DISCUSSION PAPER SERIES

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ABSTRACT

Does Performance Pay Deter Job Quits?

We use US longitudinal survey data to examine the role of performance pay (other than profit sharing) in worker quit decisions. We argue that performance pay should increasingly be viewed as an indicator of an internal labor market rather than of a simple contemporaneous incentive. Suggestive of this claim, we find that in ever more complete specifications that account for worker and employer characteristics, aggregate earnings and worker job satisfaction, performance pay is associated with a reduced probability of worker quits. This remains when including worker fixed effects that control for unmeasured invariant heterogeneity. We investigate how it varies with the type of performance pay and its intensity. We confirm heterogeneity in this influence by workplace size.

JEL Classification:	J33, J41, J63
Keywords:	voluntary quits, internal labor markets, performance pay

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1. Introduction

We examine the influence of performance pay on worker job quits. Theoretically, the direction of this influence is unclear. We argue that after accounting for the likelihood that performance pay influences both pay and job satisfaction (Parent 1988, Lazear 2000, Green and Heywood 2008, Cornelissen et al. 2011), the issue turns on whether performance pay represents contemporaneous compensation designed as a short-term incentive (such as with historical piece rates) or plays a role in internal labor markets with its associated backloaded compensation. The former suggests that performance pay should be associated with increased quits while the latter suggests it should be associated with decreased quits.

We review a series of theoretical rationales for why performance pay should increasingly be thought of as part of internal labor markets and why it could therefore reduce worker quits. Using longitudinal survey data from the US, we provide progressively more complete specifications ultimately controlling for worker and employer characteristics, aggregate earnings, hours and worker job satisfaction. Through these estimates performance pay (not including profit sharing) is associated with a reduced probability of worker quits. Moreover, individual worker fixed effect estimates do not change this empirical regularity.

In what follows, the next section discusses the reasons for anticipating that performance pay may indicate longer expected employment and reduced odds of quitting. We note past evidence that performance pay is associated with greater earnings and job satisfaction and stress the importance of controlling for these variables in examining a remaining role for performance pay. The third section isolates the data and our approach to estimating the relationship between performance pay and quitting. The fourth section presents results. In addition to examining performance pay in general, we disaggregate different types of performance pay. We also

examine different intensities of performance pay (the share of earnings at risk). These examinations continue to support a robust role for performance pay. A final examination tests for heterogeneity by establishment size. We find that performance pay plays a far stronger role in reducing quits in small establishments. We hypothesize that this could reflect the greater set of internal labor market tools (promotions, better matches, more believable backloading) associated with larger establishments. The final section draws conclusions and suggests further research.

2. Setting the Stage

Influenced by the study of piece rates, performance pay has often been perceived as contemporaneous compensation designed to motivate workers with shorter job tenures. Thus, Goldin (1994) sees piece rates as an alternative to backloaded compensation. She argues that women have shorter expected tenure and, consequently, cannot be well motivated by deferred compensation schemes of the sort explored by Lazear (1979, 1983) and so are "naturally" sorted into piece rate schemes. In this view, performance pay and longer-term employment are alternatives. Yet, the labor market experiences of men and women are becoming more similar, and the prevalence of piece rates has declined dramatically in developed countries (Hart 2016). Indeed, the growth in performance pay use has been in forms other than piece rates such as bonuses and commissions and it has moved away from lower paid jobs and toward higher paid jobs (Lemieux et al. 2009, Gittleman and Pierce 2013). Indeed, women with their still somewhat shorter expected tenure are less common among those receiving bonuses and commissions (Geddes and Heywood 2003) suggesting they are used differently than piece rates.

This all raises the possibility that performance pay should not be seen simply as contemporaneous compensation in short-term jobs and may often be integral to longer tenure and internal labor markets. There exist several lines of thought in support of this possibility. First,

performance pay is more flexible than straight wages. Bonuses and commissions are raised and lowered frequently at the micro level (Grigsby et al., 2021) and are typically, but not always, found to be highly procyclical (Bils, 1985; Devereux, 2001; Shin and Solon, 2007; Swanson, 2007). Earnings across even very broad measures of individual performance pay jobs are found to be procyclical while earnings for fixed wage jobs are not (Gittleman and Makridis 2022).[1]

Consequently, these forms of performance pay mimic the well-known consequence of profit sharing. They reduce both quits and layoffs (Weitzman 1984, Azfar and Danninger 2001, Green and Heywood 2010). Indeed, Blakemore et al. (1987) confirm that in the US the receipt of bonuses, conditional on total earnings, is associated with reduced voluntary separations. Ekinci (2019) uses personnel records showing that bonus receipt and size reduce worker turnover also conditional on earnings. Lemieux et al. (2012) confirm similar underlying logic by showing that hours of total employment vary less for workers who earn bonuses than for those on a fixed wage contract. In this way, the contingent and variable nature of performance pay should be associated with longer tenure because of reduced layoffs in bad times and reduced quits in good times.

Second, specific types of performance pay may directly reward long term commitment to the firm reducing turnover. These range from explicit "retention bonuses" (Swain et al. 2019) to performance pay awarded for specific skill acquisition. Gutherie (2000) shows that the latter "skill-based pay systems" routinely reduce quits. They also include stock options that often provide greater rewards to employees with greater tenure with the firm and so can represent a form of backloading (Brandes et al. 2003, Balsam et al. 2007, Aldatmaz et al. 2018).

