales representative (SR) multiplies her net sales (gross sales minus refunds) by a commission rate. The commission rate is determined by net sales per hour and conversion rate. Net sales per hour are divided in 12 sales-per-hour tiers and conversion rate is divided in 3 conversion-rate tiers. The higher the sales-per-hour or conversion-rate tier, the higher the performance and the commission rate. The maximum commission of 7.15% is attributed to workers in sales-per-hour tier 12 and conversion-rate tier 3, while the minimum commission of 0% is attributed to all workers in sales-per-hour tier 1, irrespective of the conversion-rate tier. The goal of the company is to heavily penalize workers with low conversion rate rather than rewarding workers with high conversion rate: conditional on the sales-per-hour tier, there is indeed a big jump in commission rate between workers in conversion-rate tier 1 vs. tier 2 (the commission is twice as high), while there is only a 10% jump in commission rate for moving from conversion-rate tier 2 to tier 3. On C-day, the conversion-rate tiers were redefined and the commission rate unexpectedly dropped. Before C-day, a worker was assigned to conversion-rate tier 2 or tier 3 if her conversion rate was above 27% and 37% respectively. After C-day, this cutoff was raised to 30% and 40% respectively, making it harder to achieve higher tiers.

Figure 2: Distribution of the conversion rate before C-day in the treatment group

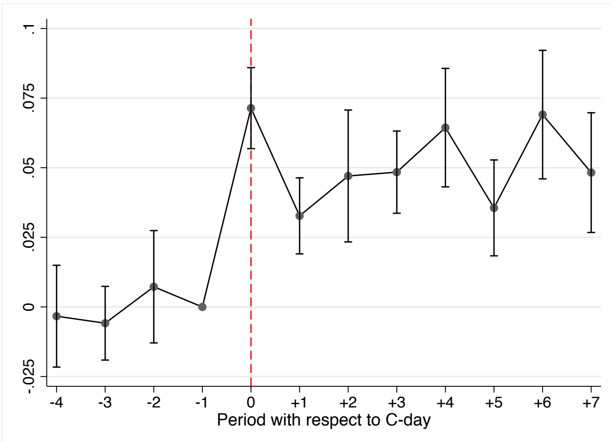


Notes: This figure plots the kernel density of conversion rate before C-day in the treatment group. It also presents the change in the incentive scheme (vertical dashed blue to red line). Density trimmed at top and bottom 1% for expositional reasons.

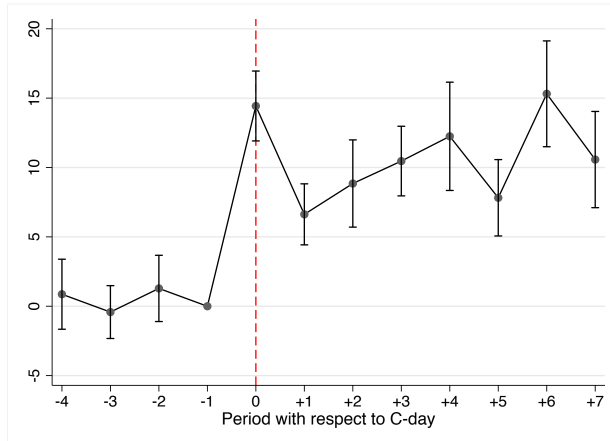
Figure 3: Difference-in-differences estimates over time

Part I: Counterproductive Practices

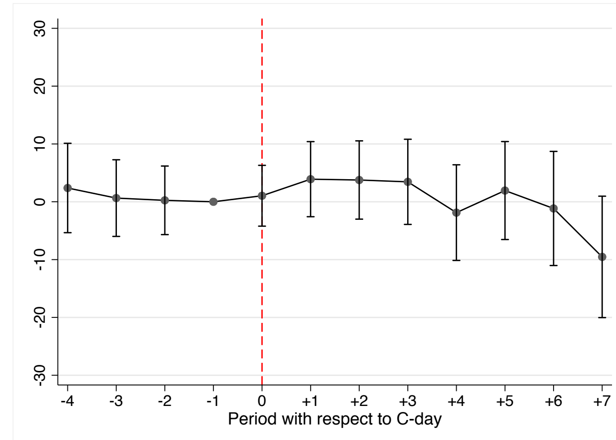
Panel A: Refund rate (R/G)



Panel B: Refunds per hour (R)

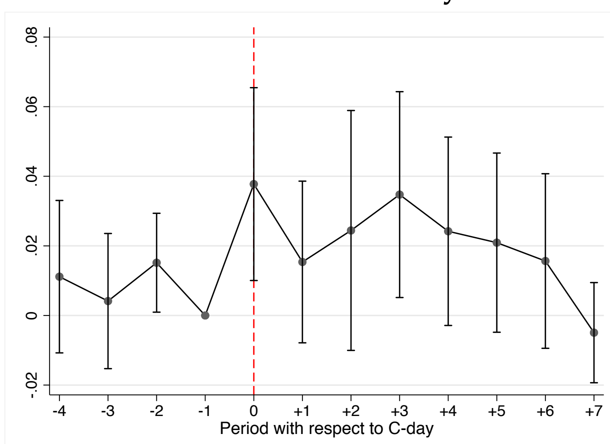


Panel C: Gross sales per hour (G)

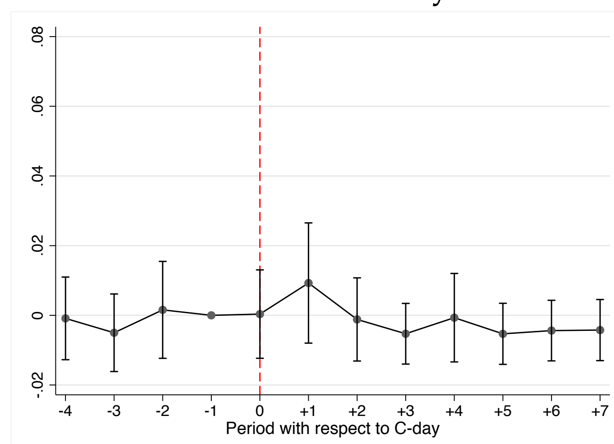


Part II: Exit

Panel D: Voluntary Exit

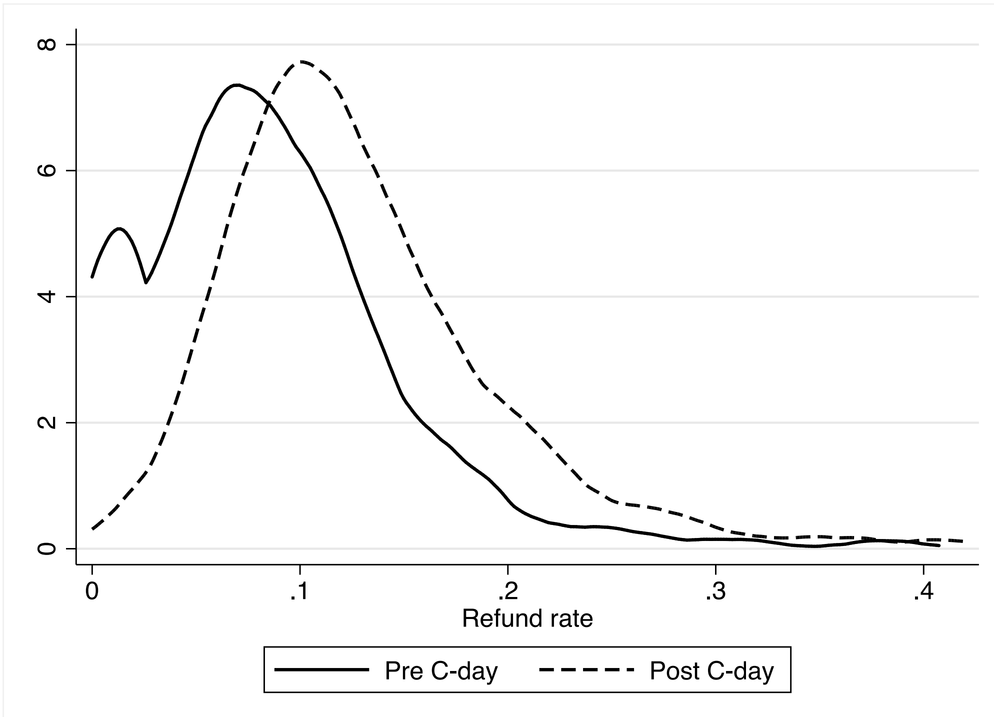


Panel E: Involuntary Exit



Notes: This figure presents the difference-in-difference estimates over time. Period 0 = the two weeks following C-day; Period -X = X periods before C-day (where one period= two-weeks). Period +X = X periods after C-day. The plotted coefficients are estimated with a regression of the outcome variable onto the interaction between the time dummies and the treatment dummy indicator (with Period -1 as the excluded category). The regressions control for worker fixed effects in Part I and for the treatment dummy indicator in Part II. All regressions also control for time fixed effects, job-specific time trends, worker tenure and worker supervisor. The bars represent 95% confidence intervals, based on standard errors clustered at the worker level.

Figure 4: Distribution of the refund rate before and after C-day in the treatment group



Kolmogorov-Smirnov test for equality of both distributions: pvalue=0.000

Notes: This figure plots the kernel density of refund rate before and after C-day in the treatment group. Density trimmed at top and bottom 1% for expositional reasons.

Table 1: Summary statistics

VARIABLES	Treatment Group: Sales representatives (SRs) Mean (1)	S.D. (2)	Control Group: Customer representatives (CRs) Mean (3)	S.D. (4)
A. Demographics (N = Workers)				
Tenure (in years)	1.854	4.137	3.161	4.911
Age (in years)	30.93	11.67	33.04	13.68
Female (1=yes)	0.680	0.467	0.652	0.477
B. Hours and Earnings (N = Workers × Periods)				
Number of hours worked	64.86	24.85	75.27	92.13
Total pay	951.4	375.9	962.6	336.7
Basic hourly pay	636.3	166.9	948.4	319.6
Commission payout	302.5	334.0	14.21	22.32
C. Performance and Countrproductive Practices (N = Workers × Periods)				
Gross sales per hour (G)	192.8	63.58	213.7	61.76
Refunds per hour (R)	22.66	19.30	17.36	10.49
Refund rate = refunds per hour/ gross sales per hour (G/R)	0.116	0.109	0.096	0.070
Δ[refunds per hour (R)] > 0 & Δ[gross sales per hour (G)] ≤ 0	0.232	0.422	0.147	0.354
Net sales per hour = gross sales - refunds per hour (G-R)	170.1	57.55	196.3	63.16
Conversion rate: % calls with positive gross sales (G>0)	0.345	0.057	n/a	n/a
Average sale size = Gross sales (G)/Number of items sold	34.85	6.885	n/a	n/a
Average handle time (in seconds)	376.5	82.06	379.1	90.05
Number of calls	177.8	79.03	272.1	206.0
Average customer satisfaction score (0 to 10)	8.605	1.101	8.380	1.557
D. Termination (N = Workers × Periods)				
Worker exits	0.041	0.199	0.024	0.153
Worker *voluntary* exits	0.033	0.180	0.022	0.147
Worker *involuntary* exits	0.008	0.088	0.002	0.044

Notes: This table reports summary statistics for the treatment and the control group. Variables in Panel A correspond to the most recent observation of each worker (one observation per worker). All other variables vary across workers on a bi-weekly basis (one period = two weeks). "Conversation rate" represents the percentage of answered calls which are concluded with a sale (G>0). "ΔR>0 & ΔG≤0" is a dummy variable that takes value 1 if refunds per hour strictly increase in two consecutive periods while gross sales per hour either decrease or stay the same. "Average sale size" is equal to the gross sale per hour divided by the number of items sold per hour. "Average customer satisfaction score (0 to 10)" is the average score that customers have assigned to the employee over a two-weeks period. The score is collected from a survey that the client answers on a voluntary basis after the call. "Worker voluntary (resp., involuntary) exits" is a dummy variable that takes value 1 if the worker quits the job (resp., is laid off) in that period. Two variables are unavailable for CRs: "Conversion rate" and "Average sale size."