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[1] Using the National Compensation Study, the authors identify a performance pay job as one where pay is tied, at least in part, to commissions, piece rates, production bonuses, other incentives based on production or sales or the job has a non-production bonus.

Third, performance pay has increasingly been thought of as a component of a broader set of human resource management (HRM) practices. Researchers identify "high commitment" (or high performance) HRM strategies as involving performance appraisals, contingent rewards (performance pay), investment in worker skills and greater opportunities for worker participation (Arthur 1994; Huselid 1995; Becker and Gerhard 1996). This cluster of practices has been shown to increase worker productivity and reduce quits (Arthur, 1994, MacDuffie, J. P. 1995, Bae and Lawler 2000, Gutherie 2001). The chosen personnel practices are typically seen as complementary. They go together to make investments in specific human capital more valuable as they increase expected tenure. The sharing of returns on specific human capital adds to the reduced incentive to quit. Yet, Fairris (2004) shows that more is at work than just greater specific human capital. He identifies a separate role for personnel policies (appraisals, payment structure, promotions and so on) that causes an internal labor market to reduce quits beyond that associated with specific human capital alone.

Pohlan and Steffes (2025) focus specifically on performance appraisals, a typical first step in the determination of many forms of performance pay. They emphasize the developmental role of performance appraisal (Brown and Heywood 2005) arguing that it provides information on performance reducing asymmetric information about a worker's career prospects. It also provides information about how better job matches within the firm might be achieved. It can also provide support and suggest training as part of worker development. The provision of this information fosters successful internal labor markets. In this way performance appraisals and the resulting actions including performance pay help create long-term trajectories for workers. Indeed, using matched data, Pohlan and Steffes show that workers within firms (largely lower

paid workers) substantially decrease their turnover intentions following the implementation of performance appraisals at their firm.

Ekinci (2019) focuses on the information associated with a bonus per se. Bonuses serve as a communication device regarding match quality between the firm and the worker (Fuchs 2015). The bonus credibly communicates private information to the worker and, when positive, revises upward worker belief about match quality. This, in turn, increases effort provision. Thus, the bonus plays a critical role in the internal labor market. Ekinci shows that bonuses are associated with a larger eventual increase in earnings and with a higher chance of promotion. As would be anticipated, they also reduce the odds of turnover conditional on wages. Again, the bonus is an indicator of backloaded compensation and an internal labor market.

It might be argued that bonuses could be seen as part of an internal labor market but that other forms of performance pay have more in common with the traditional view of piece rates as short-term motivation. Yet, increased emphasis on performance support policies within the firm argue this need not be so (Castilla 20008, 2012, Elvira and Town 2001, Madden and Vekker 2017). In this view management rewards performance by altering the context within which a given worker interacts with performance pay. Thus, to reward success a sales worker is given a "better sales territory" and if earning tips, is given a better section or shift. Madden (2012) examined stockbrokers paid commissions and found wide variations in performance support within a firm including support staff, office space and amenities and referrals from higher management. If used by management to reward performance over time, these support policies help create an internal labor market and could reduce quits.[2]

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[2] Maden and Vekker (2017) emphasize the role of "performance support bias" (Castilla 2008). The idea that in addition to rewarding performance, support policies may reflect racial bias and result in lower earnings for African Americans even when the explicit commission rate is held constant.

Yet, despite these rationales and their associated empirical results, we emphasize that the evidence is not monolithic. O'Halloran (2012) used US survey data to explore the influence of performance pay on turnover. While profit sharing routinely reduced the probability of turnover, other forms of performance pay present a contrasting pattern. Bonuses and stock options initially appeared to reduce turnover, but this vanished after controlling for earnings and job satisfaction. As O'Halloran argues, this suggests that any influence of performance pay (other than profit sharing) on turnover works through higher earnings and influencing job satisfaction. This causation is far different from the previous arguments that performance pay such as bonuses plays an independent role as an indicator of internal labor markets and its backloaded compensation.[3]

Performance pay is associated with higher earnings. This reflects both the reward to an effort response and sorting of more productive workers into performance pay (Parent 1998, Lazear 2000, Cadsby et al. 2007, Heywood et al. 2011). Thus, a worker leaving a performance pay job will have neither the return on an effort response nor the return for higher inherent ability. Higher earnings relative to alternatives tend to reduce quits (Pencavel 1972, Bloch 1979, Farris 2007, Pfeifer and Schneck 2012). Thus, to the extent that performance pay increases earnings (by either means), it should reduce quits. Thus, in testing for a robust association between performance pay and quits we will control for both earnings and earnings determinants.

Similarly, performance pay has often, but not always, been associated with greater job satisfaction (Green and Heywood 2007, Cornelissen et al. 2011, Ledic 2018, Kruse 1992).[4] This

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[3] Similarly, Bertheau (2021) finds that establishments offering variable pay are no more or less likely to search for internal candidates.