Table 2: Effect of the pay cut on counterproductive practices and exit

	(1)	(2)	(3)	(4)	(5)	(6)
	Counterproductive Practices				**Exit**	
Dependent Variable	Refund rate (R/G)	Refunds per hour (R)	Gross sales per hour (G)	$\Delta R>0$ & $\Delta G\leq 0$	Voluntary exit	Involuntary exit
Treated × Post	0.058***	12.534***	1.451	0.092***	0.029**	0.000
	(0.007)	(1.157)	(2.669)	(0.035)	(0.012)	(0.005)
Observations	6,803	6,802	6,803	5,479	6,803	6,803
R-squared	0.399	0.513	0.718	0.476	0.021	0.010
Mean Dep.Var. in Treated × Pre	0.090	16.44	180.3	0.225	0.030	0.010

Notes: All regressions include time fixed effects, job-specific time trends and control for worker tenure and worker supervisor. Col. 1-4 also control for worker fixed effects. Standard errors are clustered at the worker level. The number of observations for "$\Delta R>0$ & $\Delta G\leq 0$" is smaller because the variable has missing values in the first period (differences between two consecutive periods can be estimated only from the second period onward). *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3: Effect of the pay cut on performance and earnings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Performance						**Worker Earnings**		
Dependent Variable	Net sales per hour (G-R)	Conversion rate	Average sale size	Average handle time (in sec.)	Number of calls	Average customer satisfaction (0 to 10)	Commission payout per hour	Number of hours worked	Total commission payout
Treated × Post	-11.115***			7.163***	-1.872	0.021	-1.458***	10.450***	-65.960***
	(2.433)			(2.260)	(4.251)	(0.041)	(0.247)	(1.804)	(14.139)
Post		-0.002	0.567						
		(0.003)	(0.407)						
Sample	All	Treated	Treated	All	All	All	All	All	All
Observations	6,802	3,115	3,108	6,803	6,803	6,208	5,319	6,803	6,803
R-squared	0.685	0.459	0.308	0.810	0.711	0.345	0.773	0.729	0.778
Mean Dep.Var. in Treated × Pre	163.9			384.8	156.6	8.526	5.241	61.55	275.3
Mean Dep.Var. in Pre		0.342	34.16						

Notes: All regressions include worker fixed effetcs, time fixed effects, job-specific time trends and control for worker tenure and worker supervisor. Standard errors are clustered at the worker level. "Conversion rate" and "Average sale size" are available for the treatment group only. The associated coefficients "Post" report the difference in the variable before and after C-day, controlling for worker fixed effects, worker tenure and worker supervisor. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Heterogeneous effects of the pay cut on counterproductive practices and voluntary exit

Dependent Variable	(1) Refund rate (R/G)	(2) Voluntary exit	(3) Refund rate (R/G)	(4) Voluntary exit	(5) Refund rate (R/G)	(6) Voluntary exit
Post × Low Impact	0.043***	0.026**				
	(0.008)	(0.013)				
Post × High Impact	0.066***	0.050***				
	(0.009)	(0.016)				
Treated × Post × Low Performance			0.069***	0.038***		
			(0.008)	(0.015)		
Treated × Post × High Performance			0.046***	0.013		
			(0.008)	(0.012)		
Treated × Post × Low Tenure [≤ 2.4 yrs]					0.067***	0.030**
					(0.007)	(0.013)
Treated × Post × High Tenure [> 2.4 yrs]					0.023*	0.009
					(0.012)	(0.012)
Sample	Treated	Treated	All	All	All	All
Observations	3,114	3,115	6,803	6,803	6,803	6,803
R-squared	0.456	0.020	0.400	0.023	0.403	0.023
Mean Dep.Var. in Treated × Pre × Low	0.100	0.028	0.082	0.049	0.080	0.029
Mean Dep.Var. in Treated × Pre × High	0.075	0.034	0.099	0.017	0.104	0.042
p-value Post × (Low - High) = 0	*0.017*	*0.007*				
p-value Treated × Post × (Low - High) = 0			*0.012*	*0.005*	*<0.001*	*0.009*

Notes: The table presents heterogeneous effects of the pay cut on counterproductive practices and voluntary exit. "High Impact" is an indicator for whether the worker's conversion rate is between (27-30%] or (37-40%] in the first pay-period. "Low Impact"= 1- "High Impact." The variable is available for the treatment group only. The coefficients in col. 1-2 report the difference in refund rate/exit before and after C-day, for "High Impact" and "Low Impact" workers. "Performance" is calculated as the average "net sales per hour" in the pre-C-day period, and is divided in two groups: above the median ("High Performance") and below the median ("Low Performance"). "Tenure" is estimated in the period before C-day, and is divided in two groups: in the top quartile ("High Tenure") and in the first three quartiles ("Low Tenure"). All regressions include time fixed effects, job-specific time trends and control for worker tenure and worker supervisor. Col. 1, 3 and 5 also include worker fixed effects. Standard errors are clustered at the worker level. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Correlations between counterproductive practices and exit within the treatment group

	(1)	(2)	(3)	(4)
Dependent Variable	Voluntary exit			
Average Refund Rate (up to Exit)	-0.056**		-0.015*	
	(0.025)		(0.009)	
High Tenure		-0.554***		-0.427***
		(0.066)		(0.052)
Average Refund Rate × Low Tenure		-0.396***		-0.087***
		(0.065)		(0.016)
Average Refund Rate × High Tenure		-0.007		-0.001
		(0.007)		(0.004)
Observations	434	434	434	434
Mean Dep.Var.	0.150	0.150	0.150	0.150
p-value Avg Refund Rate × (Low - High Tenure) = 0		*<0.001*		*<0.001*

Notes: One observation per Sales Representative (SR). The table presents the correlation between counterproductive practices and exit after C-day. Counterproductive practices is measured with the average refund rate after C-day (up to exit) in col. 1-2 and with the fraction of periods with an excessive refund rate (>14%) after C-day (up to exit) in col. 3-4. "Tenure" is estimated in the period before C-day, and is divided in two groups: in the top quartile (high tenure) and in the first three quartiles (low tenure). Col. 2 and 4 control for the uninteracted indicator for High Tenure. Robust standard errors. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Correlations between counterproductive practices and exit within the treatment group (Continued)

	(1)	(2)	(3)	(4)
Dependent Variable	Voluntary exit in Period +1 onwards	Involuntary exit in Period +1 onwards	Excessive refund in Period +1 onwards	Voluntary exit in Period +1 onwards
Sample	*SRs on-the-job start of period +1*	*SRs on-the-job start of period +1*	*SRs on-the-job start of period +1 and no excessive refund rate in Period 0*	*SRs on-the-job start of period +1*
Excessive Refund Rate in Period 0	-0.178**	-0.073		
	(0.075)	(0.045)		
% Teammates with Excessive Refund Rate in Period 0			0.620**	
			(0.305)	
% Teammates Voluntarily Exiting in Period 0				-0.598
				(1.076)
Observations	287	287	161	287
Mean Dep.Var.	0.174	0.031	0.733	0.174

Notes: One observation per Sales Representative (SR). Sample restricted to workers on-the-job until start of period +1 (more than two weeks after C-day). Col. 3 further restricts the sample to workers without excessive refund rate in Period 0. Col. 1 (resp., 2) estimates the correlations between counterproductive practices in Period 0 and vountary exit (resp., involuntary) exit thereafter. Col. 3 (resp., Col. 4) estimates the correlations between the proportion of teammates who exert counterproductive practices (resp., exited) in Period 0 and the likelihood that a worker starts exerting counterproductive practices (resp., exiting) thereafter. Counterproductive practices is measured with excessive refund rate (>14%). A team is defined as all workers under the same supervisor at C-day. The average fraction of teammates who have excessive reund rate in Period 0 is 39.1%. The average fraction of teammates who voluntarily exit in Period 0 is 1.3%. Robust standard errors. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Effect of the pay cut on firm profits

Dependent Variable	(1) Total pay per hour (base pay + commissions)	(2) Net sales per hour (G-R)	(3) Net sales per hour - 30%* total pay per hour	(4) Total number of workers	(5) Total number of workers × hours
Treated × Post	-2.781**	-11.115***	-0.595	-52.85**	637.3
	(1.222)	(2.433)	(1.211)	(23.55)	(6,772)
Observations	6,803	6,802	6,802	24	24
R-squared	0.418	0.685	0.523	0.958	0.707

Notes: Observations are at the worker-level in col. 1-3 (N=#workers × #periods) and at the job-level in col. 4-5 (N=#jobs × #periods). All regressions include time fixed effects and job-specific time trends. Col. 1-3 also control for worker fixed effects, worker tenure and worker supervisor. Standard errors are clustered at the worker level in col. 1-3. Robust standard errors in col. 4-5. *** p<0.01, ** p<0.05, * p<0.1.

A Appendix Figures and Tables

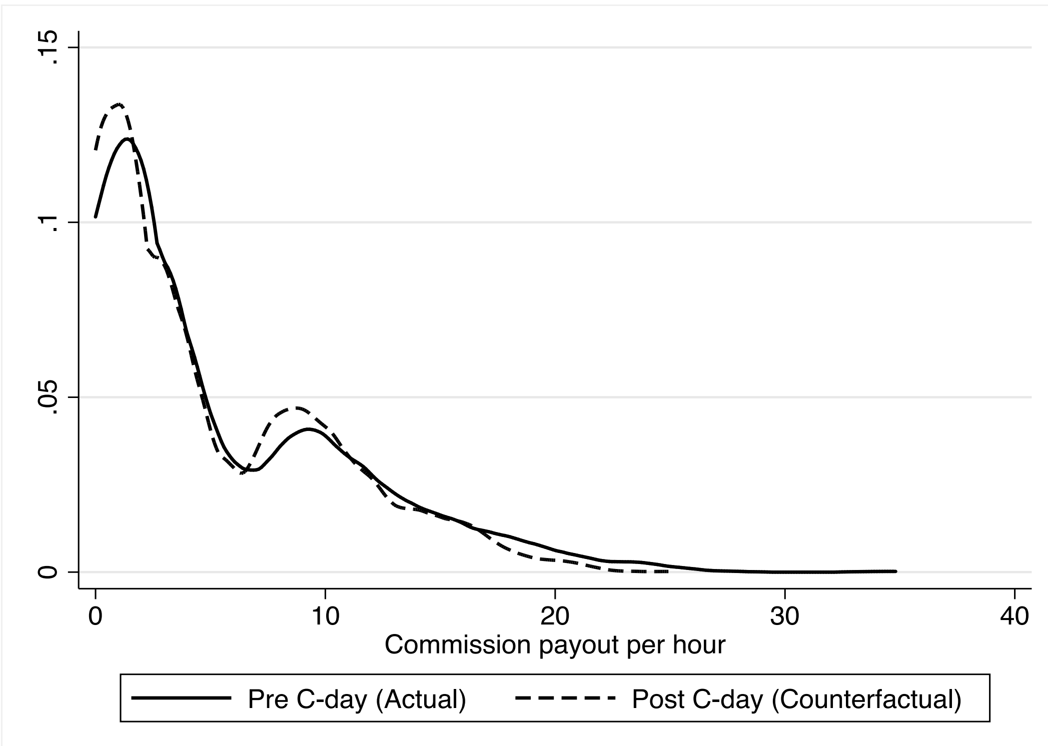
Figure A.1: Distribution of workers by tier before and after C-day