[4] We stress that this finding does not mean that each characteristic of performance pay jobs is better. Bender and Theodossiou (2014) show performance pay jobs are detrimental for overall health. Allan et al. (2021) and Baktash et al. (2022) show performance pay jobs entail greater stress, all else equal. Artz and Heywood (2016) show performance pay jobs that reward output are associated with greater rates of injury and Artz et al. (2021) show that performance pay jobs are associated with greater use of drugs and alcohol.

may reflect a greater ability of workers to optimize effort and earnings and so maximize their net benefit. In addition, workers may also directly value the stronger link between compensation and effort implied by performance pay.[5] Thus, Brown and Sessions (2003) argue that workers prefer employment environments seen as rewarding their productivity, and that such environments increase worker optimism about future employment. It also remains the case that performance pay may be part of a bundle of high commitment practices valued by workers. Goddard (2001) and Bauer (2004) present evidence on the strong association between job satisfaction and high commitment workplaces.

Again, the potential association between performance pay and job satisfaction is crucial as higher job satisfaction is also associated with reduced quits (Clark 2001, Bockerman and Ilmakunnas 2007, Levy-Garboua, et al. 2007, Cornelissen 2009). As Artz and Heywood (2023) make clear, the full value of any job consists not only of its earnings, but of the sum of all the negative and positive on-the-job characteristics consumed on the job. Measures of job satisfaction attempt to capture the sum of these characteristics and thus come closer to the "full compensation" of a job. It is this full compensation that would be used in any comparison of leaving or staying. Consequently, our estimates will ultimately control for job satisfaction as we examine the role of performance pay.[6]

We also exploit the longitudinal data to control for worker fixed effects. This holds constant unmeasured worker heterogeneity that is time invariant and correlated with quitting. As an example, risk tolerant workers sort into performance pay (Curme and Stefanec 2007; Grund and Sliwka 2010; Cornellissen et al. 2011). This naturally follows as performance pay is

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[5] Workers may also reduce quits if performance pay leads to greater identification with the firm (Kruse 1992).
[6] Jones et al (2021) examine the role of performance pay on job separation without a control for job satisfaction. They find that individual performance pay reduces the risk of separation for blue collar workers suggest this reflects increased job satisfaction

designed, in part, to shift risk to workers. Yet, risk tolerant workers are also more likely to voluntarily quit a job (van Huizen and Alessie 2019, Allen, et al. 2007). Thus, sorting on risk could generate upward bias in naïve estimates of the influence of performance pay on quits. To the extent that risk tolerance is an inherent worker characteristic, fixed effects estimates eliminate this bias.

We demonstrate a robust negative relationship between performance pay and worker quits that persists while controlling for wages, job satisfaction and worker fixed effects. We follow this with an examination of the heterogeneity in this association. We are interested in the potential role that establishment size plays.

Larger establishments typically have longer hierarchies with more promotion opportunities and with the ability to better match worker and job specific skills (Green et al.2021). Similarly, de Vera and Garcia-Brazales (2024) emphasize that large establishments provide greater opportunity to be moved into jobs involving non-routine analytical tasks even within narrowly defined occupations. Bertheau (2021) confirms that larger establishments are more likely to search internally for job candidates.[7] Indeed, larger size and the associated need for more specific skills is often identified as a primary cause of internal labor markets (Fairis 2007). Moreover, large size may be associated with increased establishment longevity making promises of backloading more believable (Lazear 1995). We anticipate that given that the characteristics of internal markets are more likely in larger establishments, performance pay may play a less important role in reducing quits in larger establishments. We note that while Jones et al. (2021) do not control for job satisfaction, they found individual performance pay had a larger influence in reducing quits among blue-collar workers in smaller rather than larger establishments. We

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[7] A variation on this is presented by DeVaro and Morita (2013) who show in UK data that internal promotion is associated with the number of workers per manager.

examine a broader set of performance pay types, a less restrictive sample and control for job satisfaction which allows us to more narrowly focus on likely characteristics of the internal labor markets.

3. Data and Empirical Approach

We draw our data from the 1997 National Longitudinal Survey of Youth (NLSY). The NLSY contains information on payment methods, hours of work, earnings, job satisfaction and a strong variety of controls related to a worker's primary job. The NLSY follows a single cohort and began interviewing in 1997 when all respondents were in their late teenage years. Our working sample consists of annual waves of data between years 1997 and 2011, and then biennially collected waves from 2013 to 2021.

The survey allows us to control for demographic variables such as gender, race, age, education, region of residence, marital status, and the number of children in the household. We also control for job characteristics such as length of tenure with the employer, union membership, public sector employment, and industry and occupation categories using the 2002 Census of Industrial and Occupational Classification Codes.

The NLSY identifies five forms of performance pay: tips, commissions, bonuses, incentive pay (including piece rates), and a small 'other' category. It is not made clear whether these are individual or group oriented, nor whether the bonuses are objectively set (by formula) or determined by the subjective judgment of a supervisor. Profit sharing, however, is clearly excluded from this measure. We initially combine all five types into one measure of performance pay but also examine heterogeneity across the measures. Nearly 24% of respondent year

observations report receiving at least one type of performance pay and we note that the types are not mutually exclusive.

We develop the quit measure by leveraging questions asked of respondents in each NLSY wave identifying first if they have recently left their primary job. If yes, they are asked "What is the main reason you left [employer name]?" and they choose between involuntary or voluntary reasons. Involuntary reasons include a layoff, workplace closure, seasonal or temporary job end, or being fired. Reasons for voluntarily quitting include family reasons, to take or look for another job, to return to school, for health reasons or due to dissatisfaction with the job. We treat the quit variable as a dummy equal to one if the respondent chose a voluntary reason and zero otherwise. This places those who left involuntarily as part of the comparison group. This seems reasonable as we wish to focus on the quits, but as we will show, it does not meaningfully change results if we simply exclude those who left involuntarily. As reported in Table 1, approximately 9.5% of respondent observations report a voluntary quit.