	Before C-day →	Conversion Rate [0 - 27%)	[27 - 37%)	[37 - 100%)	
Net Sales per Hour		Tier 1	Tier 2	Tier 3	**Total**
≤ $129.99	Tier 1	4.97%	10.99%	1.71%	**17.67%**
$130.00 to $139.99	Tier 2	0.97%	6.24%	0.52%	**7.72%**
$140.00 to $149.99	Tier 3	0.30%	7.05%	0.97%	**8.31%**
$150.00 to $159.99	Tier 4	0.89%	6.16%	1.26%	**8.31%**
$160.00 to $174.99	Tier 5	0.45%	8.98%	2.08%	**11.51%**
$175.00 to $189.99	Tier 6	0.30%	8.02%	2.38%	**10.69%**
$190.00 to $204.99	Tier 7	0.15%	4.97%	2.67%	**7.80%**
$205.00 to $224.99	Tier 8	0.07%	4.38%	3.79%	**8.24%**
$225.00 to $244.99	Tier 9	0.00%	3.34%	3.42%	**6.76%**
$245.00 to $264.99	Tier 10	0.00%	2.60%	2.60%	**5.20%**
$265.00 to $309.99	Tier 11	0.00%	1.93%	3.34%	**5.27%**
≥ $310.00	Tier 12	0.07%	0.67%	1.78%	**2.52%**
	Total	**8.17%**	**65.33%**	**26.50%**	**100.00%**

	After C-day →	Conversion Rate [0 - 30%)	[30 - 40%)	[40 - 100%)	
Net Sales per Hour		Tier 1	Tier 2	Tier 3	**Total**
≤ $129.99	Tier 1	4.54%	9.67%	0.60%	**14.81%**
$130.00 to $139.99	Tier 2	1.09%	5.63%	0.22%	**6.94%**
$140.00 to $149.99	Tier 3	1.48%	5.41%	0.16%	**7.05%**
$150.00 to $159.99	Tier 4	1.42%	6.12%	0.77%	**8.31%**
$160.00 to $174.99	Tier 5	1.75%	9.73%	1.42%	**12.90%**
$175.00 to $189.99	Tier 6	1.26%	8.80%	1.53%	**11.58%**
$190.00 to $204.99	Tier 7	0.22%	8.31%	1.64%	**10.16%**
$205.00 to $224.99	Tier 8	0.22%	7.81%	1.42%	**9.45%**
$225.00 to $244.99	Tier 9	0.22%	5.52%	1.58%	**7.32%**
$245.00 to $264.99	Tier 10	0.11%	4.04%	1.15%	**5.30%**
$265.00 to $309.99	Tier 11	0.05%	3.61%	1.58%	**5.25%**
≥ $310.00	Tier 12	0.00%	0.71%	0.22%	**0.93%**
	Total	**12.35%**	**75.36%**	**12.30%**	**100.00%**

Notes: This figure presents the percentage of workers in each commission rate bin before C-day (top panel) and after C-day (bottom panel).

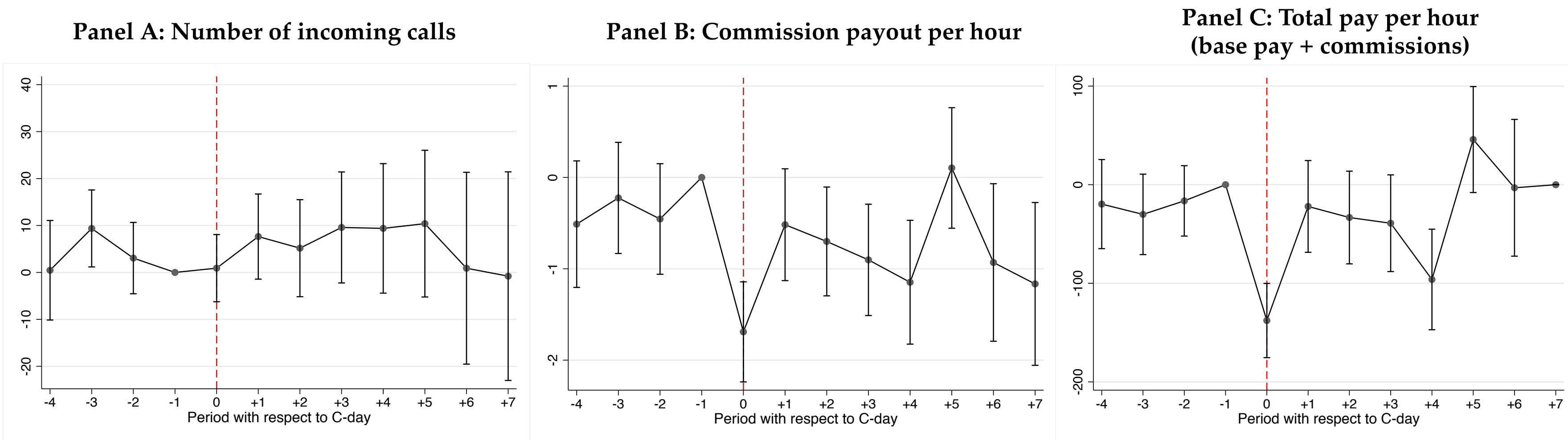
Figure A.2: Distribution of commission payout per hour before and after C-day



Kolmogorov-Smirnov test for equality of distributions: p-value=0.049

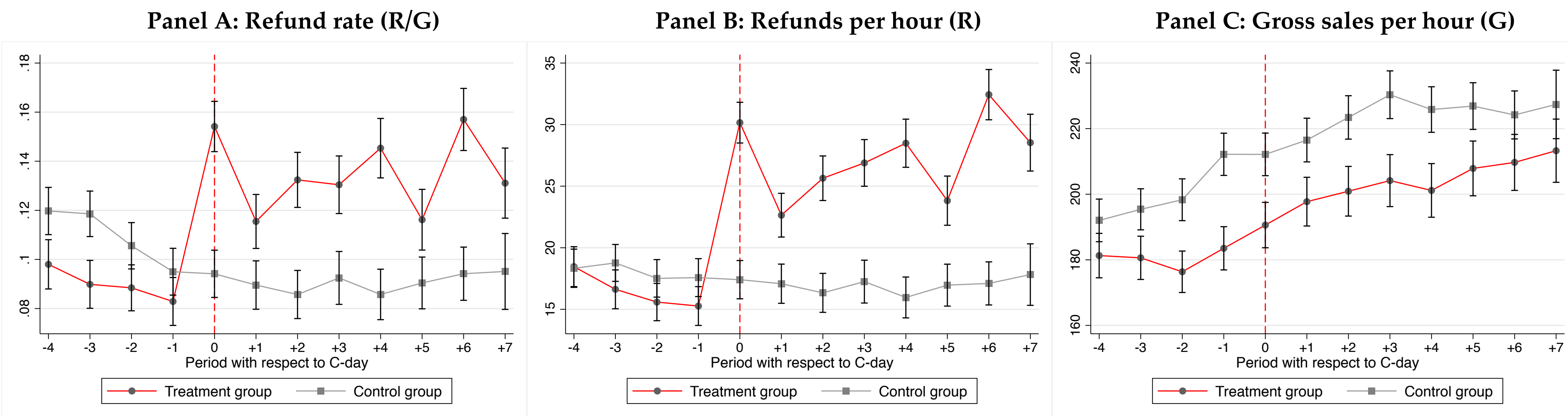
Notes: This figure plots the actual distribution of ``commission payouts per hour worked'' before C-day and the counterfactual distribution after C-day in the treatment group (holding net sales per hour and conversion rate constant at the pre-change level).

Figure A.3: Difference-in-differences estimates over time (Continued)



Notes: This figure presents the difference-in-difference estimates over time. Period 0 = the two weeks following C-day; Period -X = X periods before C-day (where one period= two-weeks). Period +X = X periods after C-day. The plotted coefficients are estimated with a regression of the outcome variable onto the interaction between the time dummies and the treatment dummy indicator (with Period -1 as the excluded category). The regressions control for worker fixed effects, time fixed effects, job-specific time trends and for worker tenure and worker supervisor. The bars represent 95% confidence intervals, based on standard errors clustered at the worker level.

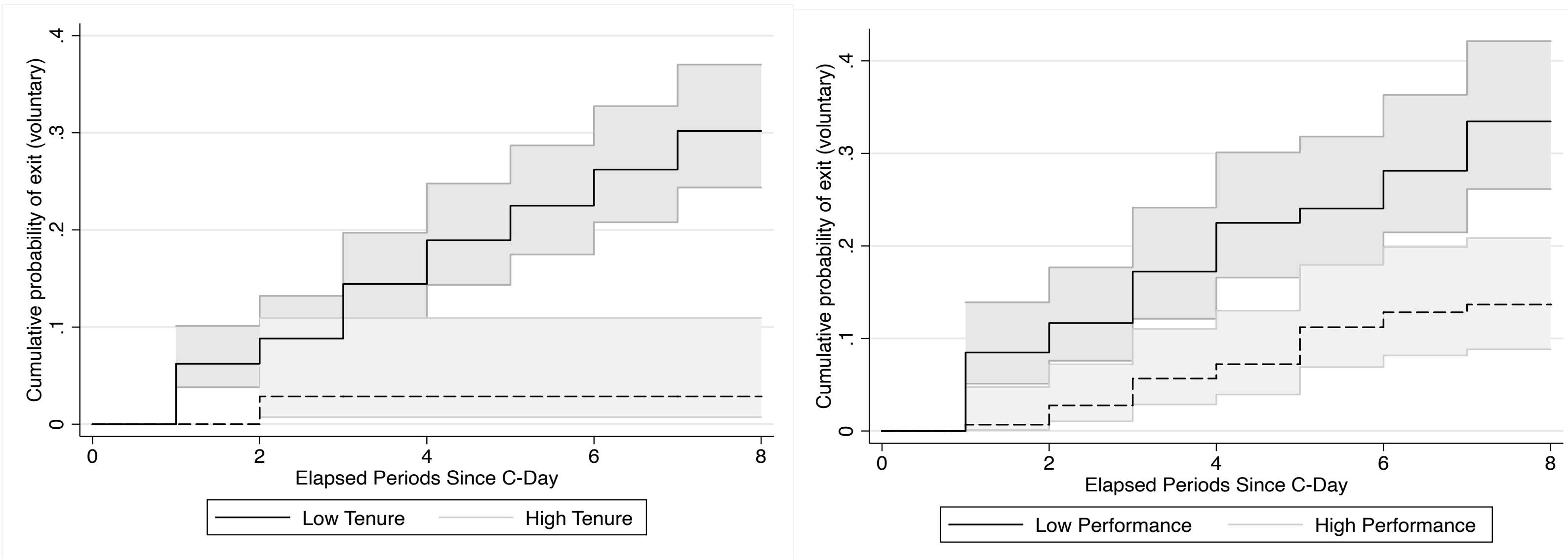
Figure A.4: Evolution of counterproductive practices over time for treatment and control group; Raw data



Notes: This figure presents the evolution of the mean of each variable over time for the treatment and the control group separately using the raw data. The bars represent 95% confidence intervals. Period 0 = the two weeks following C-day; Period -X = X periods before C-day (where one period= two-weeks). Period +X = X periods after C-day.

Figure A.5: Hazard rate of voluntary exit after C-day

Panel A: Tenure **Panel B: Performance**



Notes: We report coefficients and 95% confidence intervals from a survival analysis of voluntary exit. In Panel A, "High tenure"=1 if worker tenure is in the period before C-day is in the top quartile. In Panel B, "High Performance"=1 if the worker's average net sales per hour before C-day is above the median.