This indicator of a voluntary quit becomes the dependent variable in a linear probability model.[8] The focus is on the coefficient of the performance pay variable as we include an increasing set of control variables typically recognized in the literature to be correlated with quit behavior. These include demographic characteristics such as sex, race, age, and education as well as household characteristics like marital status and whether respondents have children. For instance, women and those with children are typically more likely to voluntarily leave jobs whereas more educated individuals are less likely to leave their jobs (Artz, 2023; Weiss, 1984). We also control for job and workplace characteristics that theoretically influence the likelihood of quits. High tenure with an employer is associated with a lower likelihood of quitting (Blau

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[8] We also estimate logit variations with little or no change in the results.

and Kahn, 1981), and so is working for the government (Ippolito, 1987), being a union member (Freeman and Medoff, 1984), or earning high wages (Viscus, 1979). Finally, we control for 21 occupation and 15 industry groups based on the 2002 Census Industrial and Occupational Classification Codes, as well as 4 geographic regions defined by the US Census Bureau. Table 1 reports the variable definitions, means, and standard deviations of all controls. Half of respondents are men, more than 20% are Black, 24% have college degrees, nearly 27% are married, and the average age is 26 years. The average hourly wage is $17.29 in nominal dollars, and the respondents work nearly 37 hours per week on average at their primary jobs. These descriptive statistics reflect the relatively young sample of respondents in the 1997 NLSY waves (1997 – 2021).

We start with a pooled cross-section of all worker observations after excluding the self-employed. We build up to a more complete estimation. In all estimates we cluster standard errors at the individual level to help assure unbiased measures of statistical significance generated by multiple observations on the same individual. Next, we present the same build up also controlling for individual fixed effects. These can be important to remove correlated but time invariant heterogeneity such as inherent differences in risk tolerance that could influence both quits and receiving performance pay. Controlling for fixed effects modestly reduces the ultimate magnitude but not the direction or significance of the coefficient on performance pay.

We then explore a variety of robustness checks. First, we break down the aggregate performance pay indicator to its five constituent variations. Second, we replace the aggregate measure with measures of the intensity of performance pay (the share of earnings at risk). Third, we use logit and conditional logit instead of our linear odds estimates. Fourth, we change the comparison group for the quits to be those who remain at their firm rather than the sum of those

who remain and those who left for nonvoluntary reasons. Finally, we change the earnings control to be a measure of relative earnings. While providing more information and nuance, these checks do not change the fundamental results.

We go on to cut our results by establishment size. This reflects our hypothesis that larger establishments had more access to alternative ways of reducing quits. The descriptive statistics suggest this. The use of performance pay is virtually identical between smaller and larger establishments (23.6 percent vs. 24.3 percent). Yet, quitting is concentrated among workers in smaller establishments (11.7 percent vs. 6.8 percent). The issue is whether performance pay is associated with quit rates differently by establishment size.

4. Results

In this section we first present initial results consisting of the pooled cross-section and individual fixed effects regressions. We then explore a variety of robustness tests that change variable definitions and specifications. Finally, we explore heterogeneity in the results by establishment size.

4.1 Initial Results

The first column of Table 2 presents a very parsimonious estimation controlling only for basic worker characteristics and for the waves of the study. It suggests that males, white workers and older workers are less likely to quit largely in line with earlier evidence (Blau and Kahn 1981, Weiss 1984, Zax 1989). Performance pay is shown to be associated with a statistically significant 1.3 percentage point reduction in the probability of quitting. This is a 14 percent reduction on the mean quit rate.

The second column adds regional dummies, indicators of completed education, marital status and the number of children in the household. These additional controls do not materially change the size of the association with performance pay. The third column adds industry and occupation controls. It also adds controls for union membership, for public sector employment, for tenure and for establishment size. The sum of these controls significantly adds to the explanatory power and causes the coefficient on performance pay to increase to 1.8 percent points. The fourth column adds earnings and hours of work while the fifth column also adds the measure of job satisfaction. As anticipated, additional earnings are associated with reduced quits and additional hours are associated with increased quits. Finally, as routinely found, increased job satisfaction (the measure of net benefits from the job) decreases quits. Despite the importance of these variables, the role of performance pay in the final column remains robust and associated with a 1.5 percentage point reduction in worker quit probability. This represents a sizeable 16 percent reduction on the mean quit rate.

Despite a reasonably long set of controls, individual heterogeneity may bias the results from the pooled cross-section. Again, as an illustration, risk tolerance is likely associated with both performance pay and quitting generating upward bias. This may be partially captured in the worker's reported satisfaction but accounting for individual fixed effect is warranted. The resulting estimates examine the influence of a change in performance pay status on the change in quit status within workers. Thus, assessing whether a given worker is less likely to quit in the period following a move to a performance pay job. If the confounding variable, such as risk tolerance, is constant over this change, its role is differenced out.