Table A.1: Predictors of performance, exit and tenure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Performance		**Exit**				**Tenure**	
Dependent Variable	Conversion rate	Net sales per hour	Voluntary exit		Involuntary exit		Tenure (in years)	High tenure (top quartile)
Lag Performance	0.336***	0.637***						
	(0.045)	(0.025)						
Net sales per hour (in $)			-0.001***		-0.000		0.008***	0.001***
			(0.000)		(0.000)		(0.002)	(0.000)
Gross sales per hour (in $)				-0.010***		-0.002		
				(0.002)		(0.004)		
Refunds per hour (in $)				0.008		-0.032		
				(0.012)		(0.024)		
Number of calls			-0.000	-0.001	-0.000**	-0.004*	-0.000	-0.000
			(0.000)	(0.001)	(0.000)	(0.002)	(0.001)	(0.000)
Age			-0.007***	-0.062***	-0.003***	-0.086***	0.224***	0.017***
			(0.002)	(0.014)	(0.001)	(0.023)	(0.020)	(0.001)
Female			-0.003	-0.031	0.023	0.700	1.297***	0.100***
			(0.022)	(0.195)	(0.014)	(0.455)	(0.289)	(0.029)
Sample	*Treated workers, one obs. per worker-period*		*All workers, one obs. per worker*				*All workers, one obs. per worker-period*	
Observations	2,741	2,743	965	965	965	965	6,864	6,864
R-squared	0.445	0.158					0.348	0.312
Mean Dep.Var.	170.145	0.345	129.534	129.534	31.088	31.088	3.128	0.284

Notes: Col. 1-2 present the estimates from a regression of worker performance in the treatment group (net sales per hour, conversion rate) in period t on worker performance in period t-1. Col. 3-6 present the estimates from a regression of whether the worker ever voluntary or involuntary exited in our data on the average on-the-job performance of that worker up to exit (one observation per worker). Because voluntary and involuntary exit are rare events, we estimate a complementary log-log model and report the marginal effects. This likelihood functioin model assumes extreme value distribution of the errors. Col. 7-8 present the estimates from a regression of worker tenure (in years or an indicator for being in the top quartile) onto worker perfromance measures, age and gender (one observation per worker-period). Standard errors are clustered at the worker level in Col. 1-2 and 7-8. Robust standard errors in Col. 3-6. *** p<0.01, ** p<0.05, * p<0.1.

Table A.2: Robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)
	Counterproductive Practices				**Exit**	
Dependent Variable	Refunds per hour (R)	Gross sales per hour (G)	Refund rate (R/G)	ΔR>0 & ΔG≤0	Voluntary exit	Involuntary exit
Panel A: Main model with re-weighting						
Treated × Post	14.208***	5.337	0.054***	0.135***	0.008	0.006
	(1.539)	(3.452)	(0.010)	(0.039)	(0.014)	(0.006)
Observations	3,804	3,805	3,805	3,337	3,805	3,805
R-squared	0.402	0.728	0.299	0.489	0.027	0.009
Panel B: Main model with standard errors clustered at the team level						
Treated × Post	12.534***	1.451	0.058***	0.092**	0.029*	0.000
	(1.393)	(4.838)	(0.008)	(0.041)	(0.015)	(0.006)
Observations	6,802	6,803	6,803	5,479	6,803	6,803
R-squared	0.513	0.718	0.399	0.476	0.021	0.010
Panel C: Main model with standard errors clustered at the treatment × month level						
Treated × Post	12.534***	1.451	0.058***	0.092*	0.029**	0.000
	(2.100)	(2.383)	(0.014)	(0.046)	(0.010)	(0.002)
Observations	6,802	6,803	6,803	5,479	6,803	6,803
R-squared	0.513	0.718	0.399	0.476	0.021	0.010
Panel D: Main model with balanced sample of workers						
Treated × Post	14.497***	1.177	0.063***	0.103**	.	.
	(1.972)	(3.640)	(0.008)	(0.042)	.	.
Observations	2,673	2,673	2,673	2,440	.	.
R-squared	0.434	0.740	0.366	0.447	.	.
Panel E: Counterproductive practices results without worker fixed effects and exit results with worker fixed effects						
Treated × Post	12.580***	3.253	0.057***	0.088***	0.031**	0.003
	(1.083)	(2.697)	(0.007)	(0.033)	(0.013)	(0.006)
Observations	6,802	6,803	6,803	5,479	6,803	6,803
R-squared	0.308	0.155	0.209	0.043	0.664	0.409

Notes: All regressions across all panels include time fixed effects, job fixed effects, job-specific time-trends and control for worker supervisor and worker tenure. Worker fixed effects are incuded in Panel A-D (col. 1-4) and Panel E (col. 5-6). Standard errors are clustered at the worker level in Panel A, D, E, clustered at the team level in Panel B, and clustered at the treatment × month level in Panel C. In Panel A: the weights are equal to the treatment probability estimated from a logit regression on pre-C-day data. To estimate the treatment probability we follow a propensity-score-matching approach that regresses an indicator for being treated on tenure, age, gender, and the first period level of net sales per hour and number of incoming calls. In Panel D: we restrict the sample to workers who are present throughout the sample period (i.e., neither hired nor terminated during the sample period). *** p<0.01, ** p<0.05, * p<0.1.

Table A.3: Test of pre-trends in counterproductive practices and exit

	(1)	(2)	(3)	(4)	(5)	(6)
	Counterproductive Practices				**Exit**	
Dependent Variable	Refunds per hour (R)	Gross sales per hour (G)	Refund rate (R/G)	$\Delta R>0$ & $\Delta G\leq 0$	Voluntary exit	Involuntary exit
Treated × Trend	0.244	-3.536	0.010	0.035	0.012	0.002
	(0.840)	(3.359)	(0.008)	(0.052)	(0.008)	(0.004)
Observations	2,729	2,730	2,730	1,837	2,730	2,730
R-squared	0.650	0.796	0.546	0.614	0.023	0.011
Mean Dep.Var.	17.270	190.150	0.100	0.199	0.030	0.007

Notes: Sample restricted to periods before C-day only. All regressions include time fixed effects, and control for worker tenure and worker supervisor. Col. 1-4 also control for worker fixed effects. Standard errors are clustered at the worker level. *** p<0.01, ** p<0.05, * p<0.1.