Table 3 presents a build-up of controls analogous to that in Table 2 but for individual-fixed effect estimates. The attenuated role of individual performance pay in the fixed-effect

estimates suggests some heterogeneity. The extent of the attenuation is, however, much more evident in the parsimonious estimates. In the final estimate that includes hours, earnings and job satisfaction, the point estimate indicates that performance pay remains associated with a reduction in quitting of 1.2 percentage points. This represents a still large 13 percent reduction on the mean quit rate.

While these initial results suggest a consistent role for performance pay, we now explore a variety of robustness examinations to both develop more confidence and provide greater detail.

4.1 Robustness

As a first robustness check, we alter the independent performance pay variable to reflect its underlying variety. Thus, instead of a single indicator of whether any type of performance pay is received, we identify each type received: commissions, bonuses, tips, incentive pay and other. The results of this alternative are shown in the first two columns of Table 4. Of the four meaningful categories, only incentive pay is not a statistically significant determinate of quitting. Thus, those receiving commissions, those receiving bonuses, and those receiving tips are all less likely to quit conditional on the controls. Again, the attenuation between the pooled cross-section and the fixed effects is modest and limited to bonuses. This helps support the suggestion that performance pay other than piece rates may indicate the presence of internal labor markets and long association with an employer.

Second, we replace the dichotomous indicator of performance pay with our rough measure of its intensity. This measures the share of earnings from performance pay as a percentage of all earnings. We create three ranges, 0 to just below 10 percent, 10 percent to just below 25 percent, and 25 percent or more. Each worker who received performance pay is

identified in one of these categories generating three dichotomous variables. The results are shown in columns three and four of Table 4. All three coefficients take negative signs suggesting a reduction in quitting with two of the three coefficients significantly different from zero. According to the fixed effect estimates, those in the lowest intensity are 1.1 percentage points less likely to quit and those in the highest intensity are 1.5 percentage points less likely to quit. Attenuation with the fixed effect remains modest but evident. The reason for the small but negative coefficient in the middle intensity is unclear. It might reflect a variation in the types of performance pay across intensity. The proportion earning incentive pay, such as piece rates, is largest in the middle intensity. Nonetheless, the size and significance of the higher and lower intensities remain supportive.

Next, we altered the sample modestly to compare those quitting to an alternative group. Instead of that alternative being the sum of those who separate involuntarily and those who remain with their employer, we include just those who remain with their employer. This results in a modest loss of sample size, and we have no strong *a priori* reason to favor this comparison. Yet, as a check, Appendix Table 1 repeats the critical estimates with this alternative definition of the dependent variable. Showing only the fixed-effect estimates, the first column indicates those on performance pay are 1.4 percentage points less likely to quit. The second column disaggregates the types of performance pay again revealing that only incentive pay is not associated with a reduced probability of quitting. The third column again reveals that all intensities take a negative sign but that just the lowest and highest are statistically significant. Interesting, the size of highest intensity is larger in this specification at 1.8 percentage points or almost one-fifth the size of the mean quit rate.

While providing more detail, these robustness checks largely serve to reinforce the pattern of initial results. We recognize that with a dichotomous dependent variable heteroskedasticity and predictions outside the zero one range are possible with a linear probability model. Consequently, we estimated the pooled cross section regressions using logit. and the fixed effect regression using conditional logit.[9] These estimates are available from the authors, but the magnitudes are virtually identical, and the patterns of statistical significance are identical. The choice of a linear probability model presents easily understood coefficients and does not influence the results.

Another concern is that the earnings control we use might not be correct. The critical measure may be the relative wage. This measure is developed by comparing a worker's current earnings to those of others. Ideally, this other wage might be at a representative outside job offer but it has been proxied either relative to others in the workplace (Pfeifer and Schneck 2012) or relative to a predicted market wage (Clark and Oswald 1996). As we do not have linked employer data, we examined the latter. The relative wage is the difference between the workers actual wage and that predicted with a standard set of worker and firm controls. After including the log relative wage rather than the log actual wage in the Table 3 column 5 estimation, the coefficient on performance pay remains unchanged in sign and significance, and only very slightly attenuates in size from -0.012 to -0.011.

4.2 Heterogeneity by Establishment Size

We explore a possible source of heterogeneity in the role we have found for performance pay. Larger establishments will more easily provide internal labor markets using tools other than

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[9] Logit is chosen as the conditional logit controls for time-invariant heterogeneity and does not suffer from the incidental parameter issue common in nonlinear fixed effect estimates (Long 1997).

performance pay. As mentioned, these larger establishments likely have greater ability to use promotions, make better worker-job matches over time and provide more believable backloading. This could make the use of performance pay as part of an internal labor market less relevant.

Table 5 explores whether the relationship between performance pay and quits differs according to establishment size. Columns 1 and 2 present fixed effect estimates of sub-samples separated by establishment size. Column 1 shows the worker fixed effect estimation on all observations in workplaces with at least 40 employees and column 2 shows the estimation on all observations in workplaces with fewer than 40 employees. While performance pay is negatively related to quits in both sub-samples, the measured association is a full percentage point larger in small establishments and achieves a higher significance level. While performance pay is associated with reduced quits regardless of establishment size, the influence in small establishments is almost three times larger.

Columns 3 and 4 combine the entire sample and examine heterogeneity by including interactions of performance pay with the large size dummy variable. Fixed-effect tests on the combined sample may better capture the within worker influence of changing workplace size that in the earlier estimates resulted in workers changing between subsamples. In column 3 the interaction variable is the only newly introduced variable to the specification in column 3 of Table 5. Those in larger establishments are significantly less likely to quit. Importantly, the coefficient on performance pay remains negative and the interaction is significantly positive. This confirms that performance pay is associated with a larger decline in the probability of quits in smaller establishments. The point estimates are very similar to those that emerge in the split sample estimates.

Yet, allowing all the coefficients to vary with establishment size remains important. Differences between large and small establishments in characteristics such as education, occupation and others may correlate with both quits and performance pay biasing the coefficient estimated in column 3. Thus, in column 4 we retain the combined sample but interact every control with establishment size. This full interaction model attenuates the negative effect that big establishments alone have on quit behavior and removes the statistical significance found in column 3. Importantly, performance pay's differential effect on quits between big and small workplaces remains unchanged. There is a small reduction in quits associated with performance pay in large establishments and still a much larger reduction in small establishments.

5. Conclusions

This exploration was motivated by a seeming evolution in the way performance pay (other than profit sharing) has been both used and perceived. Analogous to piece rates, they were once viewed as contemporaneous incentives associated with shorter-term jobs. Yet, the strategic and long-term use of performance pay has received increasing attention.

We estimate the role of performance pay in worker quits. We suspect that after correcting for relevant controls, if performance pay is a feature of internal labor markets, it will be associated with reduced quits. We confirm a generally robust role as the broad indicator of performance pay is associated with double digit percentage declines in the quit probability. This persists in the most complete specification and in estimates holding constant worker fixed effects. This supports the notion that performance pay is not, in general, associated with short term employment and may increasingly play a role in internal labor markets.

We emphasize heterogeneity across types of performance pay with our "incentive payments" not behaving as do the others and not reducing quits. We also emphasize that the magnitude of the reduction in quits is routinely larger for small establishments. We conjecture that this may reflect the smaller range of strategic tools available to backload compensation and create an internal labor market in small establishments and so the larger relative importance of performance pay.

Future work might explore whether the relationship we have identified can be found in other countries and for other cohorts. It would also be fascinating to see whether differences in influence exist between performance pay known to be determined by a subjective performance evaluation and those determined by formula. As we have suggested, there are reasons to both believe this is an important distinction and to think it is not (recall the managerial latitude in determining sales territories and support). Unfortunately, our data does not allow us to explicitly make this distinction. Finally, while quits have been a routine focus in thinking about indicators of internal labor markets, other indicators could be examined. An age representative sample, unlike our cohort sample, might explore whether performance pay is associated with longer job or employer tenure.

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Table 1: Descriptive statistics

Variable definitions	Mean (St. Dev.)
Voluntary quit: = 1 if respondent voluntarily quit primary job for any reason; 0 if respondent remained at job or involuntarily lost their job	0.094 (0.296)
Performance pay: = 1 if respondent earned compensation from any form of performance pay; 0 otherwise[a]	0.238 (0.426)
Tips – Tips are money given by clients or customers in addition to an individual's usual compensation, usually for outstanding performance and service: = 1 if received, 0 otherwise.	0.073 (0.260)
Commission – A commission is an amount or percentage of money that is given in addition to one's regular salary. In some jobs, usually sales, the base pay could be quite low and then much or most of a person's earnings could be in the form of commissions: = 1 if received, 0 otherwise.	0.038 (0.190)
Bonus – A bonus is a sum of money or an equivalent (stocks, company shares) which is given in addition to an individual's usual compensation usually for outstanding performance and service: = 1 if receive, 0 otherwise.	0.129 (0.335)
Incentive pay – In some jobs, employees receive extra money or other forms of compensation for reaching or exceeding certain levels of performance, such as meeting established production quotas: = 1 if received, 0 otherwise.	0.031 (0.174)
Other compensation – Usually non-monetary compensation that need not be tied to performance. This includes room and board, stock or stock options not tied to service or performance, personal use of company cars, free meals, etc.: = 1 if received, 0 otherwise.	0.005 (0.073)
Low performance pay share: = 1 if performance pay is received but comprises less than 10% of the total hourly wage; 0 otherwise.	0.068 (0.252)
Medium performance pay share: = 1 if performance pay comprises between 10% and 25% of the total hourly wage; 0 otherwise.	0.053 (0.225)
High performance pay share: = 1 if performance pay comprises more than 25% of the total hourly wage; 0 otherwise	0.113 (0.316)
Male: = 1 if respondent is male; 0 otherwise.	0.501 (0.500)
Black: = 1 if respondent is Black; 0 otherwise.	0.229 (0.420)
Hispanic: = 1 if respondent is Hispanic; 0 otherwise.	0.213 (0.410)
Age: age of respondent in years	26.122 (6.364)
Age squared / 100: square of respondent age divided by 100.	7.228 (3.540)
High school degree: = 1 if respondent completed between 12 and 15 years of education; 0 otherwise.	0.543 (0.498)
College degree: = 1 if completed at least 16 years of education; 0 otherwise.	0.238 (0.426)
Married: = 1 if respondent is married; 0 otherwise.	0.265 (0.441)
Children: = the number of household members under age 18.	1.004