Table A.4: Effect of the pay cut on tiers and commission rate

Dependent Variable	(1) Worker is in low conversion-rate tier 1	(2) Worker is in middle conversion-rate tier 2	(3) Worker is in high conversion-rate tier 3	(4) Conversion-rate tier (1 to 3)	(5) Sales-per-hour tier (1 to 12)	(6) Commission rate
Treated × Post	0.096***	0.071***	-0.167***	-0.263***	-0.498***	-0.004***
	(0.018)	(0.025)	(0.020)	(0.028)	(0.129)	(0.001)
Observations	3,115	3,115	3,115	3,114	3,115	3,115
R-squared	0.390	0.344	0.420	0.456	0.659	0.654
Mean Dep.Var. in Treated × Pre	0.082	0.653	0.265	2.183	5.345	0.026

Notes: This table presents effects on conversion-rate tiers, sales-per-hour tiers, and commission rates. The highest the conversion-rate tier (resp., sales-per-hour tier), the highest the conversion rate (resp., sales per hour; see Figure 1). Sample restricted to SRs (treatment group) only. All regressions report the difference in the dependent variable before and after C-day, controlling for worker fixed effects, worker tenure and worker supervisor. Standard errors are clustered at the worker level. *** p<0.01, ** p<0.05, * p<0.1.

Table A.5: Heterogeneous effects of the pay cut on counterproductive practices and voluntary exit; Extra controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent Variable	Refund rate (R/G)					Voluntary exit				
Treated × Post × Low Tenure	0.082***	0.068***	0.113***	0.079***	0.065***	0.082***	0.080***	0.104**	0.090***	0.040***
	(0.012)	(0.011)	(0.023)	(0.011)	(0.009)	(0.022)	(0.019)	(0.046)	(0.024)	(0.015)
Treated × Post × High Tenure	0.053***	0.036***	0.083***	0.051***	0.020	0.058***	0.052***	0.076	0.082***	0.018
	(0.015)	(0.013)	(0.024)	(0.016)	(0.017)	(0.021)	(0.019)	(0.048)	(0.030)	(0.015)
Controls: *VAR & Treated × Post × VAR*	*VAR = Net sales per hour*	*VAR = Number of calls*	*VAR = Average customer satisf.*	*VAR = Age*	*VAR = Female*	*VAR = Net sales per hour*	*VAR = Number of calls*	*VAR = Average customer satisf.*	*VAR = Age*	*VAR = Female*
Observations	5,915	5,915	5,592	5,915	6,803	5,915	5,915	5,592	5,915	6,803
R-squared	0.396	0.396	0.391	0.396	0.403	0.036	0.038	0.037	0.037	0.023
p-value Treated × Post × (Low - High Tenure) = 0	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*	*0.001*	*0.000*	*0.000*	*0.406*	*0.006*

Notes: The table presents heterogeneous effects by tenure controlling one-by-one for the following controls (all measured in the period before C-day) and their interaction with Treated × Post: net sales per hour, number of calls, average customer satisfaction, age and gender. All regressions include time fixed effects, job-specific time trends and control for worker tenure and worker supervisor. Col. 1-5 also include worker fixed effects. Standard errors are clustered at the worker level. "Tenure" is estimated in the period before C-day, and is divided in two groups: in the top quartile (high tenure) and in the first three quartiles (low tenure). *** p<0.01, ** p<0.05, * p<0.1.

Table A.6: Heterogeneous effects of the pay cut on counterproductive practices and voluntary exit; Robustness checks

	(1)	(2)	(3)	(4)	(5)
Dependent Variable	Average sale size	Refund rate (R/G)	Voluntary exit	Refund rate (R/G)	Voluntary exit
Post × Low Impact	-0.109				
	(0.540)				
Post × High Impact	-0.603				
	(0.601)				
Treated × Post × Quartile 1 of Tenure [≤ 0.3 yrs]		0.098***	0.047***		
		(0.008)	(0.017)		
Treated × Post × Quartile 2 of Tenure [> 0.3 yrs & ≤ 0.7 yrs]		0.050***	0.020		
		(0.009)	(0.013)		
Treated × Post × Quartile 3 of Tenure [> 0.7 yrs & ≤ 2.4 yrs]		0.045***	0.014		
		(0.011)	(0.015)		
Treated × Post × Quartile 4 of Tenure [> 2.4 yrs]		0.018	0.004		
		(0.012)	(0.012)		
Treated × Post × Quartile 1 of Performance [≤ $128]				0.064***	0.043**
				(0.011)	(0.017)
Treated × Post × Quartile 2 of Performance [> $128 & ≤ $159]				0.073***	0.032**
				(0.009)	(0.016)
Treated × Post × Quartile 3 of Performance [> $159 & ≤ $201]				0.055***	0.016
				(0.009)	(0.013)
Treated × Post × Quartile 4 of Performance [> $201]				0.040***	0.010
				(0.011)	(0.012)
Sample	Treated	All	All	All	All
Observations	3,108	6,803	6,803	6,803	6,803
R-squared	0.316	0.406	0.023	0.400	0.023
Mean Dep.Var.	34.43	0.106	0.027	0.106	0.027
p-value Post × (Low - High) = 0	*0.534*				
p-value Treated × Post × (Quartile 1 - Quartile 4) = 0		*<0.001*	*0.003*	*0.086*	*0.008*

Notes: The table presents heterogeneous effects of the pay cut. Col. 1 is restricted to the sample of treated worker only and controls for time fixed effects, worker fixed effect, time trends for high and low impact workers, worker tenure and worker supervisor. Regressions in col. 2-4 is are estimated on the full sample of workers and control for time fixed effects, job-specific time trends, worker tenure and worker supervisor. Col. 1 and 3 also control for worker fixed effects. Standard errors are clustered at the worker level in all regressions. *** p<0.01, ** p<0.05, * p<0.1.