	(1.215)
Tenure: = the number of weeks respondent has worked at primary job.	157.746
	(173.568)
Tenure squared / 100: = the square of the number of weeks respondent as worked at primary job, divided by 100.	550.090
	(1310.561)
Public sector: = 1 if respondent's employer is a government entity; 0 otherwise.	0.108
	(0.311)
Big workplace: = 1 if the number of employees at respondent's workplace is greater than or equal to 40; 0 otherwise.	0.476
	(0.499)
Union member: = 1 if respondent is covered by a union or employee association; 0 otherwise.	0.118
	(0.322)
Hourly wage: = the respondent's computed total hourly rate of pay from all sources in nominal dollars.	17.294
	(17.098)
Weekly work hours: = regular weekly hours worked, including overtime hours.	36.659
	(14.675)
Job satisfaction – how the respondent best describes how they feel about their job: = 1 if dislike it very much, = 2 if dislike it somewhat, = 3 if think it is ok, = 4 if like it fairly well, = 5 if like it very much	3.950
	(1.027)
Observations	72,280

Notes: also included are 21 occupation categories, 15 industry categories, 4 geographic regions, and 20 years/waves from 1997 to 2021.

[a] Compensation from at least one of tips, commissions, bonuses, incentives, or "other".

Table 2: Pooled Cross-section

	OLS voluntary quits for any reason Pooled cross-section				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Performance pay	-0.013***	-0.012***	-0.018***	-0.020***	-0.015***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Male	-0.022***	-0.024***	-0.018***	-0.016***	-0.016***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Black	0.030***	0.021***	0.018***	0.017***	0.009***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Hispanic	0.009***	-0.003	-4.15×10^{-4}	-0.001	-7.95×10^{-4}
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Age	-0.030***	-0.019***	-0.010**	-0.010**	-0.010***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Age squared/100	0.041***	0.025***	0.013**	0.014**	0.015**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
High school degree		-0.039***	-0.026***	-0.025***	-0.023***
		(0.004)	(0.004)	(0.004)	(0.004)
College degree		-0.054***	-0.029***	-0.020***	-0.020***
		(0.004)	(0.004)	(0.005)	(0.005)
Married		-0.005*	0.006**	0.009***	0.012***
		(0.003)	(0.003)	(0.003)	(0.003)
Children		0.006***	0.006***	0.006***	0.006***
		(0.001)	(0.001)	(0.001)	(0.001)
Tenure in weeks			-4.10×10^{-4}***	-3.82×10^{-4}***	-3.97×10^{-4}***
			(1.54×10^{-5})	(1.54×10^{-5})	(1.55×10^{-5})
Tenure squared/100			3.49×10^{-5}***	3.28×10^{-5}***	3.41×10^{-5}***
			(1.83×10^{-6})	(1.83×10^{-6})	(1.83×10^{-6})
Public employer			-0.009**	-0.010***	-0.008**
			(0.004)	(0.004)	(0.004)
Big workplace			-0.020***	-0.019***	-0.020***
			(0.002)	(0.002)	(0.002)
Union member			-0.005*	-0.002	-0.002
			(0.003)	(0.003)	(0.003)
Log hourly wages				-0.031***	-0.026***
				(0.002)	(0.002)
Weekly work hours				1.81×10^{-4}**	2.02×10^{-4}**
				(9.39×10^{-5})	(9.13×10^{-5})
Job satisfaction					-0.031***
					(0.001)
Years/waves (20)	Yes	Yes	Yes	Yes	Yes
Regions (4)	No	Yes	Yes	Yes	Yes

Industries (15)	No	No	Yes	Yes	Yes
Occupations (21)	No	No	Yes	Yes	Yes
Constant	0.597***	0.450***	0.268***	0.469***	0.562***
	(0.047)	(0.048)	(0.048)	(0.050)	(0.050)
Observations	72,280	72,280	72,280	72,280	72,280
R-squared	0.032	0.037	0.056	0.059	0.070

Notes: standard errors in parentheses; ***, **, & * reflect statistical significance at the 1%, 5%, and 10% levels, respectively. Heteroskedastic robust standard errors are clustered at the individual level.

Table 3: Individual Fixed Effects

| | OLS voluntary quits for any reason | | | | |
| | Fixed effects | | | | |
	(1)	(2)	(3)	(4)	(5)
Performance pay	-0.005*	-0.005*	-0.013***	-0.015***	-0.012***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Age	-0.008	-0.008	-1.98×10^{-4}	2.09×10^{-4}	0.001
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Age squared/100	0.043***	0.043***	0.028***	0.028***	0.028***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
High school degree		0.019***	0.021***	0.020***	0.022***
		(0.006)	(0.006)	(0.006)	(0.006)
College degree		-0.010	0.005	0.010	0.007
		(0.008)	(0.008)	(0.008)	(0.008)
Married		0.018***	0.021***	0.024***	0.024***
		(0.004)	(0.004)	(0.004)	(0.004)
Children		0.003**	0.003**	0.003**	0.004***
		(0.001)	(0.001)	(0.001)	(0.001)
Tenure in weeks			-6.81×10^{-5}***	-4.79×10^{-5}***	-8.40×10^{-5}***
			(1.56×10^{-5})	(1.55×10^{-5})	(1.57×10^{-5})
Tenure squared/100			1.08×10^{-5}***	9.13×10^{-6}***	1.13×10^{-5}***
			(1.58×10^{-6})	(1.57×10^{-6})	(1.58×10^{-6})
Public employer			-0.013**	-0.014**	-0.010
			(0.006)	(0.006)	(0.006)
Big workplace			-0.017***	-0.016***	-0.017***
			(0.003)	(0.003)	(0.003)
Union member			-0.006	-0.004	-0.003
			(0.004)	(0.004)	(0.004)
Log hourly wages				-0.032***	-0.027***
				(0.003)	(0.003)
Weekly work hours				2.68×10^{-4}**	3.08×10^{-4}**
				(1.12×10^{-4})	(1.11×10^{-4})
Job satisfaction					-0.033***
					(0.002)
Years/waves (20)	Yes	Yes	Yes	Yes	Yes
Regions (4)	No	Yes	Yes	Yes	Yes
Industries (15)	No	No	Yes	Yes	Yes
Occupations (21)	No	No	Yes	Yes	Yes
Constant	0.246***	0.232***	0.082	0.277***	0.363***
	(0.080)	(0.080)	(0.082)	(0.084)	(0.084)
Observations	72,280	72,280	72,280	72,280	72,280
R-squared	0.019	0.018	0.029	0.033	0.045

Notes: standard errors in parentheses; ***, **, & * reflect statistical significance at the 1%, 5%, and 10% levels, respectively. Heteroskedastic robust standard errors are clustered at the individual level.

Table 4: Alternative Specifications of Performance Pay

	Disaggregated performance pay		Performance pay intensity	
	Cross-section	Fixed Effects	Cross-section	Fixed Effects
	(1)	(2)	(3)	(4)
Tips	-0.017***	-0.017***		
	(0.006)	(0.007)		
Bonuses	-0.012***	-0.009***		
	(0.003)	(0.003)		
Commissions	-0.012**	-0.013*		
	(0.005)	(0.007)		
Incentive pay	-0.005	0.001		
	(0.005)	(0.005)		
Other	-0.006	-0.019		
	(0.011)	(0.012)		
Low perf pay intensity			-0.014***	-0.011***
			(0.003)	(0.004)
Med perf pay intensity			-0.005	-0.005
			(0.004)	(0.005)
High perf pay intensity			-0.019***	-0.015***
			(0.004)	(0.004)
Constant	0.561***	0.364***	0.561***	0.364***
	(0.050)	(0.084)	(0.050)	(0.084)
Observations	72,280	72,280	72,280	72,280

Notes: standard errors in parentheses; ***, **, & * reflect statistical significance at the 1%, 5%, and 10% levels, respectively. Heteroskedastic robust standard errors are clustered at the individual level. Years (20), regions (4), industries (15), occupations (21), and all other controls in tables 1 and 2 are included. Low perf pay intensity = 1 if perf pay as a proportion of total compensation is less than 10%. Med perf pay intensity = 1 if the proportion of total compensation is between 10% and 25%. High perf pay intensity = 1 if more than 25%.

Table 5: Individual Fixed Effects: Workplace Size Heterogeneity

| | OLS voluntary quits for any reason Fixed effects | | | |
	Big workplace	Small workplace	Simple interaction	Full interaction expansion
	(1)	(2)	(3)	(4)
Performance pay	-0.006*	-0.016***	-0.017***	-0.017***
	(0.004)	(0.005)	(0.004)	(0.004)
Big workplace	-----	-----	-0.020***	-0.060
	-----	-----	(0.003)	(0.110)
Big workplace X Performance pay	-----	-----	0.010*	0.011*
	-----	-----	(0.005)	(0.006)
Constant	0.272**	0.370***	0.362***	0.393***
	(0.120)	(0.133)	(0.084)	(0.102)
Observations	34,370	37,910	72,280	72,280

Notes: standard errors in parentheses; ***, **, & * reflect statistical significance at the 1%, 5%, and 10% levels, respectively. Heteroskedastic robust standard errors are clustered at the individual level. Individual fixed effects are included throughout. Years (20), regions (4), industries (15), occupations (21) and all controls from tables 1 and 2 are included. Only "Performance pay" is interacted with "Big workplace" in column 3. All variables are interacted with "Big workplace" in column 4.

Appendix Table 1: Robustness Check – Removing Involuntary Job-leavers

	Fixed Effects		
	(1)	(2)	(3)
Performance pay	-0.014***		
	(0.003)		
Tips		-0.020***	
		(0.007)	
Bonuses		-0.010***	
		(0.003)	
Commissions		-0.012*	
		(0.007)	
Incentive pay		3.17×10^{-4}	
		(0.006)	
Other		-0.021*	
		(0.012)	
Low perf pay intensity			-0.011***
			(0.004)
Med perf pay intensity			-0.005
			(0.005)
High perf pay intensity			-0.018***
			(0.005)
Constant	0.424***	0.424***	0.425***
	(0.088)	(0.088)	(0.088)
Observations	68,977	68,977	68,977

Notes: standard errors in parentheses; ***, **, & * reflect statistical significance at the 1%, 5%, and 10% levels, respectively. Heteroskedastic robust standard errors are clustered at the individual level. Years (20), regions (4), industries (15), occupations (21), and all other controls in tables 1 and 2 are included. Low perf pay intensity = 1 if perf pay as a proportion of total compensation is less than 10%. Med perf pay intensity = 1 if the proportion of total compensation is between 10% and 25%. High perf pay intensity = 1 if more than 25%. All observations reporting involuntary job loss are removed from the sample. The quit dependent variable proportion thus increases to 0.099.